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Retraction

Retracted: Analysis of the Impacts of Health Cost and Risk Preference on Farmers' Protective Behavior of Pesticide Application Based on the Autoregressive Threshold Model: A Case Study of Wuhu City in China

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] S. Cai, Y. Gu, R. Li, and Z. Teng, "Analysis of the Impacts of Health Cost and Risk Preference on Farmers' Protective Behavior of Pesticide Application Based on the Autoregressive Threshold Model: A Case Study of Wuhu City in China," *Journal of Function Spaces*, vol. 2022, Article ID 9047754, 9 pages, 2022.

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Research Article

Analysis of the Impacts of Health Cost and Risk Preference on Farmers' Protective Behavior of Pesticide Application Based on the Autoregressive Threshold Model: A Case Study of Wuhu City in China

Shukai Cai,[1] **Yaxing Gu**,[1] **Runze Li**,[1] **and Zhonghong Teng**[2]

[1]*Department of Economic and Management, Anhui Polytechnic University, Wuhu, Anhui 241000, China*
[2]*Department of Physical Education, Anhui Polytechnic University, Wuhu, Anhui 241000, China*

Correspondence should be addressed to Zhonghong Teng; tengzhonghong@ahpu.edu.cn

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This paper is aimed at investigating the impacts of health cost and risk preference on farmers' protective behavior of pesticide in a case study of Wuhu city in China. Based on the field survey data from 523 farmers in the main grain-producing areas, the cost of illness (COI) method was employed to quantitatively measure the health cost (HC) of pesticide application, the Likert scale was used to measure the risk preference (RP) of pesticide applicators, and the autoregressive threshold model was used to test the impact of health cost and risk preference on farmers' protection behavior in the process of pesticide application. The key findings of this research case study reveal that when the health cost and risk preference are both lower than the critical value ($HC \leq 107.235$, $RP \leq 3$), the health cost does not affect improving the protection level of farmers in the process of pesticide application. However, when the risk preference exceeds the critical value ($RP > 3$), and the health cost exceeds a certain critical value ($HC > 107.235$), they have a significant positive effect on improving the protection level of farmers in the process of pesticide application. High health cost combines with higher risk preference ($HC > 107.235$, $RP > 3$) which can significantly improve the protection level of farmers in the process of pesticide application.

1. Introduction

China is one of the largest pesticide producer and consumer country in the world. Zivin [1] found that pesticide application can not only control the yield loss caused by diseases and insect pests but also cause negative effects on the health of the pesticide applicator and increase the risk of pesticide exposure if the protective measures are not standardized or is unsatisfactory. A recent report published by the World Health Organization (WHO) and United Nations Environmental Programme (UNEP) [2] estimated that there are 1 million human pesticide-poisonings each year in the world, with approximately 3,500 deaths. The most common health effects associated with pesticide exposure include headaches, skin and eye problems, salivation, hormone disruption, and loss of consciousness (see for instance [3–9]). Luckily, the health effects of pesticides can be minimized among farmers and other pesticide operators by protection behavior such as the use of face masks, goggles, gloves, hats, protective clothing, and boots.

Previous research study has suggested that farmers' protective behavior of pesticide application is mostly affected by age, gender, education, household characteristics, policy characteristics, and governmental regulations (see for instance [9–13]). Recently, Wang et al. [14] have given significant attachment to the role of health cost of spraying pesticides and the farmer's risk preference. Akter et al. [8] investigates that there exists a large gap between the knowledge of potential pesticide risks, and pesticide application. Salzsar and Rand [15] found that more risk-averse farmers use less pesticide. Farmers' perceptions of the risks in human health posed by pesticides, which can decrease their pesticide expenditure, and their risk attitude is the main factor of farmers' pesticide application behavior (see for instance [16–21]). Gong et al. [22] have found that risk aversion significantly increases pesticide use. Bagheri et al. [23] concluded that farmers' knowledge of pesticide use as well as their attitudes and perceptions concerning risks and safety play a crucial role in safe spraying operations in farms. However, the existing literature paid less attention to the influence of both health cost and risk preference on farmers' pesticide application behavior. Farmers who have paid higher health costs and have stronger risk awareness are more likely to realize the negative health effects caused by pesticide application and may use more personal protective equipment (PPE) to reduce pesticide exposure, thus reducing health costs. Existing studies have studied the impact of health cost and risk preference on farmers' protective behavior, respectively. But they have not yet seen the impact of health cost and risk preference on farmers' protective behavior within a unified analytical framework. In addition, numerous researchers have not taken note that the impact of health cost and risk preference on farmers' protective behavior may be nonlinear, in case they exceed a certain threshold limit, it will have a significant impact.

In this case study, we employed the panel threshold model to empirically examine the health costs and risk preferences of rice farmers. The nonlinear effects of health cost and risk preference on farmers' protective behavior were investigated with the help of econometric estimations. The results show that farmers pay high health costs in the process of pesticide application. However, the health costs of farmers have an impact on the level of self-protection in the process of pesticide application, only when the health cost exceeds a certain critical value. Also, it has a significant and positive effect on improving the level of prevention and protection of farmers in the process of pesticide application. In addition, the health cost enlarges the protection level difference in the process of pesticide application. However, if a high health cost is combined with the higher risk preference of farmers, the gap of protection level in the process of pesticide application can be significantly enlarged, which plays a synergistic role. This study will help to further explore the influence of health cost and risk preference on farmers' protective behavior. The findings of this paper is of great significance to further take comprehensive measures to reduce the health cost of pesticide application.

Finally, the paper structure is ordered as follows: the first section of this paper is the Introduction, we investigate the impacts of health cost and risk preference on farmers' protective behavior of pesticide; Section 2 presents data and empirical analysis, where qualitative survey-based questionnaire data were collected from 523 participants; Section 3 discusses the empirical model selection and its suitability in our study; finally, we compare our output with other related studies and examine the policy implications on the impacts of health cost and risk preference on farmers' protective behavior of pesticide in Wuhu city.

2. Data Sources and Empirical Analysis

2.1. Data Sources. The data sample used in this paper is obtained by the random survey questionnaire distributed among the students who were studying at Anhui Polytechnic University. Before conducting the survey, the authors followed the essential prerequisites in the preparation of questionnaire design. As first, we carefully consider the survey main content and designed the questionnaire with the help of relevant field experts and previous literature review. In November 2014, the authors conducted a presurvey which focuses on group interviews in Yijiang Town, Nanling County, Wuhu City, and Anhui Province. The relevant field farmers' information were obtained in face-to-face interview, and later on the questionnaire was modified for the reason of reducing the psychological pressure of the interviewees. The formal survey was launched in February 2015, with the main pesticide application season-ending, which helps farmers to memorize the year's pesticide use. Most of the respondents were farmers, and 98% of them were householders. The questionnaire included different variety of questions such as the criteria of farmers, age group, education level, pesticide spraying information, and health cost of pesticide application. A total of 600 questionnaires were distributed in the formal survey, where we received a total of 556 responses from the participants with a retrieval rate of 91 percent. Overall, after we carefully scrutinized all the questionnaires, we found that 523 of them were valid, and the effectiveness ratio of the survey was 94.065 percent. Moreover, after the completion of the questionnaire, a compensation of about 20 yuan was given to each participant which is equivalent to 1/5 of the local daily wage with the purpose of improving and maintaining the enthusiasm of the interviewees and the quality of the survey.

2.2. Personal Protective Measures and Hygiene. The pesticides frequently used by the surveyed sample farmers include chlorpyrifos, chlorpyrifos benzamide, thiazide, imidacloprid, thiamethoxam, benzamide, propylphos, abamectin, BT emulsion, trichlorfon, and rice blast. Many farmers stated that when spraying pesticides, they consider a various number of protective measures such as avoid spraying pesticides during wind, smoking, taking a bath after spraying pesticides to reduce the harmful impact of pesticide application on health; however, the survey shows that farmers do not use enough protective measures when using pesticides. None of the farmers in the survey used special protective measures such as cloths, masks, gloves, hats, and goggles. The expenditure on protective equipment were mostly not mentioned in the survey by the participants. This shows that farmers more likely do not considering the importance and the need to use protective equipment. A relatively small number of farmers take precautions such as wearing masks, but this number is far less than the expectations of the survey. On the other hand, the survey finds that the proportion of farmers who wear gloves in the sample is not satisfactory. Many farmers reflect that wearing gloves will affect the efficiency of pesticide application. Others stated that farmers do not use protective measures because of discomfort, social interaction, limited number of equipment, the supply of equipment availability constraints, and cost constraints. The survey found that the protective measures taken by farmers in the process of preparing pesticide application are limited with an average value of 3.122 percent. More protective measures are adopted, including wearing long sleeve coat and trousers, washing hands, and bathing after spraying (see Table 1).

2.3. The Health Cost of Pesticide Application on Farmers. The health cost measurement methods of pesticide application mainly include the cost of illness method (COI), willingness to pay method (CVM), and prevention cost method (see for instance [24–27]). Although CVM can be used to measure the health cost comprehensively with lower cost, it also bears a lot of criticism, because the interviewees often ignore the constraints of real market conditions when expressing their willingness to pay (see for instance [28]). However, due to the integrity of data acquisition, the preventive cost method can only capture part of the health cost, which limits its application. Therefore, this paper mainly uses the disease cost method to calculate the health cost of pesticide application. Based on the observation of objective behavior and real market, the (COI) method has been widely used, which helps to measure the health cost of pesticide application relatively completely and objectively. In this paper, we use a number of econometric techniques to calculate the health cost of pesticide application, mainly including the medical cost of sensitive poisoning caused by pesticide exposure and the lost labor time. Specifically, it includes several expenditures such as: (1) the medical expenditure, transportation expenditure, and accompanying expenditure of family members in hospitals and private clinics; and (2) waiting time, treatment time, and the opportunity cost of being unable to work caused by illness. This study does not calculate the cost of chronic diseases, pain and discomfort, family care costs, and intentional pesticide poisoning.

In this paper, the health cost of pesticide application on farmers measured by the (COI) method is shown in Table 2. The total health cost is 91.846 yuan per year per person, of which the direct monetary expenditure is 48.587 yuan per year per person, including medical expenses of 36.26 3 yuan per year per person and transportation expenses of 12.325 yuan per year per person, while the opportunity cost of time loss is 43.265 yuan per year per person.

3. Effects of Health Cost and Risk Preference on Pesticide Application Behavior

3.1. Model Specification and Selection. The previous analysis shows that there are significant differences in the self-protection of the pesticide application process with different health costs and risk preferences in some places. One question is, how much impact does it have on farmers' self-protection behavior in the process of pesticide application? Considering that the relationship between health cost, risk preference, and farmers' self-protection behavior in the process of pesticide application is nonlinear, there is a complex mechanism of health cost and risk preference on farmers' self-protection behavior in the process of pesticide application. There is a certain threshold value of health cost and risk preference when the health cost and risk preference are lower than the threshold value, the impact on farmers' self-protection behavior in the process of pesticide application presents a relationship, when the threshold value is higher it presents another relationship.

Moreover, to analyze the internal relationship between the phenomena more accurately, we established a threshold autoregressive model to test the nonlinear relationship between health cost, risk preference, and farmers' self-protection behavior in the process of pesticide application.

The threshold model divides the model into two or more intervals (also known as a regime). According to the threshold value and different equations which express each interval with the help of the threshold model, it is helpful to capture the zero point or critical value where the interval may occur, which is different from the Chow test of subjective exogenous setting structural mutation points, the "threshold model" divides the interval according to the characteristics of the data themselves. In addition to the decent characteristics of the general econometric model, it can also capture the threshold effect in the economy. From one threshold model setting to a multi-threshold model setting, one threshold model is extended to a multithreshold model setting $y_{it} = \mu_i + \beta_1 x_{it} I(q_{it} \le \gamma) + \beta_2 x_{it} I(q_{it} > \gamma) + e_{it}$, $I(\cdot)$ as an indicative function, the observation value q_{it} is divided into two intervals according to whether the threshold variable is greater than or less than the threshold value γ, the observation value is divided into two intervals, when the minimum sum of squares of residual errors $S_1(\gamma)$ is searched, the corresponding threshold is the optimal estimation value $\widehat{\gamma} = \arg\min S_1(\gamma)$. The cross-sectional threshold model involves two hypothesis tests: (1) test whether the threshold effect exists and (2) test whether the estimated threshold values are equal to the true values. In the first test $H_0 : \beta_1 = \beta_2$, the alternative hypothesis is $H_1 : \beta_1 \ne \beta_2$, the statistics $F_1 = (S_0 - S_1(\widehat{\gamma}))/(\widehat{\sigma}^2)$ do not meet the standard distribution, and the bootstrap method is used to obtain the critical value of the approximate distribution. The second test $H_0 : \gamma = \widehat{\gamma}$, statistics are $LR_1(\gamma) = (S_1 - S_1(\widehat{\gamma}))/(\widehat{\sigma}^2)$. For the case of multiple thresholds, the model is set as follows:

$$y_{it} = \mu_i + \beta_1 x_{it} I(q_{it} \le \gamma_1) + \beta_2 x_{it} I(\gamma_1 < q_{it} \le \gamma_2) + \beta_3 x_{it} I(q_{it} > \gamma_2) + e_{it}. \quad (1)$$

Search the minimum residual square sum of the second threshold $S_2^r(\gamma_2)$, corresponding to the second threshold value $\widehat{\gamma}_2^r = \arg\min S_2^r(\gamma_2)$. Observe whether the two thresholds are significantly different through the following statistics: $F_2 = (S_1(\widehat{\gamma}) - S_2^r(\widehat{\gamma}_2^r))/(\widehat{\sigma}^2)$, if F_2 is significant, it indicates that there is a second threshold, and then continue to search for the third threshold, and so on, until the last hypothetical threshold is not significant. Threshold variables can be exogenous variables or explanatory variables in the model. The results obtained by this threshold regression method can fit the data more accurately and precisely than

Table 1: Personal protective measures and hygiene.

Protective measures and hygiene	Wear long-sleeved coat	Wear trousers	Wear hat	Wear gloves	Wear mask	Avoid spraying pesticide during the wind	Wash hands	Taking bath
Proportion	90.249	87.381	37.476	17.017	9.560	47.419	87.381	91.587

Table 2: Farmers' health costs of pesticide application.

Variable	Maximum	Minimum	Mean
Direct monetary expenditure (yuan)	620.236	0	48.587
Medical expenses (yuan)	450.762	0	36.263
Transportation expenses (yuan)	85.689	0	12.325
The lost time cost (yuan)	320.829	0	43.265
The total time lost (hours)	48.348	0	5.624
Time opportunity cost (yuan/hour, with nonagricultural income)	15.894	0	8.215
Time opportunity cost (yuan/hour, without nonagricultural income)	12.543	0	3.092
Total health cost (yuan/year)	705.093	0	91.846

Note: (1) When calculating the rest time, if the farmer is hospitalized, we calculate it by 10 hours a day. (2) Considering that the calculation of the opportunity cost of time is mainly based on the income of farmers working every day, while the working hours of farmers are generally 10 hours a day, we use the daily income/10 hours when calculating the opportunity cost per hour; we use the annual average income/365 days/10 hours to calculate the opportunity cost of farmers without working income.

the ordinary regression model, especially when there is a nonlinear relationship between the explanatory variable and the response variables. The equation of the influence of health cost on farmers' behavior of pesticide application and protection measures are set as follows:

$$\mathrm{AMT}_{it} = \theta_1 \mathrm{AEMP}_{it} + \theta_2 \mathrm{AEMP}_{it}^2 + \beta_1 \mathrm{HC}_{it}(\mathrm{IND}_{it} \leq \gamma_1) + \beta_2 \mathrm{HC}_{it}(\gamma_1 < \mathrm{IND}_{it} \leq \gamma_2) + \beta_3 \mathrm{HC}_{it}(\mathrm{IND}_{it} > \gamma_2) \tag{2}$$

The number of protective measures taken by (AMT) was used to reflect the difference in self-protection measures of different farmers. (HC) is the health cost of pesticide application for farmers. Moreover, to avoid the endogeneity between variables, this paper uses the health cost of pesticide application in the previous year as the value to measure the health cost of farmers. AEMP is the risk preference of farmers. γ represents the threshold. It should be noted that farmers' risk awareness is a dummy variable that cannot be directly measured. Therefore, this paper uses the Likert scale to indirectly measure the level of farmers' risk awareness. Although this method is slightly rough, however it has been proved by numerous research studies which is simple and effective.

3.2. Estimated Results. In the first round of threshold regression, the LM value and bootstrap p value of health cost (HC) as threshold variable accounted for 115.635 and 0.000, respectively; LM value and bootstrap p value of risk preference (RP) as threshold variable accounted for 97.723 and 0.000, respectively. The results show that the health cost and risk preference are likely to be the threshold variables influencing the self-protection level of farmers in the process of pesticide application at the significance level of 5%. Therefore, the health cost (HC) with a larger LM value is selected as the initial threshold grouping index. The results show that the p value of the heteroskedasticity test is 0.062, and the original hypothesis of homovariance could not be rejected. Therefore, the outcomes show that there is no heteroskedasticity, and the estimation results of the model are acceptable. Afterwards, we take "social capital HC" as the threshold variable and the likelihood ratio sequence statistic LRN (R) as the threshold function. The estimated threshold value is 107.235. 326 samples fall into the low health cost group (HC ≤ 107.235), and 197 samples fall into the high health cost group. No samples fall on the confidence interval [107.235, 107.235], therefore, we can divide the samples into two groups: the low health cost group 1 (HC ≤ 107.235) and the high health cost group 2 (HC > 107.235).

After the first round of threshold regression, the second round of threshold regression was performed for the low health cost group (HC ≤ 107.235) and the high health cost group (HC > 107.235). In the low health cost group, the LM and bootstrap p values of the two threshold variables were obtained as follows: health cost HC (18.653,0.004) and risk preference HC (21.968,0.000). Therefore, the risk preference RP with a lower bootstrap p value was selected as the threshold variable of the second grouping. The results show that the test p value of heteroskedasticity is 0.160, thus, we cannot reject the hypothesis of heteroskedasticity. The result indicates that there is no heteroskedasticity existing between the selected variables. Afterwards, we use "risk preference RP" as the threshold variable and the likelihood ratio sequence statistic LRN (R) as the threshold function, and the estimated threshold value γ is 3. With the risk preference threshold of 3, the low health cost group can be further divided into two groups: "low health cost low-risk preference group" (HC ≤ 107.235, HC ≤ 3) and "low health cost high-risk preference group" (HC ≤ 107.235, HC > 3). In these two groups, there will be no threshold (see Table 3 for detailed results).

Table 3: Threshold test with "risk preference RP" as threshold variable in the low health cost group.

	HC ≤107.235			HC ≤107.235 RP ≤3 Low health cost - low-risk preference			HC ≤107.235 RP>3 Low health cost - high-risk preference		
Dependent variable: Level of self-protection		Mean value 4.323			Mean value 3.481			Mean value 5.166	
Independent variable	Coefficient	Standard error	Mean value	Coefficient	Standard error	Mean value	Coefficient	Standard error	Mean value
Health costs (HC)	-0.322	0.008	72.262	-0.056	0.006	76.436	-0.056	0.154	68.812
Risk preference (RP)	-0.124	0.042	3.272	-0.265	0.084	2.127	-0.362	0.115	3.865
Observation sample size		326			192			134	
R2		0.492			0.124			0.256	

Heteroskedasticity Test (*p* value): 0. 160.

Table 4: Threshold test with "risk preference RP" as threshold variable in high health cost group.

	HC>107.235			HC>107.235 RP ≤3 High health cost - low-risk preference			HC>107.235 RP>3 High health cost - high-risk preference		
Dependent variable: Level of self-protection		Mean value 5.643			Mean value 5.213			Mean value 6.726	
Independent variable	Coefficient	Standard error	Mean value	Coefficient	Standard error	Mean value	Coefficient	Standard error	Mean value
Health costs (HC)	-0.096	0.008	112.863	-1.077	0.0695	132.744	-2.361	0.164	109.626
Risk preference (RP)	-0.514	0.065	3.052	-0.156	0.856	2.614	-1.365	0.325	3.986
Observation sample size		197			105			92	
R2		0.654			0.366			0.621	

Heteroskedasticity Test (p value): 0. 236.

It can be seen from Table 3 that 326 samples fall into the low health cost group (HC ≤ 107.235), and the average protection level of farmers during pesticide application is 4.323. According to the actual investigation, although many of these farmers know that pesticides are harmful to the human body, they have less knowledge and understanding about pesticide contact path, especially the impact of pesticide application on health. The findings reveal that these farmers have little knowledge about how to sensibly avoid and reduce pesticide vulnerability. In the process of pesticide application, they do not attach importance to the protection measures. They mainly wear long trousers and long sleeves. The proportion of farmers who wear hats, gloves, and masks is low, and the protective measures are simple.

By comparing the average values of protection level, health cost, and risk preference in the application process of the "low health cost low-risk preference group" and the "low health cost high-risk preference group", we can find that the average health cost in the "low health cost low-risk preference group" is 76.436. The average value of health cost in the "low health cost high-risk preference group" is 68.812, and in the "low health cost low-risk preference group" it is 2.127, which is significantly lower than that of the "low health cost high-risk preference group", which was 3.865. In contrast, in the average protection level of the two groups, it can be found that the average protection level of the "low health cost low-risk preference group" is 3.481, which is significantly lower than that of the "low health cost high-risk preference group," which is 5.166. This phenomena shows a problem such as health cost has an integration and synergistic effect on individual risk preference, and health cost must rely on risk preference. Comparing the results of the two groups, when the health cost and risk preference are lower than the critical value, the health cost has no positive effect on improving the protection level of farmers in the process of pesticide application, while when the health cost is unchanged and the risk preference exceeds the critical value, the health cost plays a positive role in improving the protection level of farmers in the process of pesticide application.

The second round of threshold regression was carried out for the high health cost group (HC > 107.235), and the heteroskedasticity test p value was 0.227, and the homovariance hypothesis could not be rejected. Thus there was no heteroskedasticity between the selected variables. Moreover, two threshold regression analyses, LM and bootstrap p value health cost variable (48.270, 0.0000) risk preference (67.101, and p value 0.000), respectively, indicate that in the high health cost group, risk preference becomes the threshold variable for further grouping. Afterwards, we take "risk preference RP" as the threshold variable, and "likelihood ratio sequence statistic LRN (R)" as a threshold function, and the estimated threshold value γ is consistently 3. Therefore, the high health cost group can be further divided into two groups: the "high health cost low-risk preference" group 1 (HC > 107.235, RP ≤ 3) and the "high health cost high-risk preference" group 2 (HC > 107.235, RP > 3).

According to Table 4, the protection level of farmers in the high health cost group is 5.643, which is significantly higher than 4.323 in the low health cost group. Comparing the average values of protection level, health cost, and risk preference in the process of pesticide application between the "high health cost low-risk preference group" and the "high health cost high-risk preference group", we can find that the average health cost in the "high health cost low-risk preference group" is 132.744, which is significantly higher than 109.626 in the "high health cost high-risk preference group". However, the average risk preference in the "high health cost low-risk preference group" is 2.614, which is significantly lower than that in the "high health cost high-risk preference group" which is 3.986. The direct result is that the self-protection level of farmers in the "high health cost low-risk preference group" is 5.213, which is significantly lower than that in the "high health cost high-risk preference group" in the process of pesticide application. This shows two key issues, first, when the health cost exceeds a certain critical value (HC > 107.235), it has a significant positive effect on improving the protection level of farmers in the process of pesticide application, and health cost is an important factor to enlarge the gap of protection level in the process of pesticide application. Second, high health costs combined with higher risk preference can significantly improve the protection level gap in the process of pesticide application and play a synergistic effect.

4. Conclusion

Based on the field survey data from 523 farmers in the main grain-producing areas, this study found that the impact of health costs and risk preference on farmers' protective measures is nonlinear when the health cost and risk preference are both lower than the critical value (HC ≤ 107.235, RP ≤ 3). On the other hand, the health cost does not affect improving the protection level of farmers in the process of pesticide application when the risk preference exceeds the critical value (RP > 3). The health cost plays a positive role in improving the protection level of farmers in the process of pesticide application when the health cost exceeds a certain critical value (HC > 107.235), it has a significant positive effect on improving the protection level of farmers in the process of pesticide application. Additionally, the increasing health cost combines with higher risk preference (HC > 107.235, RP > 3), which can significantly improve the protection level of farmers in the process of pesticide application.

There are several number of policy implications proposed in this paper. Firstly, it is essential to strengthen the publicity of health accidents in the process of pesticide application, because the health cost needs to reach a certain level or beyond a certain threshold value. The simple publicity of the negative effects of pesticides may not achieve the desired effect where more comprehensive measures should be taken. In addition, to improve the effect of publicity, the decision makers should focus on the publicity of increasing health cost accidents in the process of pesticide application. Secondly, this study shows that the combination of high health cost and high-risk preference will significantly change the behavior of farmers. Therefore, it is important to improve farmers' risk attitude and enhance their awareness of safe production through publicity. It is very necessary to make full use of new media such as TikTok and WeChat to publicize the health impact of pesticide exposure, improve the safety awareness of farmers, focus on how to use protective equipment, and especially publicize some typical adverse impact events caused by pesticide exposure. At the same time, regular training on pesticide application technology is provided for farmers to improve their mastery of pesticide application methods and pesticide application interval and understand the pesticide exposure risks caused by different pesticide application behaviors. Thirdly, more comprehensive measures should be taken to reduce the negative health effects of pesticide application. If the research provides more suitable and comfortable personal protective equipment, the personal protective equipment will be subsidized. Fourthly, due to the small scale and decentralized characteristics of agricultural production in China, the negative impact of pesticide application on publicity, government supervision, and policy implementation costs is significant. Our findings can gradually change farmers' decentralized self-control and self-control traditional ways by constantly improving the agricultural social service system, and improve the professionalism of pest control.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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