Fall into the trap of phishing for fools------Based on behavioral analysis of smoking and drinking

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Abstract: Behavioral Economics puts forward that the weakness of human decision-making is an important cause of the vulnerability of the poor. If the external environment of decision-making is bad, it is easy to fall into the trap of "phishing for fools" set by the economic subject, which causes economic loss or psychological burden and increases the risk of returning to poverty. This paper studies whether the low-income groups are more likely to fall into the trap of "phishing for fools" and make irrational decisions based on the fact that the excessive consumption of tobacco and alcohol is harmful to their health but the consumption is increasing year by year. Based on the data on the 2015 China Health and Retirement Longitudinal Study, this paper Constructs Logit model, linear regression model and ordered Probit model to empirically analyze the important factors influencing the smoking and drinking behavior of rural residents. The results showed that, under the control of individual characteristics and regional living habits, income level had a significant impact on low-income groups' alcohol and tobacco consumption behavior.

1. Introduction
The consumption of tobacco and alcohol is considered one of the seven indicators to measure the health behavior index of the residents. Excessive smoking of tobacco, grass and drinking alcohol products can cause respiratory tract injury and increase the potential risk of chronic diseases such as cardiovascular and cerebrovascular diseases, however, according to research, the consumption of these two commodities by Chinese residents shows an increasing trend year by year, and the smoking rate of rural residents is higher than that of urban residents, and it is also higher than average in the ratio of tobacco and alcohol consumption expenditure, this phenomenon should arouse the attention of all sectors of society.

Nobel Prize winners Akeroff and RobertJ. Shiller proposed the Phishing for phools theory in 2015, believing that market players will deliberately look for consumer decision-making weaknesses and defects for their own benefit, especially in terms of psychological behavior, he uses these defects to make profits for himself. Is our relatively poor population even more affected by fishing stupidity? Taking the consumption of tobacco and alcohol as an example of businesses fooling consumers, we found that the consumption of tobacco and alcohol among the poor is higher than that of people with higher incomes, and the consumption expenditure is also higher than the average level. This consumption situation should arouse the attention of relevant departments, otherwise it will threatening the results of tackling poverty. At present, China has made great achievements in poverty alleviation. However, the population just out of poverty near the poverty line still faces the risk of returning to poverty. Existing theories have conducted a lot of effective research on what causes the
population just out of the poverty line to remain vulnerable. Factors such as illness, disaster, school and policy, but rarely from the combination of the behavior of the poor and vulnerable population and the behavior of the market economy subject in their living environment, have produced hidden fooling recognize and discuss the phenomenon. In view of this, this study uses micro-survey data, through regression model, empirical research poor vulnerable population in a bad environment, income level, bandwidth burden and other factors, will increase irrational behavior consumption, falling into the trap of "phishing for fools" designed by businessmen increases the risk of returning to poverty.

2. Theoretical analysis

2.1. Income level

According to research, income status is closely related to health, the higher the income, the better the health status (Lynch, 2004). Grossman (1972) put forward the concept of health production function, thinking that the cost and benefit of health are determined by many related economic factors, of which income has the greatest influence. Here's the consumer utility function:

\[
 Utility = (H, X) 
\]

In the above formula, ‘H’ represents the personal health of residents, and X represents a composite product composed of a variety of commodities, which means that more health or more consumer products will bring greater utility to consumers. According to human capital theory, health is the core theory and foundation, which is defined as a production function, and income is an equation related to health status:

Health = (income, health care, lifestyle, family conditions...)

At the same time, Jenny M. Cundiff et al. (2015) found that different indicators of socioeconomic status such as income and education have independent and interactive effects on health outcomes. That is to say, the group with higher income level will pay more attention to their health status, strengthen physical exercise, and stay away from bad habits. Compared with low-income groups, they pay less attention. The survey found that they have more bad habits, high smoking and drinking rates, and low exercise frequency.

Low-income groups are more vulnerable than the rich to the scarcity of resources (Mullainathan & Shafir, 2013), both physical and human. As a result, they are often overwhelmed by the costs and choices of life, prone to irrational decisions and limited self-control biases that lead them into the poverty trap.

2.2. Negative emotions

The study found that bad emotions are closely related to unhealthy lifestyle habits. Negative emotions and the abuse of tobacco and alcohol are inseparable (Zhang Hecuan, 2006), and are also related to the strength of personal self-control. In the struggle between daily life and comfort zone, individuals often overestimate their self-control (Augenblick & Rabin, 2018), schedules of unimplemented actions, bills for excess consumption, etc. Low-income groups are more likely to fall into the dilemma of self-control failure.

3. Empirical analysis

3.1. Data Sources

This article uses the 2015 China Health and Retirement Longitudinal Study (CHARLS) data, covering 150 counties and 450 communities (villages) in 28 provinces (autonomous regions and municipalities), a total of 210,950 respondents from 12,200 households were given a valid sample of 17,543 after deleting the urban variables and some missing information observations.
3.2. Descriptive statistics
The gender distribution of the sample, with men accounting for 46% and women accounting for 54%, with an average age of 58 years, mainly concentrated between 44 and 70 years old. 90% of people in the sample are married. The overall education level of the sample was low, averaging only 4.5 years of schooling, with 51 percent having a primary education or less, 30 percent not even having an education, and only 19 percent completing compulsory education. The per capita annual income of the family is about 7,880 yuan. According to the poverty standard set in 2011 (the per capita net income of rural households is 2,300 yuan/year), 26% of the population is still below the poverty line, and 15.5% of the sample smoke, 65% of people drink alcohol. Among the smokers, 55% of them smoke mainly in the range of 10-20 cigarettes per day, and 17% of the population reach high-frequency smoking of more than 30 cigarettes per day. Among the drinkers, 35% of them drink alcohol more than once a day.

The smoking and drinking behaviors of the sample are used as the dependent variable measurement indicators. Among them, smoking behavior includes two sub-indicators of “whether smoking” and “smoking frequency”.

3.3. Model building
Based on the model built by Gerdtham and Li, the basic model set is as follows:

\[ Health_{behavior} = \beta_0 + \beta_1 \ln income + \delta X_i + \mu \]  

\( '\ln income' \) represents the logarithm of household income per capita, and ‘X’ represents the control variable mentioned above. According to the respective properties of the four explained variables, four models are constructed: the 0, 1 dummy variables whose explained variables are "whether to smoke" or "whether to drink" are substituted into the Logit model \([\text{formula (2), formula (3)}]\); while using "smoking frequency" and "drinking frequency" as the explanatory variables, linear regression model \([\text{Formula (4)}]\) and ordered Probit model \([\text{Formula (5)}]\) are used respectively.

Logit model to analyze the influencing factors of "whether to smoke" or "whether to drink":

\[ \ln \frac{P(smoke_i = 1)}{1 - P(smoke_i = 1)} = \beta_0 + \beta_1 \ln income + \delta X_i + \mu \]  

\[ \ln \frac{P(drink_i = 1)}{1 - P(drink_i = 1)} = \beta_0 + \beta_1 \ln income + \delta X_i + \mu \]  

\( smoke_i = 1 \) means smoking, \( smoke_i = 0 \) means not smoking; \( drink_i = 1 \) means drinking, \( drink_i = 0 \) means not drinking.

Using the OLS linear regression model to analyze the influencing factors of “smoking frequency”:

\[ smokelfre_i = \beta_0 + \beta_1 \ln income + \delta X_i + \mu \]  

Using the ordered Probit model to analyze the influencing factors of "drinking frequency", let’s say an unobservable potential variable is \( \text{drinkfre}_i \), and the unobservable variable is \( \text{drinkfre}_i^* \), which means the frequency of drinking, with 0,1,2 values, where \( C_1 < C_2 < C_3 \):

\( drinkfre_i = 0, \text{if} \ drinkfre_i^* \leq C_1 \)

\( drinkfre_i = 1, \text{if} \ C_1 \leq drinkfre_i^* \leq C_2 \)

\( drinkfre_i = 2, \text{if} \ C_2 \leq drinkfre_i^* \)

And

\[ drinkfre_i^* = \beta_1 \ln income + \delta X_i + \mu \]
if $\mu$ is an independent and identically distributed random variable, assuming that its distribution function meets the accumulation standard normal distribution, which is $\Phi$.

Then you can get an ordered Probit model:

$$P(\text{drinkfre}^* = 0) = \Phi(C_1 - \beta_1 \ln\text{income} - \delta X_i)$$

$$P(\text{drinkfre}^* = 1) = \Phi(C_2 - \beta_1 \ln\text{income} - \delta X_i) - \Phi(C_1 - \beta_1 \ln\text{income} - \delta X_i)$$

$$P(\text{drinkfre}^* = 2) = 1 - \Phi(C_2 - \beta_1 \ln\text{income} - \delta X_i)$$

### 3.4 Empirical analysis outcome

**STATA .15 analysis**

**Table I:** Influence of income level on residents’ health behavior

|        | (1)          | (2)          | (3)          | (4)          |
|--------|--------------|--------------|--------------|--------------|
|        | smoke        | smokefre     | drink        | drinkfre     |
| lnincome | -0.1503**    | -0.3508***   | 0.0171       | -0.1048**    |
|         | (0.073)      | (0.256)      | (0.035)      | (0.020)      |
| gender  | 4.1717***    | 6.6803***    | -2.0941***   | 1.2786***    |
|         | (0.213)      | (0.912)      | (0.082)      | (0.046)      |
| age     | -0.0672***   | -0.1159***   | 0.0210***    | -0.0097***   |
|         | (0.009)      | (0.030)      | (0.004)      | (0.002)      |
| marital | ——           | -2.8320      | -0.6792*     | 0.4191*      |
|         | ——           | (2.353)      | (0.379)      | (0.227)      |
| eduyear | -0.0571**    | -0.1171      | -0.0248**    | -0.0121***   |
|         | (0.024)      | (0.078)      | (0.011)      | (0.006)      |
| keepmind| -0.0283      | -0.1075**    | 0.0733*      | -0.0496**    |
|         | (0.087)      | (0.266)      | (0.038)      | (0.021)      |
| depressed| 0.1995**     | 0.0512       | 0.1012**     | 0.0244       |
|         | (0.093)      | (0.284)      | (0.040)      | (0.023)      |
| satisfied| -0.2121**    | 0.3641       | -0.0516*     | 0.0260       |
|         | (0.100)      | (0.345)      | (0.048)      | (0.027)      |
| central region | -0.0172      | -2.0481***   | 0.2586***    | -0.1510***   |
|         | (0.197)      | (0.634)      | (0.091)      | (0.052)      |
| Western region | -0.2785      | -3.1458***   | 0.1950**     | -0.1553***   |
|         | (0.187)      | (0.629)      | (0.088)      | (0.050)      |

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

It can be seen from the regression results that each model has some control variables that are statistically significant. It can be specifically as follows: The higher the income, the lower the possibility of smoking, and it is significant at the level of 5%. At the same time, it has a significant negative impact on the frequency of smoking and drinking. The longer the individual has been educated, the lower the probability of smoking and drinking, which has a significant impact on the frequency of drinking, showing that the higher the education level, the less frequent drinking. In terms of individual characteristics, men are more likely than women to engage in tobacco and alcohol consumption behavior, and are also more likely to increase the frequency of such behavior. In terms of
age, the higher the age, the lower the likelihood of smoking, the frequency of smoking and the frequency of drinking, but the higher the likelihood of drinking.

At low income levels, vulnerable populations in poverty can slip into a state of scarcity of resources (Mullainathan & Shafir, 2013), which can draw too much attention to the scarcity of resources they face, and in the face of these dilemmas, it consumes a lot of heart and brain power, so in the process of solving, the choice is prone to error. At the same time, this heavy burden of scarcity, coupled with their low level of education, vulnerable populations often choose to use intuitive heuristic "system-unity" (Kaphneman 2011) to solve problems in their lives, although this kind of decision-making method consumes less energy, it makes it easy to make irrational decisions that are disadvantageous to its long-term interests. The "System II" (Kaphneman 2011) decision-making method, which is logical and needs repeated thinking, is seldom used, because the burden of its material and psychological resources has led to its lack of such ability. In the face of the goods that can bring one-sided sensory pleasure, but the actual excessive consumption will harm the health of the body, the vulnerable people will lack the ability of rational judgment, emotional pursuit to overcome rational choice, finally falls into this kind of merchant "the trap of phishing for fools", increased the economical and the medical treatment burden.

4. Conclusion
The irrational decision-making state of the poor and vulnerable population is an important factor leading to their return to poverty. Our country’s intervention policy for poverty alleviation should be adapted to this complicated social situation. Although some domestic scholars have noticed the value of behavioral economics in solving the problem of poverty and vulnerability, in general, there are few domestic researches on the behavioral economics of vulnerability, and the analysis of behavioral economics on the phenomenon of business fishing and prevention not much. Combined with foreign research experience, this paper believes that adding behavioral science to the policy intervention tool of standard economics to solve domestic poverty vulnerability issues and other public policy issues is of great theoretical and economic value.

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