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Economic Incentives, Reputation Incentives, and Rural Residents' Participation in Household Waste Classification: Evidence from Jiangsu, China

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Abstract: With the economic development and rising living standards in rural China, the amount of household waste generated continues to increase, causing serious pollution to the environment and risks to public health. Promoting the classification of rural household waste is a critical way to improve the dwelling environment and control disease transmission in rural areas. Using the 2021 China Land Economic Survey (CLES) conducted in rural areas of Jiangsu province, China, this research explores how economic incentives and reputational incentives impact rural residents' participation in household waste classification intention and behavior. The results show that most surveyed rural residents have the intention to classify their household waste, but only half of them perform the waste classification behavior. Furthermore, both economic incentives and reputation incentives have significant positive effects on rural residents' intention and behavior regarding household waste classification, and there exists a complementary effect between them, which indicates that a combination of economic incentives and reputation incentives will increase the participation rate of rural residents in household waste classification. Finally, based on the findings, we put forward recommendations for rural waste management policies, including synergizing both economic incentives and reputation incentives, improving the mobilization system, and strengthening publicity and education on household waste classification.

Keywords: household waste classification; rural residents; economic incentives; reputation incentives; China rural revitalization

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1. Introduction

The process of China's industrialization and urbanization has promoted the rapid development of China's economy. However, this process has also shrunk farmland, migrated rural populations, damaged natural resources, generated enormous amounts of waste, polluted the environment, and eventually led to a rural decline problem [1,2]. Facing those burning issues for the environment and society, the Chinese government started to implement the Rural Vitalization Strategy in 2017 [3]. Creating a pleasant rural living environment is one of the five goals of this national strategy for rural residents [2]. Particularly, rural residents' household waste classification is specifically listed as one of the indicators to evaluate the progress of a "pleasant rural living environment" in the latest Five-year Action Plan for Rural Living Environment Upgrade Campaign [4]. About 450 million people are living in rural areas in China, the amount of domestic waste generated per person in rural areas is about 0.86 kg per day, and it is estimated that China's rural areas produce 14.1 billion tons of domestic waste per year [5]. The rural domestic waste mainly includes

organic waste (e.g., food leftovers, fruit peels, vegetable leaves, and straw, etc.), inorganic waste (e.g., slag and used ceramics, etc.), recyclable waste (e.g., rubber, plastic, wastepaper, fabric, glass, and metal, etc.), and hazardous waste (e.g., waste lamps, waste batteries, pesticide and fertilizer packaging, and expired drugs, etc.). The improper disposal of rural domestic wastes has resulted in various environmental and health-related problems: (1) water pollution; (2) soil contamination; (3) air pollution; (4) pathogenic transmission of livestock and human diseases; (5) threats to food safety and quality; (6) compromising the cleanliness and sanitation of rural communities [6,7].

Household waste classification is the starting point for effective waste management [8,9], and it determines the quality and quantity of the follow-up processing procedures including recycling, transportation, and landfilling [10]. Household waste classification can reduce harmful waste pollution and make full use of resources [11]. However, the present situation of household waste classification is not quite satisfactory, as the participation rate of residents has stayed at a low level [12]. In some areas, "garbage-surrounded villages" have become urgent problems in local governance, highlighting the difficulty of rural domestic waste management [13]. Waste management in rural areas faces various challenges including low household density, dispersed waste generation sources, large regional differences, inadequate infrastructures and services for waste collection and transportation, and lack of local government support and effective legal binding, as well as technical assistance [14–17]. All those challenges have become barriers for rural residents to engage in household waste classification behaviors [18]. Thus, to improve the human dwelling environment in rural areas, protect natural resources from further degradation, increase rural public sanitation, and reduce disease transmission risks, promoting household waste classification among rural residents ought to be given priority in the process of rural revitalization [19,20].

The implementation of rural household waste classification was first proposed by the Chinese central government in 2016, and its importance has been emphasized in the No.1 Central Documents of 2020, 2021, 2022, and 2023. In 2022, multiple government ministries (e.g., Ministry of Agriculture and Rural Affairs, Ministry of Ecological Environment, Ministry of Housing and Urban-Rural Development, Commission of Development and Reform, Bureau of Rural Revitalization, etc.) jointly issued a policy document that requires each county-level government (1) to make comprehensive plans for the establishment and operation of a rural domestic waste collection, transportation, and disposal system; (2) to promote the waste classification and resource utilization of rural domestic waste at source; (3) to improve the collection, transportation, and disposal facilities of rural domestic waste; (4) to improve the operation and management level of the rural domestic waste collection, transportation, and disposal system [4]. The central government has invested more than CNY 25.8 billion (USD 3.6 billion) in waste disposal infrastructure in rural areas over the past few years [21]. It is worth noting that the implementation of rural domestic waste classification not only requires the support of the government but also the participation of residents, which is crucial because residents are the main implementers and promoters of the entire waste classification process [12,22]. Without residents' participation, it can lead to low efficiency and even complete governance failure in waste management [19,23]. Therefore, to design more effective policies to increase rural household waste classification and create a better living environment in rural areas, it is necessary to fully understand rural residents' willingness and decision-making process to participate in household waste classification.

Many scholars have studied the influencing factors of rural residents' intention, as well as the actual behaviors, to participate in household waste classification. Research in Neoclassical Economics suggests that individuals tend to act rationally and seek to maximize their utility or wealth, but this likely presents challenges in achieving collective action or optimal outcomes, as individual rationality may not always align with the collective interests or result in socially desirable outcomes [24]. The goal of household waste classification is to bring environmental benefits including reducing the amount of waste and minimizing its negative impact on the environment, increasing resource utilization,

and improving environmental hygiene and public health [25]. Therefore, household waste classification, particularly in rural areas, is a typical collective action and altruistic behavior [26], but it is prone to low public participation and free-rider problems [10,27]. The low participation problem could be solved through institutional or incentive measures designed to increase tangible rewards and motivations [26]. Multiple scholars have analyzed a variety of incentives-based strategies. Alpízar and Gsottbauer [28] found that pro-environmental actions could be encouraged by reputational effects concerning shame and praise. Ostrom [29] identified that economic incentives played an important role in promoting waste classification because the sacrificed personal interests, such as time costs and energy costs, are compensated, yielding more private benefits than inaction. Various existing studies have shown that residents' waste classification behavior is affected by both intrinsic factors and external factors. Specifically, intrinsic factors include awareness [30], moral norms [31], attitudes [10], subjective norms [32], and perceived behavioral control [33]; external factors include facility conditions [34,35], the influence of neighbors or friends [36], and government policies and incentives methods [18], which have been proven to significantly influence individual's household waste classification and recycling behaviors. In addition, several personal characteristics, such as gender, age, income, and education level, have been proven to exert significant impacts on pro-environmental behaviors [32,37]. For example, a survey conducted in Iran showed that residents' knowledge, attitudes, and practices toward solid waste recycling were influenced by age, education level, gender, and occupation [22]. Another study conducted in Uganda indicated that gender played a role in shaping an individual's household waste classification and recycling behavior [38]. Additionally, education level was also found to have a positive correlation with consumers' recycling behavior [39].

Although a considerable number of studies have been conducted in this field, there are still certain research gaps that need to be filled. Scholars have studied economic incentives and reputational effects on various pro-environmental behaviors, but fewer studies have focused on household waste classification behaviors of rural residents in China. The willingness and practices of rural household waste classification may vary largely by location and year. Additionally, most previous studies regard economic incentives and reputation as two independent factors and examine the effects separately without considering their complementary effects, partially because few studies have incorporated these two concepts into a unified framework. Therefore, to fill the existing gap, this paper first develops a more incorporative framework considering both economic and reputational effects and then uses survey data from rural residents in Jiangsu province, China, to empirically analyze the influence of economic incentives and reputation incentives on rural residents' intention and behavior of household waste classification. Moreover, an interactive term is also added to explore the possible complementary effects between the two factors. We finally conclude this paper with a series of suggestions for effective governance on domestic waste classification in rural areas.

2. Theoretical Bases and Hypotheses

According to Neoclassical Economics, rural residents' decision making and behavior are often driven by the pursuit of maximum benefits [40]. As an important part of the incentives mechanism, economic incentives mainly emphasize the use of economic means to either reduce the cost of household waste classification for rural residents or increase the benefits rural residents receive from waste classification [41]. The economic incentives for household waste classification can be implemented by providing either rewards or compensation [8]. In this way, the residents' instinct to pursue the maximization of personal interests can be transformed into their motivation to participate in waste sorting [26]. Meanwhile, household waste classification usually takes time and effort and even requires participants to pay extra [29]. Those opportunity costs associated with household waste classification can be compensated by monetary incentives. At present, many metro cities in China (e.g., Shanghai, Tianjin, Shenzhen, etc.) have adopted certain economic incentives to

encourage residents to classify their household waste. Residents who classify household waste can earn points and then redeem them for a wide range of daily necessities in local grocery stores. By providing some economic compensation or reward for people carrying out household waste classification, the participation enthusiasm of residents can be greatly mobilized [18]. Thus, this paper puts forward the following hypothesis (**H1**): economic incentives have a positive impact on rural residents' intentions and behavior regarding household waste classification.

Social interaction plays a salient role in shaping pro-environmental behavior [42]. Research suggests that many people engage in pro-environmental behavior with the underlying purpose of enhancing their image and reputation, hoping to receive praise from the outside and feel proud of themselves [43,44]. Reputation is important ideological capital of an individual, which reflects the evaluation, opinion, and expectation made by others based on the individual's past behavior [45]. Reputation is also a kind of asset, and a good reputation can reward the individual or subject via direct and indirect reciprocity [46,47]. Individuals with a good reputation can mobilize more resources in their social network, reduce transaction costs, improve transaction efficiency, enhance the symmetrical transparency of information exchange, and better deal with uncertainty in the future [48,49]. In addition, according to Maslow's hierarchy of needs [50], being respected by others and having good interpersonal relationships are incentives for behaviors, as well as an internal pursuit of human beings. Therefore, encouraging a sense of pride and enhancing one's reputation ought to be seen as viable approaches to encourage pro-environmental behavior among residents [9].

Household waste classification has positive externalities [26]. Residents who engage in waste classification can not only achieve the rational disposal of their household waste but also contribute to a reduction in pollution within the village, creating a pleasant living environment that extends its benefits to neighbors and other rural inhabitants. Therefore, household waste classification can enable residents to garner a reputation and praise from other villagers, signifying their sense of responsibility and public morality. This aligns with the elevated expectations residents have for recognition, influence, honor, and respect within the village, ultimately enhancing their spiritual well-being. Since the rural areas of China are identified as a typical "acquaintance society" [51], people living there attach great importance to "face" and "word of mouth" [52]. A resident's good reputation will serve as "social capital" in a rural community [53]. For instance, a good reputation bestows several advantages and conveniences on individuals during significant events in rural life such as harvesting, planting, taking loans, weddings, funerals, natural disasters, and various other occasions [54,55]. Moreover, reputation enhances villagers' interpersonal interactions with others, and the benefits of a favorable reputation may have a lasting impact, extending to future generations [55]. Hence, it is reasonable to presume that the intention and behavior of rural residents to classify household waste could be enhanced as they strive to achieve a good reputation. Based on the argument above, this paper puts forward the second hypothesis (**H2**): reputation incentives have a positive influence on rural residents' intention and behavior of household waste classification.

Although reputation incentives and economic incentives act in different ways in influencing rural residents' intentions and behavior regarding household waste classification, the two constructs may have certain interactions between them. The reputation incentives are mainly characterized by honorary titles and praise from others, which cater to rural residents' demands for honor, respect, and fame [15]. Maslow's [50,56] hierarchy of needs theory suggests that the premise for individuals to pursue high-level needs such as fame and respect is to meet low-level needs such as physiology and safety in the first place, and the latter cannot be satisfied without the acquisition of economic benefits. Therefore, although reputation incentives can promote rural residents' intention and behavior regarding household waste classification, they are still inseparable from economic incentives. Similarly, economic incentives are used to satisfy individuals' pursuit of maximizing utility and help individuals meet their basic material needs in daily life [34,35]. However, with

the increasing economic development and rising living standards, the demand of rural residents gradually upgrades and tends to be more diversified. In this sense, taking economic incentives supplemented by reputation incentives may be more suitable for rural residents to pursue their high-level needs and developmental demands [57]. Thus, there may be a complementary effect between reputation incentives and economic incentives when encouraging rural residents to participate in household waste classification. The combination of these two factors could synergistically drive and enhance the motivation and enthusiasm of rural residents, leading to a greater likelihood of participation in waste classification efforts. By leveraging both the desire for recognition and the pragmatic benefits of economic rewards, rural residents may foster a stronger and longer-lasting commitment to properly sorting and recycling household waste in rural communities. Based on the argument above, this paper puts forward the following hypothesis (**H3**): economic incentives and reputation incentives have complementary effects on rural residents' intention and behavior and jointly promote household waste classification in rural areas.

Based on the theoretical discussion above, this paper analyzes the rural residents' intentions and behavior regarding household waste classification from two dimensions: economic incentives and reputation incentives. Figure 1 presents the conceptual framework of this study drawn on the three hypotheses.

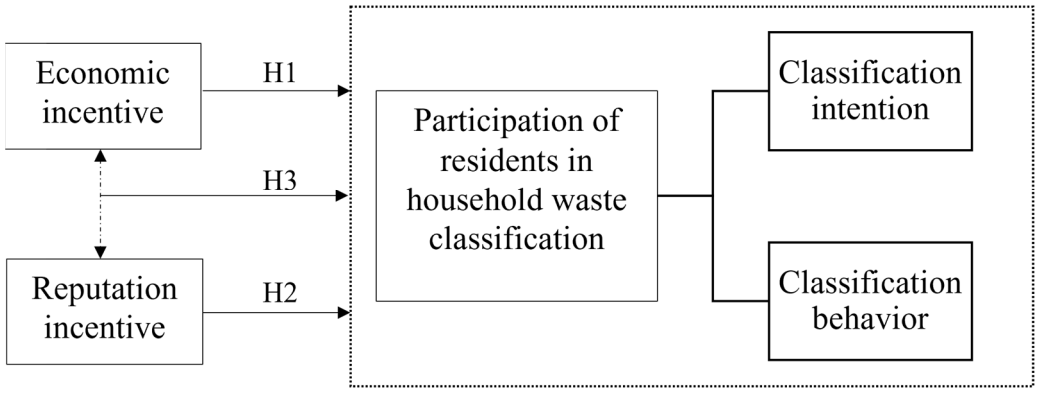

Figure 1. Conceptual framework of economic and reputation incentives influencing rural residents' intention and behavior regarding household waste classification.

3. Materials and Methods

3.1. Variables and Measurement

3.1.1. Dependent Variables

We conceptualized the participation in the household waste classification of rural residents into two parts: one is the intention of household waste classification, and the other part is the actual behavior of household waste classification [19], and both of them are binary variables. In this survey, the intention variable is measured by the question: "Are you willing to carry out household waste classification?", and the behavior variable is measured by the question: "Do you carry out household waste classification?" Table 1 presents the measurement scales and basic descriptive statistics of the dependent variables.

Table 1. Measurement scale and descriptive statistics of variables.

Variable Category	Variable Name	Measurement Scale	Mean	Standard Deviation
Dependent variables	Classification intention	Yes = 1, No = 0	0.90	0.30
	Classification behavior	Yes = 1, No = 0	0.51	0.50
Core independent variables	Economic incentives	Strongly disagree = 1, Somewhat disagree = 2, Neutral = 3, Somewhat agree = 4, Strongly agree = 5	4.12	0.95
	Reputation incentives	Strongly disagree = 1, Somewhat disagree = 2, Neutral = 3, Somewhat agree = 4, Strongly agree = 5	4.15	0.87
Control variables	Gender	Male = 1, female = 0	0.72	0.45
	Age	Continuous variable	62.40	11.41
	Education level	Years of formal education received	7.16	4.02
	Village cadre or not	Yes = 1, No = 0	0.16	0.37
	Member of the Communist Party of China	Yes = 1, No = 0	0.32	0.47
	Annual basic household income	Continuous variable	28,195.11	107,935.7

Note. n = 1897.

3.1.2. Independent Variables

The main focus of this study is to investigate the effects of economic incentives and reputation incentives on rural residents' intentions and behavior of household waste classification. Therefore, the core independent variables are economic incentives and reputation incentives. In the questionnaire, economic incentives were measured by the question "I will do better if I can exchange points for goods when classifying household waste."; the question "Do you think classifying household waste can be appreciated and praised?" was utilized to measure reputation incentives. Table 1 also shows the measurement scales and basic descriptive statistics of the independent variables.

3.1.3. Control Variables

According to previous studies, personal demographics and household characteristics of rural residents, such as gender, age, education level, and social capital, have significant effects on their decision-making process of pro-environmental behaviors [22,38,39]. To make the models more precisely explain respondents' intentions and behaviors regarding household waste classification, multiple control variables including gender, age, education level (years of formal education received), being a village cadre, being a member of the Communist Party of China, and annual basic household income were included in the models. Control variables' measurement scales and descriptive statistics can be found in Table 1.

3.2. Data Collection

The data used in this work are from the China Land Economic Survey (CLES) administrated by Nanjing Agricultural University. Data collections were conducted in rural areas of Jiangsu province in July 2021. Jiangsu province was chosen as the research site because Jiangsu is a leading province actively engaging in the Rural Living Environment Upgrade Campaign. In 2023, Jiangsu allocated a budget of CNY 1.9 billion (USD 295 million) to invest in remediating the rural living environment [58]. In addition, Jiangsu has 74 villages entitled to national beautiful leisure villages, ranking among the top in the nation [59]. Surveying the intention and behavior of household waste classification among rural residents in Jiangsu will not only help the local government formulate more effective policies but also result in significant implications for other provinces.

The survey adopted the probability proportional to size sampling technique to sample counties and administrative villages, involving 104 administrative villages of 13 cities in Jiangsu province [60]. A total of 2600 rural households were sampled to be visited through face-to-face questionnaire interviews, and our research team members filled out the questionnaires according to their answers. Initially, 2016 questionnaires were collected, but 119 of them were deleted due to incompletion, irregular filling formats, and inconsistencies. Finally, a total of 1897 valid questionnaires were obtained, with a response rate of 94.10%.

3.3. Model Specification

The dependent variables of this study are the intention and behavior of rural residents to participate in waste classification, both of which are binary dummy variables. Nonlinear models, such as probit or logit models, have been proven to be able to avoid reflection problems [61]. Therefore, a binary probit model based on the individual level is employed to analyze the impact of economic incentives and reputation incentives on rural residents' intention and behavior of household waste classification. Furthermore, to explore the interaction between these influencing factors, an interactive term model is also added to examine the complementary effect. The model is set as follows:

$$\text{prob}(y_i = 1) = \Phi(\alpha_0 + \alpha_1 x_i + \alpha_2 \gamma_i + \alpha_3 x_i \times \gamma_i + \alpha_4 Control_i + \varepsilon)$$

where y_i indicates the probability of rural residents having an intention or conducting the behavior of household waste classification; i denotes the interviewed rural resident; x_i denotes economic incentives; γ_i represents reputation incentives; $Control_i$ denotes control variables that impact rural residents' intentions and behavior; α_1 and α_2 represent the impact of economic incentives and reputation incentives on residents' intention and behavior of household waste classification, respectively; $x_i \times \gamma_i$ is the interaction term of economic incentives and reputation incentives; and α_3 denotes the complementary effect between these two factors about their influence on rural residents' intentions and behavior. α_0 is the constant term; ε is the random disturbance term.

3.4. Analytical Strategy

In this paper, the binary probit model based on the individual level is used to analyze the influence of economic incentives and reputation incentives on the intention and behavior of household waste classification in rural areas. Before estimating the model, the variance inflation factor (VIF) is used to test multicollinearity between dependent variables. When VIF = 1, there is no collinearity among dependent variables; when VIF is more than 3, there is a certain degree of collinearity among dependent variables. According to the test results, the maximum value of VIF is 1.51, and the average value is 1.31. Therefore, there is no collinearity problem among dependent variables. The standard deviation of annual basic household income is significantly greater than its mean value (Table 2), which indicates the existence of outliers. To reduce the deviation caused by outliers and avoid spurious regression, annual basic household income is winsorized at 1% and 99% levels. After the data processing and multicollinearity test, the statistical software Stata14.0 is used to conduct empirical analysis. We adopted a hierarchical regression strategy to stepwise add variables of interest into the model [62].

Table 2. The basic characteristics of the valid samples.

Variables	Frequency	Percentage
Gender		
Male	1372	72.32%
Female	525	27.68%
Age		
18–29	23	1.21%
30–49	200	10.54%
50–75	1490	78.55%
76 and above	184	9.70%
Education level		
No school-based education	232	12.23%
Primary school	737	38.85%
Middle school	628	33.10%
High school or above	300	15.81%
Village cadre		
Yes	308	16.24%
No	1589	83.76%
Member of the Communist Party of China		
Yes	611	32.21%
No	1286	67.79%

Note. n = 1897.

4. Results and Discussions

4.1. Sample Characteristics

The demographic characteristics of the respondents are presented in Table 2.

The majority of the respondents were male, accounting for 72.32%, which is consistent with the fact that most of the heads of Chinese rural families are male [63]. The average age of the interviewees was about 62 years, which is in line with the current situation of the aging of rural residents in China [63]. Of the respondents, 611 were members of the Communist Party of China, accounting for 32.21%, and 308 were village cadres, accounting for 16.24%. Moreover, 232 of the respondents never went to school for education, 737 of the respondents received primary school education, 628 of the respondents received middle school education, and 300 of the respondents received high school education or above; the average years of formal education the respondents received was about 7 years. This reflects that the average level of education of the respondents was relatively low. The average annual basic household income of the respondents was CNY 28,195 (USD 4372), while the standard deviation of it reached CNY 107,935 (USD 14,915). This reveals that the income of rural residents is generally low, and there exists a large income gap between different rural families.

4.2. Description of Jiangsu Rural Household Waste Classification Intention and Behavior

Among the 1897 Jiangsu rural residents in this survey, 1712 rural residents were willing to classify household waste, accounting for 90.25% of the whole, which indicates that most of the Jiangsu rural residents have the intention to classify household waste. However, as for rural residents' behavior of household waste classification, only 976 residents carried out household waste classification in reality, just taking up 51.45% of the respondents, which is largely lower than the rate of the residents who were willing to classify household waste. This result reveals that there exists a discrepancy between the intention and behavior of rural residents with regard to household waste classification, consistent with the studies of some scholars [64,65].

For core independent variables, rural residents generally agreed that economic incentives could promote better waste classification behavior, and waste classification behavior would be given reputation incentives, with the average value being 4.12 and 4.15, respectively.

4.3. Factors Influencing Jiangsu Rural Household Waste Classification Intention and Behavior

4.3.1. Model Estimation

The specific model estimation results can be seen in Table 3. Model 1 and Model 4 are the benchmark models, which only include the personal and family characteristics of the respondents, such as gender, age, education level, being a village cadre, being a member of the Communist Party of China, and annual basic household income. With economic incentives and reputation incentives being added, Model 2 and Model 5 are used to examine the impacts of economic incentives and reputation incentives on rural residents' intentions and behavior of household waste classification. After the inclusion of these two core independent variables, the chi-square of the two models increases from 79.50 to 150.91 and from 134.26 to 152.49, respectively, and the pseudo-R^2 increases from 0.066 to 0.125 and from 0.051 to 0.058, respectively (Table 3), indicating that the explanatory power of the model is enhanced. In Model 3 and Model 6, the interaction term of economic incentives and reputation incentives is added to examine the complementary effect between them. Previous studies have shown that if the independent variables are continuous, the interaction terms are required to be centralized first in regression analysis [66,67]. After adding the centralized interaction term to the model, the chi-square value of the models increases to 157.22 and 156.53, and the pseudo-R^2 increases to 0.130 and 0.060, respectively (Table 3). Likelihood ratio (LR) chi-square tests are used to decide each probit model's overall statistical significance [68]. In this study, all the models reached a significance level of 1% (Table 3), indicating that all these models can be preceded with the following analysis. It should be noted that Model 3 and Model 6 have the strongest explanatory power, owing to their inclusion of the variables of economic incentives, reputation incentives, and the interaction terms, and their impact on rural residents' intention and behavior of household waste classification is the main focus of this paper. Therefore, the following analysis is mainly based on the estimation results of Model 3 and Model 6.

Table 3. Model estimation results.

Variable	Classification Intention			Classification Behavior		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Economic incentives		0.102 **	0.154 ***		0.072 *	0.086 **
		(0.049)	(0.052)		(0.037)	(0.038)
Reputation incentives		0.311 ***	0.362 ***		0.090 **	0.113 ***
		(0.053)	(0.056)		(0.040)	(0.042)
Interaction of economic incentives and reputation incentives			0.082 **			0.051 **
			(0.033)			(0.026)
Gender	0.150	0.143	0.146	0.242 ***	0.241 ***	0.243 ***
	(0.096)	(0.099)	(0.099)	(0.071)	(0.071)	(0.071)
Age	−0.014 ***	−0.011 **	−0.010 **	−0.025 ***	−0.024 ***	−0.024 ***
	(0.004)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)
Education level	0.037 ***	0.032 ***	0.032 **	−0.001	−0.002	−0.002
	(0.012)	(0.013)	(0.013)	(0.009)	(0.009)	(0.009)
Village cadre or not	0.435 ***	0.408 **	0.393 **	0.238 ***	0.208 **	0.197 **
	(0.163)	(0.169)	(0.169)	(0.089)	(0.089)	(0.089)
Member of the Communist Party of China or not	0.226 **	0.230 **	0.232 **	0.147 **	0.142 **	0.140 **
	(0.106)	(0.110)	(0.110)	(0.071)	(0.071)	(0.071)
Annual basic household income	0.000 **	0.000	0.000	0.000 ***	0.000 ***	0.000 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.674 ***	−0.102	−0.578	1.285 ***	0.565 **	0.380
	(0.305)	(0.378)	(0.425)	(0.218)	(0.275)	(0.290)
LR chi2	79.50 ***	150.91 ***	157.22 ***	134.26 ***	152.49 ***	156.53 ***
Pseudo-R2	0.066	0.125	0.130	0.051	0.058	0.060

Note. n = 1897; standard errors are in parentheses; ***, **, * denote statistical significance level at 1%, 5%, and 10%, respectively.

4.3.2. Economic and Reputation Incentives Effects

As can be seen from Model 3 and Model 6, after controlling the personal and family characteristics of rural residents, both economic incentives and reputation incentives pass the significance tests. Specifically, economic incentives exert a positive influence on rural residents' intention and behavior regarding household waste classification, which is consistent with H1. Compared with the conditions without any economic incentives, taking some proper economic incentives will certainly promote the intention and behavior of rural residents to classify household waste. The possible explanation is that economic incentives can make up for the time and energy sacrificed by rural residents for household waste classification and bring more private interests to individuals engaged in household waste classification. Therefore, for the residents in rural areas, participation in household waste classification does not conflict with the pursuit of maximizing personal utility and wealth, thus avoiding the occurrence of collective-action dilemmas and free-rider problems. This result is consistent with the previous findings of some scholars [26,29].

Reputation incentives exert a positive influence on rural residents' intention and behavior of household waste classification, which means that in rural areas reputation incentives play a distinctive role in promoting the participation of residents in household waste classification. Therefore, H2 is verified here, which is consistent with the findings of Alpízar and Gsottbauer [28]. Possible explanations can be divided into the following two aspects. On the one hand, gaining praise from the outside and having a good reputation are identified as intrinsic pursuits of human beings [50], which will bring spiritual benefits to individuals. On the other hand, as one kind of social capital, a good reputation can increase the private benefits of individuals via indirect reciprocity [46], especially for rural residents who live in an "acquaintance society" [51]. At the same time, with the rapid development of the economy and the improvement of living standards in China, the basic material needs of rural residents have been largely met, making rural residents attach even more importance to their reputation and fame [15]. Therefore, rural residents' intentions and behavior regarding household waste classification can be greatly promoted if participation in waste classification can improve individuals' reputations. In this sense, taking some proper measures to enhance personal reputation incentives will certainly promote the intention and behavior of rural residents to classify household waste.

4.3.3. The Complementary Effect

From the empirical results of Model 3 and Model 6, the interaction term of economic incentives and reputation incentives is significant at the 5% significance level (Table 3). The coefficient of the interaction term is positive, which means that reputation incentives and economic incentives have complementary effects on rural residents' intentions and behavior of household waste classification. Therefore, H3 is accepted. Furthermore, when comparing Model 3 to Model 2 and comparing Model 6 to Model 5 (Table 3), it can be found that by adding the interaction term, the main effects of the two core independent variables are increased. This finding indicates the interaction term not only plays a significant role in promoting rural residents' intention and behavior with regard to household waste classification but also strengthens the standalone impacts of economic and reputation incentives. Therefore, combining economic incentive measures with reputation incentive measures can synergistically stimulate the enthusiasm of rural residents to participate in household waste classification to the maximum extent.

4.3.4. Personal Characteristics Effects

Some meaningful results are also observed among the variables of personal characteristics and family characteristics. As shown in Model 3, age, education level, being a village cadre, and being a member of the Communist Party of China have significant impacts on rural residents' intention of household waste classification at the 5% significance level (Table 3). From Model 6, gender, age, being a village cadre, being a member of the Communist Party of China, and annual basic household income have also resulted

in significant impacts on the household waste classification behavior of rural residents (Table 3). In general, residents who are younger and with a better education background are more inclined to accept household waste classification, which is consistent with the findings of Jia et al. [19] and Xu et al. [69]. In other words, younger residents tend to receive more education, and it is easier for them to understand the meaningfulness of household waste classification [19]. In addition, elder residents can hardly make extra efforts to classify household waste because of physical limits [70]. Xu et al. [69] also argued that elder villagers dislike changes or new things in their daily rural life. Therefore, age has a negative impact on rural residents' participation in household waste classification, while education level can positively influence the intention of rural residents to classify household waste.

Being a village cadre and a member of the Communist Party of China is significant at 5% significance (Table 3), which promotes the intention and behavior of rural residents with regard to household waste classification. This could be because the village cadres and members of the Chinese Communist Party are more involved in rural public affairs and governance than other residents [71], so they have a more profound understanding of waste classification policy and can better realize the merits and necessity of household waste classification. From the perspectives of social capital and embeddedness, in an authoritarian state, political affiliation can bring more resources and social capital that enable them to embed their own interests into public affairs [72]. At the same time, to gain access to a higher social prestige and political status, members of the political elite class (e.g., Party members and village cadres) also have the pressure to act as role models who actively respond to the call of the state [72].

Annual basic household income is significant at the 1% significance level in Model 6, which is consistent with the findings of previous studies [32,33,38]. It indicates that with the increase in income, the basic material needs of rural residents in daily life have been satisfied, so they pay more attention to the village living environment and their reputation among others.

5. Conclusions and Implications

Promoting household waste classification in rural areas is essential to address the environmental challenges associated with increasing waste generation in rural communities, and it has become a critical step towards achieving the Rural Living Environment Upgrade plan and rural revitalization in China [73]. Using data from the Jiangsu Rural Land Economic Survey (CLES), a series of binary probit models were employed to test our hypotheses. We conclude that: (1) Most surveyed rural residents have the intention to classify their household waste, but only half of them have performed the waste classification behavior. (2) Both economic incentives and reputation incentives can promote rural residents' intentions and behavior toward household waste classification. (3) A complementary effect between economic incentives and reputation incentives is also found to have a positive impact on rural residents' intentions and behavior of household waste classification. The combination of economic incentives and reputation incentives can strengthen the effects of both incentives.

Recommendations for rural governance policies are provided for improving environmental sustainability and achieving rural revitalization in China:

First, establish a sound incentive mechanism for promoting household waste classification in rural areas, which needs to synergize both economic incentives and reputation incentives. In the realm of economic incentives, a material rewards program could be introduced as a means to compensate rural residents for the time and effort spent in classifying household waste. The scheme entails bestowing residents with designated points for effectively classifying their domestic waste. These points can be exchanged for daily necessities such as laundry detergent as well as agricultural production inputs such as fuel, fertilizers, and pesticides. Monetary rewards could also be provided to more directly convert residents' intentions into the actual behavior of household waste classification.

As for reputation incentives, some activities are recommended to be carried out in rural communities. For example, organize a waste classification knowledge competition, and post the results of the competition on the bulletin board in the village. In addition, actively publicize the advanced deeds of residents participating in household waste classification. In some public places, such as village committee meetings and villagers' congresses, residents who perform well in household waste sorting should be publicly praised and rewarded as honorable role models. This can meet the needs of rural residents for praise and honor and create a good social atmosphere for participation in household waste classification.

Second, improve the mobilization system. Our findings captured the leading role of village cadres and party members in the household waste classification movement. Therefore, in the process of improving rural household waste management, it is suggested to further leverage the demonstrative and leadership capacities of party members and village cadres. Specifically, waste classification could be included in the performance assessment criteria for party members and village cadres. Additionally, it is necessary to utilize the characteristics of the acquaintance society in Chinese villages. Use social ties (family members, relatives, friends, neighbors, and co-workers) to encourage more villagers to participate in the classification of household waste through the demonstration of party members and cadres.

Finally, strengthen publicity and education on household waste classification. Explore reproducible and applicable rural household waste classification models, compile waste classification guidelines, and widely disseminate knowledge through various education channels including online videos, workshops, field trips, broadcasts, etc. Such efforts should be made to comprehensively improve the awareness of waste classification among rural residents of all ages. In addition, considering that rural residents with more education experiences are more likely to understand the benefits of household waste classification and accept the call for household waste classification, it is necessary to further promote the popularization of education in rural areas and improve the overall education level of rural residents. This can increase the participation rate of rural residents in household waste classification, improve rural public health, and better achieve rural revitalization.

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