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Examining the Effects of Environmental Knowledge and Health Insurance Coverage on Health Status

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Abstract: Rural women in developing nations are especially vulnerable to higher health risks due to environmental pollution exposure and are more likely to experience poorer health outcomes. Using data from the 2013 China General Social Survey CGSS2013, this study empirically examined the relationship among environmental knowledge (EK), pollution, health investment (i.e., holding and purchasing a public health insurance policy, engaging in frequent physical activity, and acquiring commercial insurance), and health status. The sample was composed of 1930 women residing in rural regions in China. Three main research questions are investigated: whether environmental knowledge affects health investment and health status, whether health investments impact health status, and whether the relationship between environmental knowledge and health status is mediated by health investment. Our results showed that the level of EK for women in rural China significantly impacted their self-reported physical and mental health. To account for potential endogeneity due to mutual causality, this study employed television usage and network usage as two instrumental variables (IVs) of EK and used an IV-probit method. Additionally, we estimated a model that replaced health status with the variable Body Mass Index (BMI) to assess the reliability and robustness of our results. The results were consistent, providing evidence of robustness. Additionally, we examined the relationship between health investment (holding and purchasing a public health insurance policy, engaging in frequent physical activity, and acquiring commercial insurance) and health status. Our results indicated that the level of EK had no significant impact on participating in the new rural cooperative medical system. However, the preference for purchasing commercial insurance was positively impacted by EK, though it did not directly affect health status. Conversely, an increase in EK and pollution was associated with a greater likelihood of engaging in physical exercise, which, in turn, improved overall mental health.

Keywords: mental health; pollution; rural women; China; health investments; ecological knowledge

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1. Background

As a critical source of human capital investment, health plays a vital role in human development and improves human well-being [1–4]. However, over the past few decades, China has suffered heavy environmental pollution due to rapid economic growth and relaxed environmental protection policies. The resulting ecological deterioration has yielded negative monetary impacts and abundant non-monetary losses, such as residents' physical and mental health and human capital damages via multiple channels concerning water, land, and air [5–8]. For example, air pollution data from the Ministry of Ecology and Environment of China suggested that 338 cities experienced heavy pollution for 2311 days in 2017. Only 27.2% of these cities reached the standard of good air quality. Moreover, a report by the World Health Organization (WHO) in 2016 stated that about 140 out of every 100,000 people in China died from ambient and household air pollution. This is

consistent with numerous field and lab experiments that have confirmed environmental pollution as one of the critical reasons for the continuous deterioration of human health and mortality [9,10]. Despite enacting national and local environmental policies to improve the well-being of communities, environmental pollutants continue to threaten the health of urban and rural residents in China [11].

1.1. Rural Women in Farming

Over the past decade, the disparity in employment opportunities, medical services, and household income for those in rural areas [12–15] has led to a migration of male farmers—particularly young and middle-aged—seeking improved employment opportunities and higher income. These in-migration dynamics strain women left in rural areas who must simultaneously provide for household public goods (e.g., caring for the elders and children) while working more frequently in agricultural production. Data from the Third National Agricultural Census of China described that over 149 million female farmers accounted for more than 47% of the total number of farmers in China by the end of 2016. Scholars have described this gender shift as "agricultural feminization" [16,17].

Female farmers have become increasingly vulnerable to exposure to farm point and non-point source pollution, such as pesticide exposure and excess fertilizers. Moreover, this cohort is more likely to be vulnerable to severe health risks and less informed about environmental health risks and knowledge than male farmers [18,19]. The National Health Commission of China revealed that chronic diseases among rural women in China increased from 13.5% to 32.3% between 2003 and 2013. Compounding this further is the inadequacy of essential medical facilities in rural areas. For example, the number of health professionals per thousand people in urban areas was 11.10 in 2019, while that of their rural counterparts was only 4.96 [20,21]. There is a gap between the supply of medical and health public goods versus the demand for such public goods in rural China [22].

1.2. Environmental Pollution and Health Risks

The extant literature indicates that those suffering from illness, regardless of income level, will likely suffer from fewer opportunities concerning welfare, freedom, and capability [12]. Moreover, those with lower health status often confront more diseases, increasing the household's financial burden and leaving some in poverty, i.e., the "health–poverty" trap [11]. In addition to these considerations, environmental pollution can bring both physical (somatic) health problems and disease and mental health problems such as depression [13]. However, fewer empirical studies have considered these two types of health problems simultaneously (e.g., [16]).

Previous studies have shown that environmental pollution increases public health risks, especially for rural residents. Such hazards include pesticide-induced nervous system disorders (e.g., seizures, headaches, and blurred vision) and skin problems; air pollution-induced respiratory (e.g., asthma, reactive airways disease, and lung cancer) and cardiovascular diseases; and heavy metal exposures leading to kidney, bone, lung, liver, and endocrinological disorders [23–28].

Compared to their urban counterparts, the per capita income for rural residents is relatively lower despite having a higher risk of medical expenditure and pension. In addition, historically, long-term investments into fundamental public health facilities in rural areas have been scarce and unequally distributed [18]. To address the increasingly severe health risks of rural residents, China's government has gradually established a series of public health systems since 2003, such as the new rural cooperative medical system (NRCMS) and the new rural social endowment insurance (NRSEI). The NRCMS is a comprehensive coverage system, covering 95% of rural residents since 2010 [5]. Many studies have demonstrated the positive effects of the NRCMS on public health. In [13], it was found that NRCMS has improved service availability and has reduced disease economic burden. However, despite these documented improvements, others have argued that NRCMS's effectiveness is not ideal and has a limited capability for reducing the

expenditures of severe diseases and the poverty induced by such diseases [19,20]. In fact, even the above-cited studies that reported on NRCMS' improvements on health have also reported their lower impacts on reducing the economic risk of illness and promoting equity in health services [13].

1.3. The Current Study

1.3.1. Purpose of the Study and Contribution to the Literature

We examined the relationships among environmental knowledge (EK), health investment, and health status of women residing in rural regions in China. This study contributes to the body of knowledge by addressing a number of limitations identified in the extant literature. Firstly, previous studies [21,22] have only assessed the impact of health investment represented by NRCMS on residents' physical and mental health from the public perspective but have not examined this relationship from a personal health investment perspective. Second, prior research on residents' health has primarily focused on adolescents, infants, middle-aged, and older people [13,29,30]. Less attention, however, has been paid to rural women. Thirdly, fewer studies have investigated the effect of EK on health outcomes [23,24,31]. Awareness and cognition are fundamental prerequisites for ensuring behavior [25]. Hence, the present study aimed to explore the relationship among EK, health investments, and health status with a sample of rural women in China and investigate the potential mediating effects of public and personal health investments.

1.3.2. Research Questions

This exploratory study empirically investigated the following research questions: (1) whether environmental knowledge affects health investments and health status, (2) whether health investment impact health status, and (3) whether the relationship between environmental knowledge and health status is mediated by health investment.

The theory of planned behavior argues that good awareness and cognition are salient prerequisites of individuals' intentions and behavior change [25]. In other words, individuals' awareness and cognition of environmental protection depend on having a certain level of knowledge of the environment [26,27,32,33]. The value-belief-norm theory also supports the notion that individuals with higher knowledge about environmental pollution may have a higher perceived ability to take pro-environmental behaviors [28,31,34–37]. Further, previous studies have found that individuals with higher educational attainment have better health and lifespans [38]. In the context of our research, we anticipated that rural women with higher EK levels would be more likely to adopt actions (i.e., make health investments) to mitigate health risks caused by environmental pollution and exhibit better health status.

Regarding the association between health investment and health status, the extant literature largely supports the positive effects of physical exercise/activity on mortality reduction, quality of life improvement, and mental health indicators [39–42]. Thus, our study hypothesized that physical exercise would positively affect physical and mental health. On the other hand, there is no consensus on whether these health investments significantly reduced health risks and health status, especially for the role of NRCMS. Some evidence showed the positive effects of NRCMS on public health and alleviating economic burden, yet more studies indicated that NRCMS might not perform well as anticipated [13,17,18]. In light of the mixed results in the literature, we refrain from making directional predictions for the association between health insurance decisions and health status. Finally, concerning the mediation effect of health investment for the EK and health status relationship, [43] found a positive correlation among health literacy, health service utilization, and health outcomes with a sample of internal immigrants in China. Their mediation analysis showed that health service utilization partially affected the association between health literacy and health outcomes. In our study, we anticipated observing a significant mediation effect.

2. Methods

2.1. Data and Sample

Data for this study came from the 2013 Chinese General Social Survey (2013CGSS), a nationally representative dataset of Chinese households [44]. CGSS datasets are publicly available and can be downloaded via http://cgss.ruc.edu.cn/ (accessed on 30 January 2023). The Chinese General Social Survey program started in 2003 and has been implemented yearly, save for 2007. The 2013CGSS employs a nationwide stratified sampling method, collecting from 11,438 urban and rural residents in 28 provinces in China. Specifically, we used the 2013 wave because it was the only year the dataset contained a set of 10 items measuring respondents' EK and questions regarding physical and mental health variables. After retrieving the dataset, we conducted several data cleaning and preparation methods. We delimited the data to the population of interest—female respondents residing in rural areas—and removed missing values for the main variables of interest—the resulting sample used for analysis comprised 1930 women in rural China.

2.2. Variables and Measures

2.2.1. Dependent Variable

The dependent variable in this study was defined as health status. Based on the literature and data availability [13,45], we divided this variable into physical and mental health. Women's physical health was measured using a five-point Likert scale question (i.e., "What is your health status?"), where 5 indicated very good health, and 1, very poor. For the purpose of this study's analysis, a dummy variable was created, where response choices "very poor" and "poor" were set as 0 ("poor physical health") and 1 ("good physical health"), otherwise. Next, we used question A17 in the 2013CGSS codebook to measure rural women's mental health. The question asked respondents about the frequency to which they have felt depressed in the last four weeks—previous studies have used similar questions as a proxy for mental health [13,46]. The question was measured using a five-point Likert scale, where a score of 5 points denoted "always," and 1 meant "never." A dummy variable was created using response choices: "often" and "always" were combined and represented "poor mental health" and otherwise denoted "good mental health".

2.2.2. Independent Variable

The current study used EK as the primary independent variable. We calculated EK scores based on women's responses to ten questions (See Appendix A for the list of questions). In terms of scoring, we assigned 1 point for correct answers, 0 for incorrect responses, and for those who selected "don't know"—this scoring process and method is informed by [47]. The sum of scores received for all ten questions generated the variable EK.

2.2.3. Covariates

Our literature review identified a set of influential physical and mental health factors among rural communities and women in particular [13,20,48,49]. For example, Ref. [50] found that climate variables (e.g., high temperature and reduced rainfall), social-demographic factors, and economic variables affected farmers' mental health in Australia. Similarly, [51] showed that rural women's physical and mental health were also determined by education and employment. This study classified covariates into three categories: personal characteristics, family characteristics, and health-related variables. The respondents' personal characteristics included age, educational attainment, and party affiliation. We hypothesized that older respondents and those with higher education would be more likely to exhibit good health [13,51]. In rural China, residents who are members of the communist party tend to show higher social status, which often translates to a better quality of life and health [52]. The second category of covariates is family characteristics. Our study uses the household income variable to describe family characteristics. Generally, higher household income denotes more healthcare choices and a higher capacity to pay medical bills [53]. We use the logarithm form for this variable to reduce the model's heteroscedasticity [54].

We anticipated that the social network would benefit women's health, especially mental health in rural China, because the more frequency of social contact with neighbors or relatives, the higher the possibility of limiting their mental problems [55,56]. Additionally, our covariates contain the variables of health investments, such as medical system participation, commercial insurance purchasing, and physical exercise [56]. The definition and descriptive statistics of variables are shown in Table 1.

Table 1. Descriptive statistics of variables.

Variables	Item (Question Number in the Codebook)	Operationalization	Number of Obs.	Mean	Standard Deviation	Min	Max
Self-reported health	In your opinion, what is your health status? (A15)	1 = very good, good, or fair; 0 = poor or very poor. Binary variable.	1930	0.748	0.434	0	1
Mental health	In the past four weeks, what frequency do you feel depressed? (A17)	1 = often or always; 0 = never, rarely, or sometimes. Binary variable	1929	0.104	0.305	0	1
Environmental Knowledge	See Appendix A for the complete list of items (B25)	Calculated by ten questions, 1 point for the correct answer, 0 points for "don't know" and wrong answer. Continuous variable.	1929	3.184	2.505	0	10
Age	What is your birthdate? (A3)	Calculated by the answer minus 2013 from respondents, Continuous variable	1930	49.336	15.462	18	90
Education level	What is your highest education level? (A7a)	High school or more = 1, less than high school = 0; Binary variable	1930	0.070	0.256	0	1
Party affiliation	What is your political status? (A10)	Party member = 1; No party member = 0; Binary variable.	1930	0.017	0.130	0	1
Household income	What was your family income in 2012? (A62)	Continuous variable.	1930	33,940.07	37,541.71	0	645,000
Family size	How many people live in your household unit? (A63)	Continuous variable.	1930	3.277	1.491	1	11
Social network	How often have you socialized in your free time in the past year? (A31)	1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always. Ordinal variable	1930	3.119	1.024	1	5
NRCMS participation	Did you or your family participate in the new rural cooperative medical system in the past year? (A61)	1 = yes; 0 = others; Binary variable	1930	0.939	0.239	0	1
Physical exercise	What is the frequency of exercise in your free time in the past year? (A30)	1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always. Ordinal variable.	1924	1.401	0.944	1	5
Commercial Insurance	Did you buy some commercial health insurance in the past year? (A61)	1 = yes; 0 = others; Binary variable	1930	0.036	0.187	0	1
Television	In the past year, what is the frequency of your television use? (A28)	1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always. Ordinal variable.	1929	4.073	0.976	1	5
Internet	In the past year, what is the frequency of your internet use? (A28)	1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always. Ordinal variable	1929	1.474	1.055	1	5
Body Mass Index	Weight and height; (A13–A14)	The ratio of weight to the square of height. Continuous variable.	1912	22.101	4.586	13.672	142.399

2.3. Model Selection

The present study aimed to explore the impacts of rural women's EK on health status in China. As such, the dependent variable is the self-reported health status of rural Chinese women, including subjective physical and mental health, and the leading independent variable is EK. In addition, we controlled for a set of covariates: household income, age, and education level. Previous studies have deemed the control variables significant health status predictors [56,57]. The multi-linear regression model can be represented as follows:

$$health_i = \alpha_0 + \alpha_1 \cdot knowledge_i + \sum \beta_i x_i + \varepsilon_i \quad (1)$$

where $health_i$ denotes the ith women's health status in rural China, which involves two dimensions, namely, self-reported health and mental health. We estimated these two variables separately; $knowledge_i$ refers to the score of the ith respondent's EK. The x_i represents a vector of control variables influencing women's health in rural China. Lastly, ε_i represents the error term for the model.

3. Results and Discussion

3.1. Descriptive Statistics

As shown in Table 1, the means of self-reported and mental health of respondents in the sample were 0.748 and 0.104, respectively. In other words, most respondents reported having good physical and mental health status. As for the variable EK, the mean was 3.184 (out of ten possible points) with a standard deviation of 2.505, indicating that female residents in rural China scored low in the environmental knowledge index. The health investment variables suggested that the majority of respondents (93.9%) in rural China had participated in the New Rural Cooperative Medical System (NRCMS), which is consistent with the participation rate provided in official governmental data [58]. Importantly, only 3.6% of respondents indicated having purchased commercial insurance. In addition, females in our samples exhibited low levels of physical exercise activities. Finally, rural women were unlikely to be party members, and their average social network was 3.119, suggesting a low involvement in social activities.

3.2. Effects of EK on Health Status among Rural Women

We hypothesized that EK, directly and indirectly, impacted rural women's physical and mental health. To empirically test such hypotheses, we employed a series of regressions. Table 2 shows the logit model results for EK and self-reported and mental health.

As expected, the results in Table 2 showed that both self-reported and mental health were positively affected by women's EK, significant at a 0.1% significance level. The marginal effects of EK on women's physical health and depression were 0.016 and −0.012, respectively. In addition, the respondents' age was negatively correlated with health status. Women's social network and household income were positively associated with self-reported and mental health and were significant at a 1% significance level. Contrary to previous findings [58,59], we found no evidence that NRCMS participation and holding commercial insurance influenced women's health in rural areas.

3.3. The Endogeneity and Robustness

3.3.1. Instrumental Variable Methods for Endogeneity

Our basic model examined the associations between EK and women's health status. However, the model did not allow for verifying causal effects for these two variables because of the potential endogeneity. Theoretically, the endogeneity of a regression model has at least three sources [60]. First, the simultaneity implies that the dependent variables (X) cause the independent variable (Y), while Y also causes X. Second, the omitted variables, or covariates related to the error term. Lastly, the measurement error. The measurement error describes the observation errors on variables or data collection errors. The data in our analysis was retrieved from the CGSS2013, a nationally representative dataset with a

rigorous sampling procedure [49,57]. The probability of measurement error in this dataset is reasonably low. Thus, the present study only focuses on the endogenous problems caused by omitted variables and simultaneity.

Table 2. The results of the basic logit regression model.

Variables	Self-Reported Health	Marginal Effects	Mental Health	Marginal Effects
Environmental knowledge	0.097 *** (0.026)	0.016 *** (0.004)	−0.139 *** (0.038)	−0.012 *** (0.003)
Age	−0.037 *** (0.004)	−0.006 *** (0.001)	0.011 * (0.006)	0.001 * (0.001)
Education level	0.325 (0.329)	0.053 (0.054)	0.020 (0.396)	0.002 (0.035)
Party affiliation	0.014 (0.447)	0.002 (0.074)	0.086 (0.623)	0.008 (0.056)
Social network	0.227 *** (0.054)	0.037 *** (0.009)	−0.214 ** (0.073)	−0.019 ** (0.007)
Physical exercise	0.096 (0.069)	0.016 (0.011)	−0.103 (0.101)	−0.009 (0.009)
NRCMS participation	−0.196 (0.257)	−0.032 (0.042)	0.085 (0.337)	0.007 (0.030)
Commercial Insurance	0.376 (0.398)	0.062 (0.065)	0.231 (0.449)	0.021 (0.040)
Log household income	0.114 ** (0.038)	0.019 ** (0.006)	−0.173 *** (0.041)	−0.015 ** (0.004)
Family size	0.062 (0.040)	0.010 (0.007)	0.049 (0.053)	0.004 (0.005)
Constant	0.687 (0.6505)	-	−0.035 (0.748)	-
Number of observations	1923		1922	
Log Likelihood	−962.448		−606.111	
Pseudo R^2	0.112		0.056	

Note: ***, **, and * indicate $p < 0.001$, $p < 0.01$, and $p < 0.05$, respectively. The numbers in brackets denote standard error. The standard error of margin effects was calculated by the delta method.

In our study, the simultaneity of rural women's EK and health status may exist, suggesting that higher EK improves women's physical and mental health. Meanwhile, women with chronic health conditions may pay more attention to the reasons related to their health (e.g., exposure to environmental pollution) and, thus, have greater awareness and knowledge of environmental issues. Likewise, our regression models may omit influential variables affecting women's health status. Hence, we employed instrumental variable (IV) methods to re-estimate the regression model and corrected the estimation bias from potential endogeneity.

The basic idea of the IV method is to find one or more reasonable IVs, which should satisfy the following properties: First, the IVs should be exogenous, indicating no correlation with the error term, ε; the second property is relevance, in other words, the IVs must be correlated with the independent variables, X [60]. Based on data availability in 2013CGSS, we used two variables as the IVs: television and internet use (see Table 1 for description). Previous research has shown that television and the internet are crucial channels for rural residents to access information about health [61]. Yet, these channels may not be directly associated with their health status. Thus, we can reasonably infer that rural women who watch television or use the internet with a higher frequency may have a higher level of EK because information related to environmental pollution can be accessed through these two channels. However, using and accessing these two communication channels do not directly determine their physical and mental health status.

The results for the estimated IV-probit model are presented in Table 3. The values of the Wald test of exogeneity were 35.17 and 6.83 for self-reported and mental health, respectively. The results were significant at the 0.1% and 1% significance levels. The results of the Wald test rejected the null hypothesis that all variables are exogenous, supporting the need to use the IV methods to correct the potentially biased results [62]. We also tested the strength of our instrument variables. The values of F-statistic were 44.03 and 44.02 for the two models, which are larger than the criteria of 10 and significant at a 0.1% significance

level. These results suggested that the IVs were valid [63]. Women's EK had significant positive effects on their self-reported and mental health. The marginal effects of EK were 0.189 and −0.065 on women's physical and mental health, respectively; these results are significant at a 0.1% level. When comparing these results with the logit model results, the effects in the IV-probit model are greater; in other words, the logit model may have underestimated the impact of EK on physical and mental health when endogeneity issues are unaccounted for [60].

Table 3. The results of the IV-probit model.

Variables	Self-Reported Health	Marginal Effects	Mental Health	Marginal Effects
Environmental knowledge	0.393 ***	0.189 ***	−0.312 ***	−0.065 ***
	(0.025)	(0.041)	(0.067)	(0.024)
Control variables	Control	-	Control	
Constant	−0.899 **		0.810	
	(0.318)	-	(0.438)	-
Wald test	35.17 ***		6.83 **	
Log-likelihood	−5199.87		−4855.51	
F statistic	44.04 ***		44.02 ***	
N	1916		1915	

Note: *** and ** indicate $p < 0.001$ and $p < 0.01$, respectively. The numbers in brackets denote standard error. We used delta methods to calculate the standard error of marginal effects and two-step methods to estimate the F-statistics.

3.3.2. Robustness Check

Prior studies showed that individuals' self-reported health might be a highly subjective measure and thus may not truly mirror respondents' health status. The mismatch between perceived health status and actual health status may lead to unreliable results and conclusions [64]. Hence, to assess the reliability and robustness of our results, we used the body mass index (BMI) variable as a proxy of health status. BMI was calculated by dividing the body mass (weight) by the square of the body height. Consistent with the definition and thresholds provided by the World Health Organization [65], we defined healthy individuals as those with BMI values between 18.5 and 23.9. Respondents with BMI values lower than 18.5 (malnourished) or higher than 23.9 (overweight and obese) were deemed unhealthy. A binary variable was created using this framework. Furthermore, considering the variables of self-reported and mental health were measured by 5-point Likert scales, we then estimated an ordered logit model to check the robustness of our results.

Table 4 provides the results of robust tests. The second and third columns of Table 4 describe the results of the ordered logit model with the dependent variable of self-reported physical and mental health measured by five-point Likert scales. The last column in Table 4 shows the results of the robust test with the dependent variable of BMI. Consistent with the basic and IV-probit model results, the robustness check models showed that EK significantly and positively affected women's health status in rural China. In other words, increased EK is associated with improved health status among women in rural China.

3.4. Further Exploration: The Mediation Effects of Health Investment

The previous sections examined the direct connections between EK and physical and mental health for women in rural China. However, these results do not capture the pathways for the effects of EK on women's health. Hence, in this section, we examined how EK may influence women's physical and mental health through the mediating effects of health investments. Individuals' environmental cognition may affect their behavior [25]. EK can increase women's cognition and awareness about environmental pollution and incidentally lead to health investment and pro-environmental behaviors [47].

Table 4. The results of the robust test.

Variables	Self-Reported Health	Mental Health	BMI Index
Environmental knowledge	0.086 *** (0.019)	−0.063 ** (0.018)	0.066 *** (0.021)
Control variables	Control	Control	Control
Number of Observations	1923	1922	1906
Log-likelihood	−2643.84	−2465.56	−1252.73
Pseudo R^2	0.066	0.025	0.015

Note: *** and ** indicate $p < 0.001$ and $p < 0.01$, respectively. The numbers in brackets denote robust standard errors.

A set of mediation models was estimated to analyze the mediating effects of health investments. This study mainly explored the mediation effects of health investments in rural China: public health investment (e.g., rural women's participation in the NRCMS) and private health investment (e.g., physical exercise and commercial medical insurance). Figure 1 illustrates the paths explored in the mediation models.

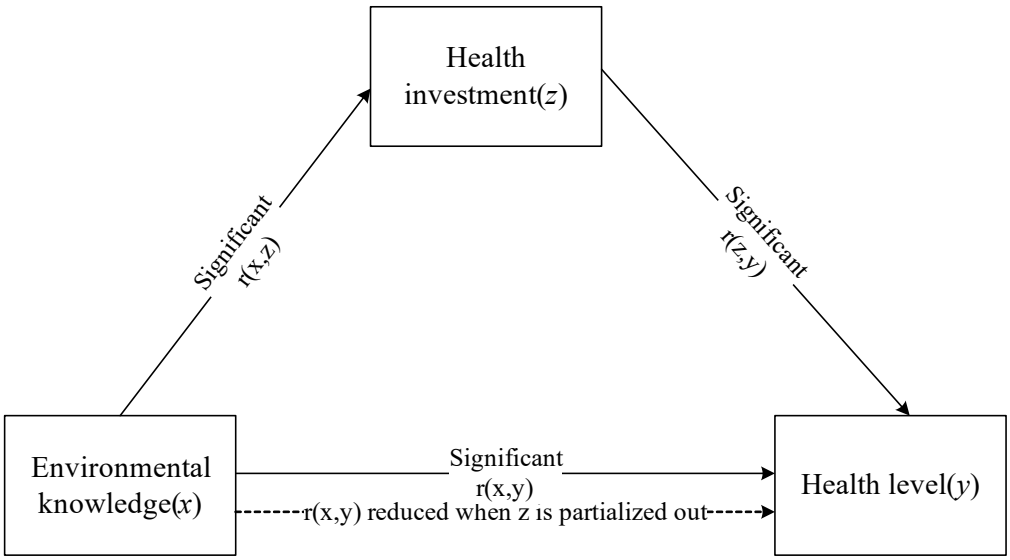

Figure 1. Illustration of mediation analysis model: the impact of environment knowledge (x) of women in rural China on their health level (y) is mediated by the respondents' health investment (z).

The mediation effects can be examined using a Sobel test [66,67]. Table 5 shows the results of the Sobel test for the mediation effects of health investments. Table 5 indicates that physical exercise significantly mediated EK and women's mental health. Still, the mediation effects of physical activity on EK and self-reported health were not significant. As shown, the regression coefficients of EK were reduced after adding the mediator, decreasing from 0.053 to 0.051 and from −0.038 to −0.035, respectively. The mediation effect of physical exercise was significant at a significance level of 1%.

Moreover, physical activity has a significant impact on women's mental health. Table 6 shows the mediation effects of NRCMS participation on EK and self-reported physical and mental health for women in rural China. However, the mediation effects were not significant, suggesting that public health investments (i.e., NRCMS) may not influence women's physical and mental health in rural China. This paper also examined the mediation effects of commercial insurance (See Appendix B). The results also showed that there is no evidence to support that commercial insurance impacts women's health in rural China.

Table 5. Mediation test of physical exercise on EK and women's physical and mental health.

Variables	Model 1 Dependent Variable: Self-Reported Health	Model 2 Dependent Variable: Physical Exercise	Model 3 Dependent Variable: Self-Reported Health	Model 4 Dependent Variable: Mental Health	Model 5 Dependent Variable: Physical Exercise	Model 6 Dependent Variable: Mental Health
Environmental knowledge	0.053 *** (0.011)	0.051 *** (0.009)	0.051 *** (0.011)	−0.038 *** (0.009)	0.051 *** (0.009)	−0.035 *** (0.009)
Physical exercise	-	-	0.042 (0.027)	-	-	−0.055 * (0.023)
Control variables	Control	Control	Control	Control	Control	Control
N	1923	1923	1923	1922	1922	1922
Adjusted R^2	0.175	0.077	0.176	0.059	0.077	0.062
F	59.25 ***	23.75 ***	52.19 ***	18.34 ***	23.72 ***	16.79 ***

Note: *** and * indicate $p < 0.001$ and $p < 0.05$, respectively. The numbers in brackets denote standard error.

Table 6. Mediation test of the medical system on EK and women's physical and mental health.

Variables	Model 1 Dependent Variable: Self-Reported Health	Model 2 Dependent Variable: The Medical System	Model 3 Dependent Variable: Self-Reported Health	Model 4 Dependent Variable: Mental Health	Model 5 Dependent Variable: The Medical System	Model 6 Dependent Variable: Mental Health
Environmental knowledge	0.053 *** (0.011)	−0.001 (0.002)	0.053 *** (0.011)	−0.038 *** (0.009)	−0.001 (0.002)	−0.038 ** (0.009)
NRCMS participation	-	-	−0.081 (0.101)	-	-	−0.064 (0.088)
Control variables	Control	Control	Control	Control	Control	Control
N	1929	1929	1929	1928	1928	1928
Adjusted R^2	0.175	0.004	0.175	0.059	0.004	0.059
F	59.60 ***	2.02 *	52.22 ***	18.17 ***	2.01	15.96 ***

Note: ***, ** and * indicate $p < 0.001$, $p < 0.01$, and $p < 0.05$, respectively. The numbers in brackets denote standard err.

3.5. Limitations and Future Directions

Despite the contributions of this study, the findings in this research must be evaluated in light of several limitations. First, we utilized an IV-probit model to address the potential endogeneity in this study. However, the robustness of our findings is limited by finding a valid IV. Though the internet and television are two critical channels for rural residents to access environmental information [27,68], there is limited evidence to show that rural women directly access environmental knowledge from these two channels. The values of F-statistics showed that our IVs are strong enough [69], yet we cannot entirely exclude the potential bias caused by these IVs. This issue may have ramifications for the internal validity of the present study. Future research may find more valid IVs or use other methods to correct endogeneity issues. Second, given the emphasis of this study, our sample was delimited to rural women in China. Thus, our results only apply to this particularly vulnerable population in this nation. Our findings may not hold with samples of rural women in other developing countries with different health coverage systems and insurance schemes. Note also that gender differences in the relationships among EK, health investments, and health status may exist [31,36] and that the effects of EK and health investments on health status may even be different for Chinese female individuals living in large and urban cities.

The cross-sectional design of this study also limits our ability to establish causal effects among the relationship examined. Using panel data to explore these relationships further is warranted and may be an endeavor for future research if and when the data is available. In addition, the age of the data is another salient limitation. This study was conducted with data from the 2013 Chinese General Social Survey wave. While this data captured changes implemented during the last major healthcare reform of 2003—which concentrated on establishing an insurance system with universal coverage [65]—other social and economic dynamics and conditions have occurred in China and may potentially yield different results if the study were replicated with more recent data. Finally, this study used self-reported physical and mental health as indicators of health status. Though more objective health measures would strengthen this study's validity, we were constrained by the availability of the specific variables in the dataset. It is worth noting that we used Body Mass Index (BMI) to test the robustness of our results, calculated based on respondents' weight and height—these two variables were available in the dataset. Several studies have documented the utility of BMI as a more objective health indicator [70]. Nevertheless, we underscore the need to replicate this study using more objective health indicators, such as biomarkers and medical records.

4. Conclusions

Rural China has undergone a profound economic transformation over the past decades [71]. While China has made several developments in terms of poverty alleviation since 2020, there are still several social issues in rural China that need to be addressed, including environmental pollution, health care disparities, and residents' welfare. Using the data from the 2013CGSS, our study investigated the relationship between rural women's EK and their physical and mental health. We posited that environmental knowledge positively influences rural women's physical and mental health. Our findings, including the robustness checks, also confirmed these conclusions. Nevertheless, contrary to prior studies [72,73], we did not find any evidence to support that participating in NRCMS and purchasing commercial insurance significantly impacted women's physical and mental health. In other words, our results suggested that public health programs, such as NRCMS, did not provide a remarkable and direct impact on women's health status. Moreover, the mediation analysis indicated that women's EK did not influence their health status through the pathway of public health investments. In contrast, personal health investments, such as physical exercise, benefit women's mental health. Finally, our study indicated that social networks might help promote women's health, particularly mental health. Thus, our findings have implications for formulating public health and wellness programs in China, and by extrapolation, in other developing nations. First, women remain among the most vulnerable population with greater health risks from environmental pollution exposure and relatively less medical care in the rural areas of the developing world (e.g., [36]). Though China has executed a relatively comprehensive public health system since 2003, our study found that this system might not fully address the health needs of women, particularly those living in rural settings.

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Data Availability Statement: Data can be obtained from the official website of the Chinese General Social Survey (http://cgss.ruc.edu.cn/English/Home.htm (accessed on 30 January 2023)). The data that support the findings of this study are openly available in Zenodo at https://doi.org/10.5281/zenodo.7655455.

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Appendix A

We use data from the 2013 Chinese General Social Survey (CGSS). The CGSS employs a stratified multi-stage probability sample designed to produce a representative sample of Chinese residents.

Environmental Knowledge questions (response choices: a. True, b. False, c. Don't Know):

1. Vehicle exhaust poses no threat to human health.
2. Excessive use of chemical fertilizers and pesticides can cause environmental damage.
3. The use of phosphorous washing powder will not cause water pollution.
4. Fluorine discharge from refrigerators can be a factor that damages the ozone layer in the atmosphere.
5. Burning coal does not affect acid rain.
6. Species depend on each other, and the disappearance of a species has a ripple effect.
7. In the air quality report, level III means better air quality than Level I.
8. Single species of trees are more likely to cause diseases and pests.
9. In the water pollution report, water quality V (5) means better than water quality I (1).
10. An increase in carbon dioxide in the atmosphere could be a climate warming factor.

Correct answers: 1. False; 2. True; 3. False; 4. True; 5. False; 6. True; 7. False; 8. True; 9. False; 10. True

Appendix B

Table A1. Mediation test of commercial insurance on EK and women's physical health.

Variables	Model 1 Dependent Variable: Self-Reported Health	Model 2 Dependent Variable: Commercial Insurance	Model 3 Dependent Variable: Self-Reported Health
Environmental knowledge	0.053 *** (0.011)	0.004 * (0.002)	0.053 *** (0.011)
Commercial Insurance	-	-	0.130 (0.130)
Control variables	Control	Control	Control
N	1929	1929	1929
Adjusted R^2	0.175	0.020	0.175
F	59.34 ***	6.61 ***	52.27 ***

Note: *** and * indicate $p < 0.001$ and $p < 0.05$, respectively. The numbers in brackets denote standard error.

Table A2. Mediation test of commercial insurance on EK and women's mental health.

Variables	Model 4 Dependent Variable: Mental Health	Model 5 Dependent Variable: Commercial Insurance	Model 6 Dependent Variable: Mental Health
Environmental knowledge	−0.038 *** (0.009)	0.004 (0.002)	−0.038 *** (0.009)
Commercial Insurance	-	-	−0.081 (0.113)
Control variables	Control	Control	Control
N	1928	1928	1928
Adjusted R^2	0.059	0.020	0.059
F	18.17 ***	6.60 ***	15.98 ***

Note: *** indicates $p < 0.001$. The numbers in brackets denote standard error.

References

1. Grossman, M. On the Concept of Health Capital and the Demand for Health. *J. Political Econ.* **1972**, *80*, 223–255. [CrossRef]
2. Graham, C. Happiness and Health: Lessons—And Questions—For Public Policy. *Health Aff.* **2008**, *27*, 72–87. [CrossRef] [PubMed]
3. Easterlin, R.A. Will Raising the Incomes of All Increase the Happiness of All? *J. Econ. Behav. Organ.* **1995**, *27*, 35–47. [CrossRef]
4. John, H.; Richard, L.; Jeffrey, S. *World Happiness Report 2013*; Sustainable Development Solutions Network: New York, NY, USA, 2015.
5. Yang, M. Demand for Social Health Insurance: Evidence from the Chinese New Rural Cooperative Medical Scheme. *China Econ. Rev.* **2018**, *52*, 126–135. [CrossRef]
6. Lu, Y.; Song, S.; Wang, R.; Liu, Z.; Meng, J.; Sweetman, A.J.; Jenkins, A.; Ferrier, R.C.; Li, H.; Luo, W.; et al. Impacts of Soil and Water Pollution on Food Safety and Health Risks in China. *Environ. Int.* **2015**, *77*, 5–15. [CrossRef]
7. Sawut, R.; Kasim, N.; Maihemuti, B.; Hu, L.; Abliz, A.; Abdujappar, A.; Kurban, M. Pollution Characteristics and Health Risk Assessment of Heavy Metals in the Vegetable Bases of Northwest China. *Sci. Total Environ.* **2018**, *642*, 864–878. [CrossRef]
8. Franchini, M.; Mannucci, P.M. Impact on Human Health of Climate Changes. *Eur. J. Intern. Med.* **2015**, *26*, 1–5. [CrossRef]
9. Wu, W.; Wu, P.; Yang, F.; Sun, D.; Zhang, D.-X.; Zhou, Y.-K. Assessment of Heavy Metal Pollution and Human Health Risks in Urban Soils around an Electronics Manufacturing Facility. *Sci. Total Environ.* **2018**, *630*, 53–61. [CrossRef]
10. Landrigan, P.J. Air Pollution and Health. *Lancet Public Health* **2017**, *2*, e4–e5. [CrossRef]
11. Yang, T.; Liu, W. Does Air Pollution Affect Public Health and Health Inequality? Empirical Evidence from China. *J. Clean. Prod.* **2018**, *203*, 43–52. [CrossRef]
12. Sen, A. *Development as Freedom*; Oxford University Press: Oxford, UK, 2001; ISBN 978-0-19-102724-6.
13. Chen, S.; Oliva, P.; Zhang, P. *Air Pollution and Mental Health: Evidence from China*; National Bureau of Economic Research: Cambridge, MA, USA, 2018.
14. Li, W.; Zhang, L.; Yue, M.; Ruiz-Menjivar, J.; Zhang, J. Health Vulnerability and Health Poverty of Rice Farmers: Evidence from Hubei Province in China. *China Agric. Econ. Rev.* **2023**. *ahead-of-print*. [CrossRef]
15. Al-Maruf, A.; Pervez, A.K.M.K.; Sarker, P.K.; Rahman, M.S.; Ruiz-Menjivar, J. Exploring the Factors of Farmers' Rural–Urban Migration Decisions in Bangladesh. *Agriculture* **2022**, *12*, 722. [CrossRef]
16. Sankoh, A.I.; Whittle, R.; Semple, K.T.; Jones, K.C.; Sweetman, A.J. An Assessment of the Impacts of Pesticide Use on the Environment and Health of Rice Farmers in Sierra Leone. *Environ. Int.* **2016**, *94*, 458–466. [CrossRef]
17. Hu, B.; Shao, S.; Ni, H.; Fu, Z.; Hu, L.; Zhou, Y.; Min, X.; She, S.; Chen, S.; Huang, M.; et al. Current Status, Spatial Features, Health Risks, and Potential Driving Factors of Soil Heavy Metal Pollution in China at Province Level. *Environ. Pollut.* **2020**, *266*, 114961. [CrossRef]
18. Song, S.; Yuan, B.; Zhang, L.; Cheng, G.; Zhu, W.; Hou, Z.; He, L.; Ma, X.; Meng, Q. Increased Inequalities in Health Resource and Access to Health Care in Rural China. *Int. J. Environ. Res. Public Health* **2019**, *16*, 49. [CrossRef]
19. Yip, W.; Hsiao, W.C. Non-Evidence-Based Policy: How Effective Is China's New Cooperative Medical Scheme in Reducing Medical Impoverishment? *Soc. Sci. Med.* **2009**, *68*, 201–209. [CrossRef]
20. Sun, X.; Sleigh, A.C.; Carmichael, G.A.; Jackson, S. Health Payment-Induced Poverty under China's New Cooperative Medical Scheme in Rural Shandong. *Health Policy Plan.* **2010**, *25*, 419–426. [CrossRef]
21. Babiarz, K.S.; Miller, G.; Yi, H.; Zhang, L.; Rozelle, S. New Evidence on the Impact of China's New Rural Cooperative Medical Scheme and Its Implications for Rural Primary Healthcare: Multivariate Difference-in-Difference Analysis. *BMJ* **2010**, *341*, c5617. [CrossRef]
22. McCullough, J.M. Local Health and Social Services Expenditures: An Empirical Typology of Local Government Spending. *Prev. Med.* **2017**, *105*, 66–72. [CrossRef]
23. Zuo, J.; Rameezdeen, R.; Hagger, M.; Zhou, Z.; Ding, Z. Dust Pollution Control on Construction Sites: Awareness and Self-Responsibility of Managers. *J. Clean. Prod.* **2017**, *166*, 312–320. [CrossRef]
24. Okumah, M.; Martin-Ortega, J.; Novo, P. Effects of Awareness on Farmers' Compliance with Diffuse Pollution Mitigation Measures: A Conditional Process Modelling. *Land Use Policy* **2018**, *76*, 36–45. [CrossRef]
25. Ajzen, I. The Theory of Planned Behavior. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 179–211. [CrossRef]
26. Minton, E.A.; Bret Leary, R.; Upadhyaya, S. Religion's Influence on Consumer Response to Moral vs. Justice Message Appeals. *Int. J. Consum. Stud.* **2018**, *42*, 768–778. [CrossRef]
27. Zhu, J.; Zheng, S.; Kaabar, M.K.A.; Yue, X.-G. Online or Offline? The Impact of Environmental Knowledge Acquisition on Environmental Behavior of Chinese Farmers Based on Social Capital Perspective. *Front. Environ. Sci.* **2022**, *10*, 1052797. [CrossRef]
28. Wang, Y.; Yang, J.; Liang, J.; Qiang, Y.; Fang, S.; Gao, M.; Fan, X.; Yang, G.; Zhang, B.; Feng, Y. Analysis of the Environmental Behavior of Farmers for Non-Point Source Pollution Control and Management in a Water Source Protection Area in China. *Sci. Total Environ.* **2018**, *633*, 1126–1135. [CrossRef]
29. Luechinger, S. Air Pollution and Infant Mortality: A Natural Experiment from Power Plant Desulfurization. *J. Health Econ.* **2014**, *37*, 219–231. [CrossRef]
30. Gouveia, N.; Junger, W.L.; Romieu, I.; Cifuentes, L.A.; de Leon, A.P.; Vera, J.; Strappa, V.; Hurtado-Díaz, M.; Miranda-Soberanis, V.; Rojas-Bracho, L.; et al. Effects of Air Pollution on Infant and Children Respiratory Mortality in Four Large Latin-American Cities. *Environ. Pollut.* **2018**, *232*, 385–391. [CrossRef]

31. Wang, W.; Jin, J.; He, R.; Gong, H. Gender Differences in Pesticide Use Knowledge, Risk Awareness and Practices in Chinese Farmers. *Sci. Total Environ.* **2017**, *590–591*, 22–28. [CrossRef]
32. Liu, Y.; Ruiz-Menjivar, J.; Zhang, L.; Zhang, J.; Swisher, M.E. Technical Training and Rice Farmers' Adoption of Low-Carbon Management Practices: The Case of Soil Testing and Formulated Fertilization Technologies in Hubei, China. *J. Clean. Prod.* **2019**, *226*, 454–462. [CrossRef]
33. Li, W.; Ruiz-Menjivar, J.; Zhang, L.; Zhang, J. Climate Change Perceptions and the Adoption of Low-Carbon Agricultural Technologies: Evidence from Rice Production Systems in the Yangtze River Basin. *Sci. Total Environ.* **2021**, *759*, 143554. [CrossRef]
34. Elahi, E.; Khalid, Z.; Zhang, Z. Understanding Farmers' Intention and Willingness to Install Renewable Energy Technology: A Solution to Reduce the Environmental Emissions of Agriculture. *Appl. Energy* **2022**, *309*, 118459. [CrossRef]
35. Feng, W.; Reisner, A. Factors Influencing Private and Public Environmental Protection Behaviors: Results from a Survey of Residents in Shaanxi, China. *J. Environ. Manag.* **2011**, *92*, 429–436. [CrossRef]
36. Wang, J.; Fei, Y.; Shen, H.; Xu, B. Gender Difference in Knowledge of Tuberculosis and Associated Health-Care Seeking Behaviors: A Cross-Sectional Study in a Rural Area of China. *BMC Public Health* **2008**, *8*, 354. [CrossRef]
37. Zhang, L.; Ruiz-Menjivar, J.; Luo, B.; Liang, Z.; Swisher, M.E. Predicting Climate Change Mitigation and Adaptation Behaviors in Agricultural Production: A Comparison of the Theory of Planned Behavior and the Value-Belief-Norm Theory. *J. Environ. Psychol.* **2020**, *68*, 101408. [CrossRef]
38. Raghupathi, V.; Raghupathi, W. The Influence of Education on Health: An Empirical Assessment of OECD Countries for the Period 1995–2015. *Arch. Public Health* **2020**, *78*, 20. [CrossRef]
39. Chekroud, S.R.; Gueorguieva, R.; Zheutlin, A.B.; Paulus, M.; Krumholz, H.M.; Krystal, J.H.; Chekroud, A.M. Association between Physical Exercise and Mental Health in 1·2 Million Individuals in the USA between 2011 and 2015: A Cross-Sectional Study. *Lancet Psychiatry* **2018**, *5*, 739–746. [CrossRef]
40. Schmitz, N.; Kruse, J.; Kugler, J. The Association between Physical Exercises and Health-Related Quality of Life in Subjects with Mental Disorders: Results from a Cross-Sectional Survey. *Prev. Med.* **2004**, *39*, 1200–1207. [CrossRef]
41. ten Have, M.; de Graaf, R.; Monshouwer, K. Physical Exercise in Adults and Mental Health Status: Findings from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *J. Psychosom. Res.* **2011**, *71*, 342–348. [CrossRef]
42. Pan, X.-F.; Wang, L.; Pan, A. Epidemiology and Determinants of Obesity in China. *Lancet Diabetes Endocrinol.* **2021**, *9*, 373–392. [CrossRef]
43. Hai-YanYu; Wu, W.-L.; Yu, L.-W.; Wu, L. Health Literacy and Health Outcomes in China's Floating Population: Mediating Effects of Health Service. *BMC Public Health* **2021**, *21*, 691. [CrossRef]
44. Xiang, J.; Liu, C.; Li, Y. The Impact of Household Real Estate and Self-Employment: Evidence from China. *Econ. Model.* **2021**, *94*, 873–884. [CrossRef]
45. Luo, Y.; Wu, J.; Xu, Y. Can Self-Governance Tackle the Water Commons?—Causal Evidence of the Effect of Rural Water Pollution Treatment on Farmers' Health in China. *Ecol. Econ.* **2022**, *198*, 107471. [CrossRef]
46. Marazziti, D.; Cianconi, P.; Mucci, F.; Foresi, L.; Chiarantini, I.; Della Vecchia, A. Climate Change, Environment Pollution, COVID-19 Pandemic and Mental Health. *Sci. Total Environ.* **2021**, *773*, 145182. [CrossRef] [PubMed]
47. Duan, W.; Sheng, J. How Can Environmental Knowledge Transfer into Pro-Environmental Behavior among Chinese Individuals? Environmental Pollution Perception Matters. *J. Public Health* **2018**, *26*, 289–300. [CrossRef]
48. Reddy, P.M.C.; Rineetha, T.; Sreeharshika, D.; Jothula, K.Y. Health Care Seeking Behaviour among Rural Women in Telangana: A Cross Sectional Study. *J. Fam. Med. Prim. Care* **2020**, *9*, 4778–4783. [CrossRef]
49. Han, J.; Zhao, X. Impact of Internet Use on Multi-Dimensional Health: An Empirical Study Based on CGSS 2017 Data. *Front. Public Health* **2021**, *9*, 749816. [CrossRef]
50. Daghagh Yazd, S.; Wheeler, S.A.; Zuo, A. Understanding the Impacts of Water Scarcity and Socio-Economic Demographics on Farmer Mental Health in the Murray-Darling Basin. *Ecol. Econ.* **2020**, *169*, 106564. [CrossRef]
51. D'Souza, M.S.; Karkada, S.N.; Somayaji, G. Factors Associated with Health-Related Quality of Life among Indian Women in Mining and Agriculture. *Health Qual. Life Outcomes* **2013**, *11*, 9. [CrossRef]
52. Gong, C.H.; Kendig, H.; He, X. Factors Predicting Health Services Use among Older People in China: An Analysis of the China Health and Retirement Longitudinal Study 2013. *BMC Health Serv. Res.* **2016**, *16*, 63. [CrossRef]
53. Zhao, Z. Income Inequality, Unequal Health Care Access, and Mortality in China. *Popul. Dev. Rev.* **2006**, *32*, 461–483. [CrossRef]
54. Bellemare, M.F.; Wichman, C.J. Elasticities and the Inverse Hyperbolic Sine Transformation. *Oxf. Bull. Econ. Stat.* **2020**, *82*, 50–61. [CrossRef]
55. Bai, Y.; Bian, F.; Zhang, L.; Cao, Y. The Impact of Social Support on the Health of the Rural Elderly in China. *Int. J. Environ. Res. Public Health* **2020**, *17*, 2004. [CrossRef]
56. Liu, C.; Huang, N.; Fu, M.; Zhang, H.; Feng, X.L.; Guo, J. Relationship Between Risk Perception, Social Support, and Mental Health Among General Chinese Population During the COVID-19 Pandemic. *Risk Manag. Healthc. Policy* **2021**, *14*, 1843–1853. [CrossRef]
57. Sun, J.; Lyu, S.; Dai, Z. The Impacts of Socioeconomic Status and Lifestyle on Health Status of Residents: Evidence from Chinese General Social Survey Data. *Int. J. Health Plan. Manag.* **2019**, *34*, 1097–1108. [CrossRef]
58. Wang, Y. Development of the New Rural Cooperative Medical System in China. *China World Econ.* **2007**, *15*, 66–77. [CrossRef]

59. Wang, L.; Wang, A.; FitzGerald, G.; Si, L.; Jiang, Q.; Ye, D. Who Benefited from the New Rural Cooperative Medical System in China? A Case Study on Anhui Province. *BMC Health Serv. Res.* **2016**, *16*, 195. [CrossRef]
60. Greene, W. *Econometric Analysis*, 8th ed.; Pearson: New York, NY, 2017; ISBN 978-0-13-446136-6.
61. Gunn, K.M.; Barrett, A.; Hughes-Barton, D.; Turnbull, D.; Short, C.E.; Brumby, S.; Skaczkowski, G.; Dollman, J. What Farmers Want from Mental Health and Wellbeing-Focused Websites and Online Interventions. *J. Rural Stud.* **2021**, *86*, 298–308. [CrossRef]
62. Rivers, D.; Vuong, Q.H. Limited Information Estimators and Exogeneity Tests for Simultaneous Probit Models. *J. Econom.* **1988**, *39*, 347–366. [CrossRef]
63. Staiger, D.; Stock, J.H. Instrumental Variables Regression with Weak Instruments. *Econometrica* **1997**, *65*, 557–586. [CrossRef]
64. Crossley, T.F.; Kennedy, S. The Reliability of Self-Assessed Health Status. *J. Health Econ.* **2002**, *21*, 643–658. [CrossRef]
65. World Health Organization Body Mass Index (BMI). Available online: https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/body-mass-index (accessed on 17 February 2023).
66. Baron, R.M.; Kenny, D.A. The Moderator–Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *J. Personal. Soc. Psychol.* **1986**, *51*, 1173. [CrossRef] [PubMed]
67. Preacher, K.J.; Hayes, A.F. Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models. *Behav. Res. Methods* **2008**, *40*, 879–891. [CrossRef] [PubMed]
68. Sheng, J.; Lu, Q. The Influence of Information Communication Technology on Farmers' Sales Channels in Environmentally Affected Areas of China. *Environ. Sci. Pollut. Res.* **2020**, *27*, 42513–42529. [CrossRef] [PubMed]
69. Angrist, J.D.; Pischke, J.-S. *Mostly Harmless Econometrics: An Empiricist's Companion*; Princeton University Press: Princeton, NJ, USA, 2009.
70. Gutin, I. In BMI We Trust: Reframing the Body Mass Index as a Measure of Health. *Soc. Theory Health* **2018**, *16*, 256–271. [CrossRef]
71. *Four Decades of Poverty Reduction in China: Drivers, Insights for the World, and the Way Ahead*; The World Bank: Washington, DC, USA, 2022; ISBN 978-1-4648-1877-6.
72. Sun, J.; Lyu, S. Does Health Insurance Lead to Improvement of Health Status Among Chinese Rural Adults? Evidence From the China Family Panel Studies. *Int. J. Health Serv.* **2020**, *50*, 350–359. [CrossRef]
73. Qi, W.; Liu, F.; Zhang, T.; Qi, X. Can China's New Rural Cooperative Medical System Improve Farmers' Subjective Well-Being? *Front. Public Health* **2022**, *10*, 848539. [CrossRef]