How Individual Characters Affect the Ex ante Moral Hazard of Basic Medical Insurance: Evidence from China

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Abstract

How individual characters affect the ex ante moral hazard of basic medical insurance still remain academically debatable. This paper based on divergent individual characters of insurers to analyze the roles of basic health insurance on the ex ante moral hazard. It found health level, marital status, income level and age are the key individual factors affecting ex ante moral hazard of basic health insurance. But the roles of rural-urban difference and gender are not obvious. It gives supplementary explanations to the medical service expenditure, waste of medical resources and other issues, and also put forward the corresponding policy recommendations.

Keywords: Ex ante moral hazard, Basic medical insurance, Individual characters

1. Introduction

The comprehensive coverage of basic medical insurance is the key issue of for narrowing social income gaps and guarantee public welfares, especially for lifting the availability of residents' medical services and alleviating poverties due to illness. However, it also has some problems such as the ambiguity of security objects, system fragmentation and lack of connections. What's more important, there will also be some negative effects like moral hazard.

In existing studies, moral hazard could be divided into ex ante and ex post. Thereinto, the ex ante moral hazard means because the insurer faces a lower marginal expenditure on medical services, they have tendencies to reduce the investment in risk prevention in advance, resulting in an increase in the probability of risk (illness).

In the context of the current rising expenditure and the serious waste of utilization on medical services, this paper based on the individual characters of insurers to analyze the roles of basic health insurance on the ex ante moral hazard. It could give supplementary explanations to the medical service expenditure, waste of medical resources and other issues, and put forward the corresponding policy recommendations.

The contributions of this paper are as belows. First, from the perspective of bad behavior and unhealthy dietary structure, we analyzed the role of demand-side factors that have caused current increasing medical spending. It can provide a way to avoid the ex ante moral hazard, reduce the excessive medical services and solve the doctor-patient conflict.

Second, as one of the basic institutions for residents to resist the risk of disease and ensure their own health, we analyzed the impact of basic medical insurance on the ex ante moral hazard, and the mechanism of different individual characteristics in it. It can not only put forward effective suggestions for the government to integrate the current fragmented medical insurance, but also provide detailed and perfect suggestions for the government to control the ex ante moral hazard according to the health status, marital status, income level and age difference of insurers.

Third, this paper based on *China Health and Retirement Longitudinal Study* (CHARLS) 2013, an open, high-quality micro-survey database. The macroeconomic policy research based on microcosmic in this paper has stronger preciseness and credibility than the general use of macro data.

The rest of the paper is as below. Chapter 2 is literature review. Chapter 3 is theretical analysis. Chapter 4 is the methodology. Chapter 5 is empirical results. Chapter 6 is robustness check. And Chapter 7 concludes.

2. Literature Review

Compared with the ex post moral hazard, the study of the ex ante moral hazard has begun to rise in recent years. Ehrlich and Becker (1972) first raised ex ante moral hazard: when patients take part in commercial or public medical insurance, the marginal price of medical service they face decreases. Hence the medical insurance plays the role of smoothing income, and their motivation of self-protection and prevention decreases, which produces ex ante moral hazard.

However, there is a lot of controversies about the ex ante moral hazard in academic circles. At present, the empirical research is generally divided into two categories, one used bad living habits to measure the existence of ex ante moral hazard. The other measured the ex ante moral hazard by using the changes of calorie intake and dietary structure of the insurers after insurance.

Newhouse (1993) found the amount of health insurance will not have an impact on bad living habits. But Stanciole (2008) found health insurance promotes smoking, obesity and sedentary tendencies, but has a mitigating effect on alcoholism. Medicare may have direct and indirect effects on the health behavior of the elderly (Dave and Kaestner, 2009). The direct impact is to promote their bad living habits. But the indirect impact is due to the increase in the frequency of medical treatment after insurance, doctors will convey health-related information to them, thus inhibiting the poor health behavior of the insured (Spenkuch, 2012).

But some scholars have come to different conclusions. Courbage and Coulon (2004) has shown that medical insurance does not cause ex ante moral hazard. Simon, Soni and Cawley (2017) and Ghislandi et al (2015) also came to the same conclusion. The expansion of medical insurance coverage can promote the reduction of people's unhealthy behavior (Rezayatmand, Pavlova and Groot, 2012). The coverage of government health counselling plays an important role, especially by strengthening the cooperation between clinicians and the community, which can reduce the bad health behavior and financial burden of residents (Krist et al., 2010). Therefore, different incentive strategies are proposed for different insured groups (Fronstin, 2009).

In addition to the fact that bad living habits will affect people's health, the change of dietary structure, especially the intake of high calorie diet, is also an important factor to measure the existence of ex ante moral hazard. Klick and Stratmann (2007) found improving the level of protection for diabetes treatment in medical insurance can also increase the Body Mass Index (BMI) of the treated population, which indirectly proves the existence of ex ante moral hazard. On the contrary, Rashad and Markowitz (2009) found there is only a weak positive correlation between medical insurance coverage and BMI, which will not lead to obesity among insurers. The increase in coverage and the amount of compensation does not result in an increase in BMI, but increases the probability of obesity, and causes the heterogeneity in private and public insurance (Grossman and Mocan, 2011).

To sum up, the conclusions of the existing research are controversial in terms of medical insurance and ex ante moral hazard. In terms of medical access rate, a large number of literature believes that medical insurance can promote the utilization of medical services and improve the health status of residents, but there are also a small number of contrary views. In terms of out-of-pocket medical expenses, most of them think that medical insurance can reduce the family burden of residents, and there is also heterogeneity. In the aspect of ex ante moral hazard, most of them think that medical insurance can promote bad health behavior, but also is not conducive to the dietary structure of residents.

3. Theoretical Analysis

This chapter first expounds the source of moral hazard through the elasticity of price demand, and analyzes relevant individual characteristics and puts forward hypotheses according to some previous research conclusions.

As Figure 1 shows, as a kind of normal consumer goods, the consumption of medical services decreases gradually with the rise of price, and the demand curve tilts to the lower right. In the absence of basic health insurance (D_1), consume X_1 of medical services at P_1. When the basic medical insurance is involved, it reduces the elasticity of consumers' price demand for medical services. On the one hand, this reflects the protective effect of medical insurance on personal income, and the elasticity of price demand faced by insurers becomes smaller after participating in the insurance (from D_1 to D_2). Under the same price, the insurers are willing to consume more medical services, which makes themselves more "rich". That is, it mitigates the impacts and shocks of medical service expenses caused by income level restriction.
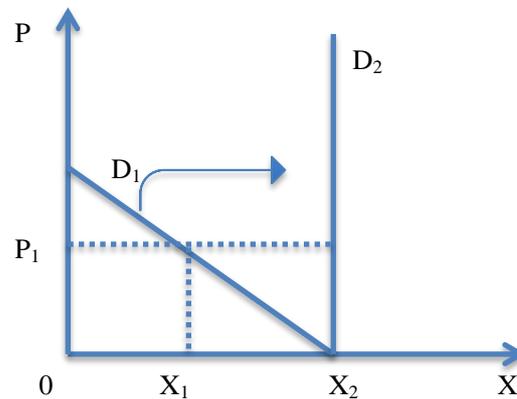
Figure 1. The Effect of Basic Medical Insurance on the Demand Curve of Service Utilization

On the other hand, as third parties share some of the spending on health services, the price of health services relative to consumers has fallen and demand has increased. And with the increase of the payment amount of basic medical insurance, the elasticity is increasing, that is, the demand curve is getting steeper and steeper (from D_1 to D_2). When health insurance covers all the costs of medical services, consumers need the maximum amount of their medical services X_2. At this point, the demand curve is perpendicular to the X axis (D_2), and the specific amount of increase in medical services depends on the price elasticity of medical services.

No matter which of the above aspects are analyzed, the insurers has the motivation to produce ex ante moral hazard. When basic health insurance relieves the impact of expensive health care costs, insurerss are more flexible in their own income. If they have bad living habits at this time, it is likely that there will be ex ante moral hazard. When the basic medical insurance increases the medical service demand of insurers, it is necessary to consider the insurer's time preference. It is possible that the insurers do not consume the medical service instantaneously when the consumption increases at that time. In this case, it's not just medical care, it's more about health care needs. They may tend to shift the demand to the future. Similarly, if they have bad habits like smoking, drinking, etc, it is likely for them to transfer the demand to the future. Based on the above analysis, we propose the hypothesis:

H0: Basic medical insurance will produce ex ante moral hazard.

From the analysis in the previous section, we have made clear the source of moral hazard. It should be emphasized that the process of moral risk arising from basic medical insurance is not clear. There are many individual characteristics that play an important role in it (Dave and Kaestner, 2009). From these studies, we can see the heterogeneity of ex ante moral hazard based on individual characteristics. Therefore, in this chapter, we systematically explore the role and mechanism of these factors in the process of ex ante moral hazard.

(1) health level. Health level has always been one of the individual characteristic factors concerned by scholars about ex ante moral hazard. Many scholars have proved that basic medical insurance can promote the utilization of medical services. Compared with the people with higher health level, the people with low health level consume more medical services, and have more contact and communication with hospitals, doctors and other medical service providers. In the process, doctors will send them disease-related information (such as smoking is harmful to health, etc.) and prevention information. These people may increase their preventive input to the disease after obtaining information. It is under this kind of supervision and repeated reminder that the poor health behavior of the people with low health level is relatively weak. Many scholars have found that there is a significant correlation between health standards and bad living habits. We use CHARLS data samples from people aged 45 and over. It is not only based on the self-assessment of health status, but also takes chronic diseases as one of the indicators, which has a certain degree of objectivity.

Based on the above analysis, this paper puts forward the following hypothesis:

H1: In the population with better health, the ex ante moral hazard is stronger, and vice versa.

(2) marital status. Marriage is also an important factor affecting bad health behavior.

Kendler et al (2017) found that marriage can not only reduce the drinking behavior of people who have no history of drinking, but also reduce the drinking behavior of individuals with a history of drinking in the family. At the same time, marriage is more effective for men, because women pay more attention to health, and can remind men at any time after marriage to reduce their unhealthy behavior. The main view of the marriage crisis model is that marital crisis (including

divorce) promotes unhealthy behavior and increases the risk of death. Feng et al (2014) found that the probability of mental damage in single or widowed individuals was higher than that in married people, and the effect on men was more significant. People who are unhappy in marriage may have a lonely personality and a more depressed mood. They need tobacco and alcohol to kill time and soften themselves. When basic health insurance reduces the price of medical services, this group of people may be more likely to aggravate their unhealthy behavior. Based on the above analysis, this paper puts forward the following hypothesis:

H2: People with poorer marital status are more likely to have ex ante moral hazard, and vice versa.

(3) Income level. The relationship between income and health is a hot spot in health economics. The high income group has more channels and quantities to obtain health information from the outside world, and can even buy health information. This information makes individuals pay more attention to their health, thus reducing the probability of prior moral hazard. Many literature show a positive correlation with health at a high income level, and an inverted U-shaped relationship between income gap and health (Yu and Wang, 2017). Based on the above analysis, this paper puts forward the following hypothesis:

H3: The ex antemoral hazard is stronger among the people with higher income level, and vice versa.

(4) Urban-rural differences. The difference between urban and rural areas is also an individual characteristic factor in the process of generating ex ante moral hazard. The probability of smoking in rural residents is higher than that in urban residents, which is related to the difference of traditional habits and health awareness (Rong, Yu, Zhang and Hu, 2010). The number of smoking and drinking in rural patients is higher than that in urban patients, but the frequency of exercise and physical examination is smaller than that in urban patients (Labuhn, Carolyn, Koon and Mullooly, 2010). Based on the above research, we think that due to some social status and living habits factors, the tendency of rural residents to have bad living habits is more serious than that of urban residents. Urban residents are relatively in an open information environment. Under the reminder of these information, urban residents may reduce their bad living habits, and the probability of ex ante moral hazard is less. Based on the above analysis, this paper puts forward the following hypothesis:

H4: The ex ante moral hazard in the rural residents is stronger than urban residents.

(5) Gender difference. The gender heterogeneity of ex ante moral hazard is also worthy of discussion. Studies have shown that men are more likely to smoke, drink and exercise than women, but the probability of physical examination is lower than that of women (Stanciole, 2008; Courbage and Coulon, 2004; Rezayatmand, Pavlova and Groot, 2012). Rashad and Markowitz (2009) also found The BMI index and the probability of obesity in men are higher than those in women. Men are the main sources of family economy. Compared with women, they will face more family and social conflicts (Farré, 2013). In addition, men also have more social activities than women (Kim, 2010). Because they are busy at work and spend less time in leisure exercise, men have a higher BMI index and an increased probability of being overweight and obese. Based on the above analysis, this paper puts forward the following hypothesis:

H5: Ex ante moral hazard is more likely to occur in men than in women.

(6) Age difference. The ex ante moral hazard of people in different age groups is also an important research angle. Young people have a high pressure in their lives and work, and it is more possible for them to relieve the pressure by smoking and alcohol (Mccool, Cameron and Petrie, 2005). Elderly people are richer in life experience and are more optimistic than the young people in the state of mind (Hagberg, Hagberg and Saveman, 2002). At the same time, with the growth of age, their physical function of the body decreases, so their risk of ex ante moral risk may be lower. Based on the above analysis, this paper puts forward the following hypothesis:

H6: Ex ante moral hazard is more likely to occur among young people than elderly people.

4. Methodology

The data used in this study are *China Health and Retirement Longitudinal Study* (CHARLS) 2013 established by the National Exhibition Research Institute of Peking University. The subject of investigation is the 45-year-old and the above population nationwide. CHARLS 2013 annual follow-up questionnaire includes basic information, family, health status & function, health care & insurance, work, retirement & pension, income, housing situation and visitor observation. We use basic information, health status & function, health care & insurance and income.

(1) Variables of living habits

The indicators of non-health used herein include *smoking*, the number of drinking of different types of wine (*winb, winep, wineh*), *activities*, *BMI* and *obesity*. In the questionnaire, the interviewees first asked whether the interviewees used to smoke, and then went on to ask if they still smoked. This article deals with individuals who have smoked before and still smoke as *Smoking* equals to 1. Individuals who have never smoked or who used to smoke and quit smoking now set *Smoking* equals to 0.

At the same time, respondents were asked how often and how much they drank in the past year. It were calculated for the most recent drink of strong wine (*winb*), beer (*winep*), and low wine (*wineh*). The questionnaire also asked respondents about their social activities in the past month. The range of social activities in the questionnaire is wide, which includes not only face-to-face interactions with outsiders (such as cross-door, mahjong, dancing, helping others, participating in associations or charitable activities, etc.), as well as on-line communication using some software (for example, surfing the Internet, stocks, etc.). In this article, the *activities* were recorded as 1 if yes in the past month, and recorded as 0 if no.

With regard to BMI index and overweight, the height and weight of the interviewees were measured and recorded in the physical examination questionnaire, in order to caculate BMI. The respondents also were asked about their waist circumference. We set *Obesity* equals to 1 for male waist circumference>=85cm or female waist>=80cm. Otherwise set it as 0.

(2) Variables of basic medical insurance cost

The basic medical insurance coverage is located in the medical care and insurance module. The questionnaire asked whether the interviewees participated in the urban job insurance, Social endowment insurance for urban residents and the new rural social endowment insurance. Then the respondents were asked the premium to be paid each year to take part in the insurance. According to the interviewees' annual contribution to the three insurances, this paper synthesizes the variable *Insurance* and takes the logarithm.

(3) Variables of health status

The variables of health status are located in the health and functional modules, and four variables are selected as health variables. The first is self-assessment of health status (*selfhealth*), questionnaire randomly divided the interviewees into two groups. The questions in the two groups were the same, but the answers were different. The first group is: 1, excellent; 2, very good; 3, good; 4, general; 5, not good. In this way, when the interviewees answer 5, *selfhealth* takes 1, and the rest takes 0. The second group is: 1, good; 2, good; 3, general; 4, not good; 5; very bad. In this way, when respondents answer 4 or 5, *selfhealth* takes 1 and the rest is 0.

Second, we set variables of ability for daily living (*lifeability*). There are many questions about the ability of daily life in the health and functional modules in the questionnaire, and there are four options for interviewees to choose: 1, there are no difficulties; 2, there are difficulties but can be completed; 3, there are difficulties in need of help; 4, unable to complete. When the interviewees chose 1 or 2, *lifeability* was recorded as 1, which was regarded as basic barrier in daily life. When the interviewees chose 3 or 4, *lifeability* was recorded as 0, which was regarded as an obstacle to daily life.

Third the interviewees were also asked about their chronic diseases, and a total of 14 chronic diseases were asked: 1, hypertension; 2, dyslipidemia; 3, diabetes; 4, cancer and other malignant tumors; 5, chronic lung disease; 6, liver disease; 7, heart disease; 8, stroke; 9, kidney disease; 10, digestive system disease; 11, emotional and mental problems; 12, memory-related diseases; 13, arthritis or rheumatism; 14 asthma. Based on Zhang, Lei, Strauss, and Zhao (2017), if patients had serious chronic diseases (one of 4,7,8 or 12), we set *major* 1 and the rest 0. If the interviewees suffered from normal chronic diseases (one of 1, 2, 3, 5, 6, 9, 10, 11, 13 or 14), we set *minor* 1 and the rest 0.

(4) Variables of individual characters

The higher the level of education means more health knowledge and lifestyle, and the stronger the willingness to invest in health. The level of education is located in the basic information module. The highest academic qualifications are interviewed by questionnaire. In this paper, the variable *education* is 1 for senior high school and above, and the rest is 0. Gender information is also located in basic information module. In this paper, the variable *male* is set 1 and female is 0. Age is also an important personal characteristic variable. In this study, the variable *age* was set up as the first year of each individual, and *agegroup* was the age grouping variable. The age of all the individuals in the sample was divided into three groups: high, middle and low. We set agegroup 1 for high groups and 0 for the rest.

In addition, according to the marital status, the questionnaire also asked the interviewees about their current marital status. This article sets the variables *separate* and *widow*. When their spouse is still alive but does not live with his or her (or has never married), we set *separate* 1, and the rest 0. *Widow* is set to 1 for bereavement, and the rest 0. The purpose of this paper is to distinguish among the different effects of no marriage, injury to marriage or the loss of spouse on personal behavior.

Personal income is located in the income module. Under the influence of weather, pest, plant disease and other external factors, the income of low-income households varies greatly every month (Lu et al., 2013), which will affect the robustness of regression results. At the same time, the monthly household living expenses will basically stabilize at the same level, and the error is much smaller than the use of personal monthly income. Therefore, in this paper, it is

proposed to set up the variable *lnincome*: the natural logarithm of the monthly domestic expenditure as an indicator to improve the effectiveness of the estimation result (Michael et al., 1997). We also set variables *lnincomegroup,* which were divided into three groups according to their size: the high income group set 1, and the rest 0. Finally, according to the type of account where the interviewees live, we set variable *hukou*. The value of *hukou* for agricultural account is 1, and the non-agricultural account is 0.

Table 1. The List of all Variables

Name	Definition
Dependent Variables	
wine	Drink more than once a month in the past year
wineb	Number of spirits consumed last time in the past year
winep	Number of beers consumed last time in the past year
wineh	Number of low-alcohol drinks consumed last time in the past year
smoking	Smoking or not at present
activities	Engaged in social activities in the past month
BMI	Weight / height ^{2}
wm	Waist circumference (cm)
obesity	Obesity (based on waistline criteria)
Independent Variables	
Insurance	Logarithm of contributions to three basic medical insurance
education	High school and above
selfhealth	Self-assessment of health
lifeability	Activity of daily living
major	Serious chronic diseases
minor	Mild chronic diseases
male	Gender
separate	Whether or not to be separated
widow	Widowed or not
lnincome	Monthly average income of the family
lnincomegroup	Income group
age	Age
agegroup	Age group
hukou	Account types

According to the theoretical hypothesis and data form, the linear probability model (LPM) is used in this study.

$$y_i = \beta_0 + \alpha_0 pbmi_i + \alpha_1 confac_i + \alpha_2 pbmi_i * confac_i + \boldsymbol{x_i'}\boldsymbol{\beta} + \varepsilon_i \ \ (i = 1,2 \cdots, n)$$

In the model i is individuals. y_i is dependent variables. $pbmi_i$ is individual amount of basic medical insurance expense. $confac_i$ is individual characters, included health level, marital status, income level, urban-rural differences and gender differences. $\boldsymbol{x_i'}$ is a series of control variables. When y_i is continuous variables, the coefficient of the independent variables represents the marginal effect. When y_i is binary variables of 0 and 1,

$$\mathrm{P}(y_i = 1|pbmi_i, confac_i, \boldsymbol{x_i'}) = E[y_i|pbmi_i, confac_i, \boldsymbol{x_i'}]$$

So we can get

$$\mathrm{P}(y_i = 1|pbmi_i, confac_i, \boldsymbol{x_i'})$$
$$= \beta_0 + \alpha_0 pbmi_i + \alpha_1 confac_i + \alpha_2 pbmi_i * confac_i + \boldsymbol{x_i'}\boldsymbol{\beta} + \varepsilon_i \ \ \ (i = 1,2 \cdots, n)$$

The model shows that the response probability P is a linear function of independent variables, which we call the linear probability model (LPM). LPM will produce two shortcomings: one is the fitted probability may be less than 0 or greater than 1, and the other is the partial effect of any explanatory variable with horizontal value is constant (Wooldridge, 2003). This two are clearly far from the actual situation. Even so, in the application, the ordinary least square regression (OLS) of LPM is still acceptable and widely used. The advantage is that it is easy to calculate and obtain the marginal effect.

To overcome the above problems, we can set the logarithmic unit (Logit Model) and the probability unit model (Probit Model), to ensure that the response probability is between 0 and 1:

$$P(y_i = 1|pbmi_i, confac_i, \mathbf{x}_i')$$
$$= \Phi(\beta_0 + \alpha_0 pbmi_i + \alpha_1 confac_i + \alpha_2 pbmi_i * confac_i + \mathbf{x}_i'\boldsymbol{\beta} + \varepsilon_i) \qquad (i = 1,2\cdots,n)$$

In the logarithmic unit model:

$$\Phi(z) = e^z/1 + e^z$$

In the probability unit model:

$$\Phi(z) = (2\pi)^{-1/2} * exp((-z)^2/2)$$

This is a nonlinear binary response model, and we use maximum likelihood estimation (MLE) (Wooldridge, 2003). Although the nonlinear binary response model can avoid the fitting value greater than 1 or less than 0, it also has problems that the marginal effect is not easy to calculate and changes with independent variables. The average marginal effect, the marginal effect at the mean value of the sample and the marginal effect at a certain representative value are generally used to analyze the average marginal effect. For policy analysis, it is usually more meaningful to use the average marginal effect or the marginal effect at a representative value.

The statistical description of all variables is shown in Table 2.

Table 2. The Statistical Description of all Variables

Name	Sample	Mean	S.E	Minimum	Maximum
wine	18371	0.2637	0.4406	0	1
wineb	3370	2.7777	5.3513	0	100
winep	2225	26.0747	155.7348	0	3300
wineh	665	4.1334	7.9252	0	100
smoking	14937	0.2897	0.4536	0	1
activities	16819	0.5808	0.4934	0	1
BMI	12977	3.1694	0.3128	2.4027	12.6235
wm	13042	86.8113	11.0224	19.5	144.8
obesity	13042	0.2552	0.4360	0	1
Insurance	15623	3.9148	1.5107	0	9.5750
education	17852	0.2676	0.4427	0	1
age	18564	59.9049	10.2449	16	102
agegroup	18564	0.3334	0.4714	0	1
separate	18585	0.0778	0.2678	0	1
widow	18585	0.1106	0.3136	0	1
selfhealth	18405	0.2704	0.4442	0	1
male	18594	0.4766	0.4995	0	1
lifeability	12645	0.2307	0.4213	0	1
lnincome	17231	6.2553	1.0305	-0.6931	10.6084

lnincomegroup	17231	0.3334	0.4714	0	1
hukou	18334	0.7739	0.4183	0	1
major	16921	0.1881	0.3908	0	1
minor	17332	0.9405	0.2365	0	1

In order to ensure that the OLS estimate satisfies the Gauss Markov Theorem, it is necessary to satisfy the assumption of exogenous variables,

$$Cov(\varepsilon_i, \boldsymbol{x}_i) = 0$$

However, there are always some factors and variables that can not be observed and the endogeity issues are inevitable. There are three sources of endogeity: missing variable deviation, synchronism (including reverse causality and common factor driving) and measurement error. The main variables explored in this paper are basic medical insurance and bad living habits. The main problems are simultaneous equation error and self-selection error. However, it has been reported that the three basic health insurance policies in China basically cover all the population (Marten et al., 2014). Therefore, we thought there is no endogeity in the empirical research of this paper.

5. Results

Table 3-Table 5 are the main regression results. The dependent variables in Table 3 include *smoking* and *activities*; in Table 4 include *wine*, *wineb*, *winep* and *wineh*; in Table 5 include *BMI*, *wm* and *obesity*. In model (1) we didn't add the intersection of basic medical insurance cost and other individual characters. The results show basic medical insurance do increase the probability of smoking for insurers. For every 1 yuan increase in the cost of basic medical insurance, the probability of smoking increases by 0.5% (significant at 10% level). This suggests that hypothesis H0 holds, but the role of basic medical insurance in leading to ex ante moral hazard is weak.

Model (2) and (3) add the intersection of basic medical insurance with *agegroup* and *lnincomegroup*. The coefficients of *Insurance* is significantly negative, and *Insurance*agegroup* significantly positive. It shows that the high age group increases the negative effect of the cost of basic medical insurance on the probability of smoking. It shows that the high age group increases the negative effect of the cost of basic medical insurance on the probability of smoking. The probability of smoking is higher in the low age group after purchasing the basic medical insurance, so the ex ante moral hazard is higher in the low age group, which verifies hypothesis H6.

In model (3), the coefficients of *Insurance* is significantly negative, and the coefficients of *Insurance*lnincomegroup* significantly postive. It shows that ex ante moral hazard in the high-income group is stronger, which verifies H3. Model (4) shows that the cost of basic health insurance significantly reduces the number of social activities of insurers, which verifies ex ante moral hazard. Model (5) shows that people with poor health can increase the negative effect of medical insurance on social activities. It is not in line with H1, which may result from the poor physical quality of these individuals and their inability to participate in social activities, which does not indicate that ex ante moral hazard in the people with poor health condition is stronger.

Table 3. The Effects of Basic Medical Insurance on Smoking and Activities (OLS)

Dependent Variables	*smoking*	*smoking*	*smoking*	*activities*	*activities*
	（1）	（2）	（3）	（4）	（5）
Insurance	0.0049*	-0.0025	-0.0003	-0.0158***	-0.0206***
	（1.81）	（-0.68）	（-0.09）	（-4.37）	（-4.81）
education	0.0046	0.0052	0.0051	0.0593***	0.0593***
	（0.49）	（0.53）	（0.52）	（4.67）	（4.67）
age	-0.0001	-0.0000	-0.0000	-0.0032***	-0.0032***
	（-0.37）	（-0.18）	（-0.16）	（-5.37）	（-5.43）
separate	0.0113	0.0092	0.0094	0.0218	0.0218
	（0.75）	（0.58）	（0.59）	（1.02）	（1.02）

	(1)	(2)	(3)	(4)	(5)
widow	0.0366***	0.0396***	0.0379***	0.0859***	0.0860***
	（2.92）	（3.04）	（2.91）	（5.04）	（5.05）
selfhealth	0.0160**	0.0164**	0.0166**	-0.0562***	-0.0559***
	（2.02）	（1.97）	（1.99）	（-5.22）	（-5.20）
male	0.6180***	0.6164***	0.6149*	-0.0113	-0.0108
	（74.81）	（71.72）	（1.71）	（-1.07）	（-1.02）
lifeability	0.0218**	0.0163*	0.0168*	-0.1028***	-0.1019***
	（2.32）	（1.66）	（1.71）	（-7.94）	（-7.87）
lnincomegroup	0.0027	0.0018	0.0014	0.0287***	0.0288***
	（0.70）	（0.45）	（0.35）	（5.45）	（5.46）
hukou	0.0070	0.0124	0.0155	-0.1267***	-0.1264***
	（0.69）	（1.13）	（1.43）	（-9.08）	（-9.07）
major		0.0201**	0.0204**		
		（2.83）	（2.14）		
Insurance*agegroup		0.0161***			
		（2.83）			
Insurance*lnincomegroup			0.0095*		
			（1.72）		
Insurance*selfhealth					0.0162**
					（2.08）
N	7916	7916	7285	9401	9401
Adj R-squared	0.43	0.43	0.43	0.04	0.04

Note: ***, **, * indicated statistical significance at 1%, 5%, and 10% level respectively. The t statistics is represented in parentheses. *Insurance* has been centralized.

Table 4. The Effects of Basic Medical Insurance on Alcohol Drinking (OLS)

Dependent Variables	wineb	wineb	wineb	wineb	wineb	winep	winep	winep	wineh	wineh	wineh
	（1）	（2）	（3）	（4）	（5）	（6）	（7）	（8）	（9）	（10）	（11）
Insurance	0.0418	-0.0164	-0.0783	-0.0992	-0.6700	-1.1569	-2.8936	-3.8118*	0.3831	0.1203	-0.1884
	（0.66）	（-0.23）	（-0.92）	（-1.30）	（-1.70）	（-0.70）	（-1.55）	（-1.71）	（1.15）	（0.34）	（-0.47）
education	0.2077	0.2083	0.2068	0.2554	0.2189	4.9773	5.0277	5.1462	0.7021	0.8034	0.7052
	（0.97）	（0.97）	（0.97）	（1.14）	（0.95）	（0.94）	（0.95）	（0.97）	（0.55）	（0.63）	（0.55）
age	-0.0411***	-0.0423***	-0.0402***	-0.0412***	-0.0395***	-0.2731	-0.2618	-0.2669	-0.0293	-0.0282	-0.0614
						（-0.98）	（-0.94）	（-0.96）	（-0.46）	（-0.44）	（-0.96）
separate	0.3607	0.3417	0.3573	0.2818	0.3632	-3.8918	-3.5872	-3.3690	-0.1412	-0.0723	-0.3081
	（0.96）	（0.91）	（0.95）	（0.71）	（0.89）	（-0.41）	（-0.38）	（-0.36）	（-0.07）	（-0.03）	（-0.15）
widow	0.1394	0.1516	0.1803	0.1845	0.1383	-5.5763	-6.5214	-5.1294	1.7797	2.7142	0.8273

	（0.38）	（0.42）	（0.49）	（0.48）	（0.36）	（-0.54）	（-0.63）	（-0.50）	（1.00）	（1.48）	（0.46）
selfhealth	0.0636	0.0858	0.0426	0.0164	0.0379	10.9932**	10.8846**	10.9637**	3.7320**	3.6054**	3.0991*
	（0.30）	（0.40）	（0.20）	（0.07）	（0.17）	（2.06）	（2.04）	（2.05）	（2.88）	（0.06）	（2.37）
male	1.0079***	1.0290***	1.0065***	1.1963***	1.0137***	-3.3685	-3.3816	-3.5905	-0.7264	-0.6516	-0.2611
	（3.91）	（3.99）	（3.91）	（4.41）	（3.70）	（-0.61）	（-0.62）	（-0.65）	（-0.60）	（-0.54）	（-0.21）
lifeability	-0.2542	-0.2278	-0.2622	-0.2339	-0.2237	-5.0664	-4.2386	-5.0118	-1.4900	-1.6060	-0.8414
	（-1.04）	（-0.93）	（-1.08）	（-0.91）	（-0.86）	（-0.77）	（-0.65）	（-0.77）	（-0.95）	（-1.02）	（-0.53）
lnincomegroup	0.2030*	0.2015*	0.2151**	0.1880*	0.2057*	2.0130	2.1763	1.8361	0.2943	0.3374	0.4580
	（1.94）	（1.92）	（2.05）	（1.73）	（1.85）	（0.74）	（0.81）	（0.68）	（0.45）	（0.52）	（0.69）
hukou	-0.1195	-0.1351	-0.2131	-0.1893	-0.0971	-13.8221**	-14.6710**	-13.6831**	-0.8468	-0.9728	-0.6824
	（-0.49）	（-0.55）	（-0.86）	（-0.73）	（-0.37）	（-2.22）	（-2.35）	（-2.20）	（-0.53）	（-0.61）	（-0.40）
major				0.1423							1.6476
				（0.55）							（0.93）
minor					0.1069						
					（0.19）						
Insurance*selfhealth		0.2531*					7.6961**				
		（1.72）					（1.99）				
Insurance*agegroup			0.2724**								
			（2.12）								
Insurance*major				0.5853***							1.2358*
				（3.88）							（1.74）
Insurance*minor					0.7381*						
					（1.85）						
Insurance*lnincomegroup								5.7303*			
								（1.76）			
Insurance*widow										1.7458**	
										（2.02）	
N	1518	1518	1518	1407	1428	964	964	964	297	297	278
Adj R-squared	0.03	0.03	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.001

Table 5. The Effects of Basic Medical Insurance on BMI, Waistline and Obesity (OLS)

Dependent Variables	BMI	BMI	BMI	BMI	BMI	wm	wm	obesity	obesity
	（1）	（2）	（3）	（4）	（5）	（6）	（7）	（8）	（9）
Insurance	0.0007	0.0025	-0.0033	-0.0035	0.0046	-0.0839	0.0728	0.0010	0.0064*
	（0.25）	（0.87）	（-0.93）	（-0.97）	（1.33）	（-0.87）	（0.56）	（0.37）	（1.74）
education	0.005	0.0052	0.0049	0.0049	0.0038	0.5237	0.5283	0.0306***	0.0307***
	（0.54）	（0.56）	（0.52）	（0.53）	（0.38）	（1.55）	（1.57）	（3.22）	（3.24）
age	-0.0016***	-0.0015***	-0.0016***	-0.0015***	-0.0016***	-0.0331**	-0.0338**	-0.0022***	-0.0022***
	（-3.64）	（-3.61）	（-3.74）	（-3.61）	（-3.57）	（-2.16）	（-2.20）	（-5.04）	（-5.09）
separate	0.0096	0.0097	0.0100	0.0108	0.0126	-1.6408***	-1.6342***	-0.0574***	-0.0572***
	（0.61）	（0.538）	（0.63）	（0.68）	（0.75）	（-2.90）	（-2.89）	（-3.60）	（-3.59）
widow	0.0012	-0.0015	0.0014	0.0009	-0.0015	-0.4145	-0.4381	0.0006	-0.0002
	（0.10）	（-0.12）	（0.11）	（0.07）	（-0.12）	（-0.95）	（-1.00）	（0.05）	（-0.02）
selfhealth	-0.0210***	-0.0209***	-0.0208***	-0.0210***	-0.0304***	-0.4212	-0.4143	-0.0030	-0.0028
	（-2.70）	（-2.69）	（-2.67）	（-2.70）	（-3.60）	（-1.51）	（-1.48）	（-0.39）	（-0.36）
male	-0.0511***	-0.0512***	-0.0507***	-0.0508***	-0.0511***	-1.2366***	-1.2613***	0.5512***	0.5504***
	（-6.65）	（-6.68）	（-6.61）	（-6.61）	（-6.27）	（-4.49）	（-4.58）	（71.17）	（70.99）
lifeability	-0.0129	-0.0126	-0.0127	-0.0127	-0.0201**	0.3338	0.3395	0.0103	0.0105
	（-1.36）	（-1.33）	（-1.34）	（-1.34）	（-1.99）	（0.99）	（1.00）	（1.09）	（1.11）
lnincomegroup	0.0156***	0.0155***	0.0154***	0.0155***	0.0150***	0.6190***	0.6073***	0.0142***	0.0138***
	（4.08）	（4.05）	（4.02）	（4.04）	（3.69）	（4.51）	（4.42）	（3.68）	（3.57）
hukou	-0.0505***	-0.0497***	-0.0487***	-0.0505***	-0.0408***	-3.1515***	-3.0422***	-0.0804***	-0.0767***
	（-4.82）	（-4.75）	（-4.63）	（-4.82）	（-3.60）	（-8.38）	（-7.99）	（-7.61）	（-7.17）
major					0.0458***				
					（4.74）				
insurance*widow		-0.0137*							
		（-1.78）							
insurance*hukou			0.0093*						
			（1.72）						
insurance*male				0.0090*					
				（1.71）					
insurance*major					-0.0123**				
					（-2.02）				
insurance*agegroup							-0.3518*		-0.0120**
							（-1.82）		（-2.20）
N	7297	7297	7297	7297	6785	7337	7337	7337	7337
Adj R-squared	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.43	0.43

In Table 4, the coefficients of *Insurance* is still significantly positive. In model (2)-(5) the coefficients of intersections *Insurance*selfhealth*, *Insurance*agegroup*, *Insurance*major* and *Insurance*minor* is significantly positive. It implies individual factors such as health status, age and chronic disease can all affect ex ante moral hazard.

In detail, in model (2), *selfhealth* can adjust the effect of *Insurance* on *wineb* (significant positive). The negative effect of *Insurance* on *wineb* is enhanced, which indicates that the ex ante moral risk is stronger in healthy population (H1). In model (3), the *agegroup* of high age can enhance the negative effect of *Insurance* on *wineb*, so ex ante moral hazard is stronger among young people (H6). Both models (4) and (5) verifies H1. Model (6) imply *Insurance* can reduce beer consumption *winep*. Model (7) verifies H1. In model (8), *Insurance* can significantly reduce *winep*, but the negative effect is stronger in the high income group. This is not consistent with H3, which may be because beer comsumption is the inferior good to the high income group due to its higher calories and cheaper prices. Model (9) implies *Insurance* has postive effects on *wineh*, which also indicates ex ante moral hazard. Models (10) and (11) show that marital status and health status also regulate the effect of *Insurance* on *wineh*. These results verify H1 and H2.

In Table 5, the coefficients of *Insurance*widow, Insurance*hukou, Insurance*male* and *Insurance*major* are significant, which imply marital status, differences between urban and rural areas, gender and chronic diseases can all affect ex ante moral hazard.

The coefficient of *Insurance*widow* in model (2) is significantly negative, contrary to H1. The possible reason is that widowed people are depressed, resulting in a relatively light weight, thus offsetting the income effect of basic health insurance, which in turn increases food intake. Model (3) shows that rural residents can significantly increase the negative effect of basic medical insurance on body weight, that is, to restrain ex ante moral hazard and verify that H4 is not valid. Model (4) shows that men's ex ante moral hazard is weaker than women, contrary to previous researches. Model (6) explores the effect of *Insurance* on the waist circumference, also indicating the existence of ex ante moral hazard. Model (7) shows that ex ante moral hazard is weaker in the elderly group (H6). This is also the same for model (8) and (9).

6. Robust Check

In order to verify the robustness and effectiveness of the results, we sue Probit and Logit Models instead. The results are given in Table 6 and 7, which show that the empirical results are robust.

Table 6. The Effects of Basic Medical Insurance on Smoking, Drinking and Activities (Probit)

Dependent Variables	wine	wine	smoking	smoking	smoking	smoking	activities	activities	obesity	obesity
	（1）	（2）	（3）	（4）	（5）	（6）	（7）	（8）	（9）	（10）
Insurance	-0.0033	-0.0113	0.0250*	-0.0076	0.0027	0.0035	-0.0448***	-0.0606***	0.0028	0.0451**
	（-0.30）	（-1.00）	（1.73）	（-0.39）	（0.14）	（0.20）	（-4.54）	（-5.09）	（0.23）	（2.79）
education	-0.0149	-0.0167	0.0201	0.0214	0.0196	0.0192	0.1607***	0.1612***	0.4243***	0.4246***
	（-0.40）	（-0.44）	（0.41）	（0.44）	（0.40）	（0.39）	（4.76）	（4.77）	（10.60）	（10.59）
age	-0.0089***	-0.0090***	0.0007	0.0007	0.0008	0.0007	-0.0081***	-0.0082***	0.0149***	0.0146***
	（-4.92）	（-4.96）	（0.30）	（0.31）	（0.35）	（0.29）	（-5.28）	（-5.33）	（7.74）	（7.56）
separate	-0.0487	-0.0407	0.0467	0.0451	0.0454	0.0462	0.0569	0.0570	-0.1719**	-0.1685**
	（-0.77）	（-0.64）	（0.58）	（0.56）	（0.57）	（0.57）	（1.00）	（1.01）	（-2.28）	（-2.24）
widow	0.0700	0.0689	0.2230***	0.2293***	0.2204***	0.2216***	0.2233***	0.2238***	-0.5370***	-0.5446***
	（1.25）	（1.23）	（3.32）	（3.41）	（3.28）	（3.30）	（4.98）	（4.99）	（-8.68）	（-8.78）
selfhealth	-0.3241***	-0.3236***	0.0787*	0.0784*	0.0799*	0.0765*	-0.1475***	-0.1474***	-0.0789**	-0.0772**
	（-9.42）	（-9.40）	（1.82）	（1.81）	（1.85）	（1.77）	（-5.24）	（-5.24）	（-2.20）	（-2.15）

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
male	1.2426***	1.2458***	2.0375***	2.0443***	2.0370***	2.0386***	-0.0318	-0.0305		
	[38.05]	（38.11）	（48.92）	（48.92）	（48.89）	（48.91）	（-1.15）	（-1.10）		
lifeability	-0.0551	-0.0561	0.0952*	0.0935*	0.0970**	0.0990**	-0.2656***	-0.2631***	0.0006	0.0025
	[-1.36]	（-1.38）	（1.93）	（1.89）	（1.96）	（2.00）	（-7.86）	（-7.79）	（0.01）	（0.06）
lnincomegroup	0.0541***	-0.0538***	0.0069	0.0091	0.0070	0.0077	0.0758***	0.0762***	0.0858***	0.0820***
	（3.24）	（3.22）	（0.33）	（0.44）	（0.33）	（0.37）	（5.48）	（5.50）	（4.79）	（4.56）
hukou	0.0339	0.0365	0.0766	0.0558	0.0730	0.0731	-0.3473***	-0.3479***	-0.2058***	-0.1749***
	（0.80）	（0.86）	（1.38）	（0.99）	（1.31）	（1.31）	（-9.22）	（-9.23）	（-4.51）	（-3.77）
major			0.1274***	0.1264***	0.1275***	0.1295***				
			（-8.43）	（2.63）	（2.65）	（2.69）				
insurance*separate		0.1148***								
		（2.67）								
insurance*agegroup				0.0715**						-0.0927***
				（2.45）						（-3.92）
insurance*lnincomegroup					0.0477*					
					（1.68）					
insurance*major						0.0637**				
						（2.11）				
insurance*selfhealth								0.0500**		
								（2.39）		
N	9665	9665	7285	7285	7285	7285	9401	9401	7337	7337
Pseudo R-squared	0.17	0.17	0.38	0.38	0.38	0.38	0.03	0.03	0.04	0.04

Note: The z statistics is represented in parentheses

Table 7. The Effects of Basic Medical Insurance on Smoking, Drinking and Activities (Logit)

Dependent Variables	wine	wine	smoking	smoking	smoking	smoking	acti	acti	obesity	obesity
	（1）	（2）	（3）	（4）	（5）	（6）	（7）	（8）	（9）	（10）
Insurance	-0.0078	-0.0217	0.0379	-0.0234	-0.0010	0.0023	-0.0722***	-0.9834***	0.0065	0.0832***
	（-0.42）	（-1.11）	（1.46）	（-0.66）	（-0.03）	（0.07）	（-4.46）	（-5.00）	（0.32）	（2.97）
education	-0.0280	-0.0311	0. 0395	0.0430	0.0394	0.0378	0.2605***	0.2608***	0.7131***	0.7153***
	（-0.44）	（-0.49）	（0.46）	（0.50）	（0.45）	（0.44）	（4.74）	（4.74）	（10.61）	（10.62）

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
age	-0.0166***	-0.0168***	-0.0006	-0.0004	-0.0004	-0.0007	-0.0132***	-0.0134***	0.0252***	0.0247***
	（-5.26）	（-5.30）	（-0.15）	（-0.10）	（-0.10）	（-0.16）	（-5.31）	（-5.36）	（7.69）	（7.49）
separate	-0.0812	-0.0603	0.0823	0.0785	0.0788	0.0805	0.0926	0.0926	-0.2957**	-0.2934**
	（-0.74）	（-0.55）	（0.57）	（0.54）	（0.55）	（0.56）	（1.01）	（1.01）	（-2.22）	（-2.20）
widow	0.1030	0.1003	0.4230***	0.4331***	0.4191***	0.4212***	0.3659***	0.3670***	-0.9527***	-0.9691***
	（1.02）	（0.99）	（3.27）	（3.35）	（3.24）	（3.26）	（5.00）	（5.02）	（-8.31）	（-8.42）
selfhealth	-0.5715***	-0.5706***	0.1551*	0.1547*	0.1580**	0.1509*	-0.2363***	-0.2370***	-0.1409**	-0.1369**
	（-9.41）	（-9.39）	（1.94）	（1.94）	（1.98）	（1.89）	（-5.21）	（-5.23）	（-2.26）	（-2.20）
male	2.1890***	2.1942***	3.5389***	3.5511***	3.5380***	3.5412***	-0.0512	-0.0492		
	（36.25）	（36.31）	（44.66）	（44.67）	（44.65）	（44.64）	（-1.14）	（-1.10）		
lifeability	-0.0976	-0.0989	0.1550*	0.1545*	0.1578*	0.1619*	-0.4261***	-0.4221***	0.0080	0.0104
	（-1.37）	（-1.39）	（1.70）	（1.69）	（1.73）	（1.77）	（-7.85）	（-7.77）	（0.11）	（0.14）
lnincomegroup	0.0967***	0.0957***	0.0128	0.0177	0.0134	0.0142	0.1216***	0.1221***	0.1456***	0.1391***
	（3.31）	（3.27）	（0.33）	（0.46）	（0.35）	（0.37）	（5.41）	（5.43）	（4.69）	（4.47）
hukou	0.0699	0.0727	0.1472	0.1036	0.1391	0.1403	-0.5641***	-0.5653***	-0.3559***	-0.3006***
	（0.95）	（0.99）	（1.45）	（1.01）	（1.37）	（1.38）	（-9.10）	（-9.11）	（-4.66）	（-3.85）
major			0.1898**	0.1881**	0.1894**	0.1991**				
			（2.10）	（2.08）	（2.10）	（2.20）				
insurance*separate		0.1929***								
		（2.59）								
insurance*agegroup				0.1312**						-0.1642***
				（2.52）						（-4.07）
insurance*lnincomegroup					0.0837*					
					（1.65）					
insurance*major						0.1070**				
						（1.99）				
insurance*selfhealth								0.0813**		
								（2.39）		
N	9665	9665	7285	7285	7285	7285	9401	9401	7337	7337
Pseudo R-squared	0.17	0.17	0.38	0.38	0.38	0.38	0.03	0.03	0.04	0.04

The above empirical studies show that, when a large number of bad habits are used as the index, ex ante moral hazard caused by the basic medical insurance is common. Marital status, health status, income level and age are the main individual characteristic factors. The influence of urban and rural hukou and gender on ex ante moral hazard needs to be further explored. In general, the hypotheses tested in this paper is shown in Table 8:

Table 8. An Overview of the Test for Hypotheses

H0	H1	H2	H3	H4	H5	H6
Yes	Yes	Yes	Yes	No	No	No

We can draw the following conclusions. People with good health are more likely to have ex ante moral hazard. People with poor marital status have a stronger ex ante moral hazard. People with high income level have stronger ex ante moral hazard. Younger people have stronger ex ante moral hazard.

The roles of hukou and gender are not obvious. We think the possible reason is that rural people lack some channels to carry out unhealthy behavior, or their life pressure is relatively small, and will not sit for long hours because of manual work. As to gender, in the context of the adequate supply of women's labour force, the female population also faces great work and living pressure, so some unhealthy living habits, such as sedentariness, are inevitable.

7. Conclusion and Policy Suggestions

The empirical results show that health level, marital status, income level and age are the key individual factors affecting ex ante moral hazard. In this regard, we make the following suggestions.

First, people with good health are more likely to have ex ante moral hazard. We recommend that the health population be encouraged to carry out health services other than treatment services through "health-care fund covering preventive medical expenditure". The cost of these health services (such as fitness and health product consumption) should be included in the scope of health insurance reimbursement. This will help to increase their own attention to health and correct the concept of

"Treat the disease seriously and prevent it lightly" in the whole society. It could reduce the production of ex ante moral hazard from the source and medical service expenditures.

Second, people with poor marital status have a stronger ex ante moral hazard. We can encourage some social groups to actively participate in it and publicize the correct concept of marriage in traditional culture. We should advocate the establishment of harmonious, happy and stable families and actively guide the social atmosphere. The departments of civil affairs should support the development of social marriage mediation companies. In detail, Tax benefits can be given based on the number of spouses contributed by the company annually. It is also possible to offer the loan preferences to these companies to help them in the online website construction.

Third, people with high income level have stronger ex ante moral hazard. We suggest that enterprises set up small gymnasiums for their employees. We also suggest that enterprises set up rest areas for employees to take a nap, and provide free coffee, desserts and other meals in the area. These measures not only promote the health of employees, but also improve their sense of belonging and security. Enterprises should also strengthen tobacco control in their office locations, and reduce unhealthy behavior among employees.

Fourth, younger people have stronger ex ante moral hazard. For young people with unhealthy lifestyles, we suggest that they relieve stress in healthy ways, such as fitness, swimming, etc., rather than smoking and drinking. For young people, only by reducing unhealthy behavior can they effectively prevent future mid-life crisis and have a harmonious and happy family.

Finally, the introduction of commercial insurance company funds into the field of social security is conducive to alleviating the current decline of health funds in many local governments, which ensures the role of health funds in protecting labor reproduction and stabilizing social and economic development. It is necessary to actively guide commercial insurance companies into the field of health, strengthen the cooperation between social security institutions and commercial insurance companies, and improve the efficiency of the use of health resources, all of which are conducive to reducing unhealthy behaviors, controlling the ex ante moral hazard, and then preventing the waste of medical resources.

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