

Is There Moral Hazard in China's Basic Endowment Insurance Market?

—An Empirical Study on the Influence of Basic Endowment Insurance on Fertility Decision-making

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ABSTRACT

Under the influence of the birth control carried out for years, the growth rate of newborn baby in China has been on a low state. The consequently sharp increase in proportion of elderly population has aggravated the expenditure of China's social security and the dearth of labourer, impeding the economic development in China. Particularly in China's basic endowment insurance market, aging population increases the financial burden of young generation and makes the supply of the future endowment insurance fund ever unstable. Meanwhile, social security has also become one of the important factors contributing to the current low fertility rate in China, the popularization of which will further affect the population structure and bring moral hazard to the insurance market itself. In this article, based on data from the China General Social Survey, Poisson regression model and Logit model were established, with propensity score matching method and instrumental variable method adopted to eliminate endogeneity problem. This paper will take whether or not to participate in urban/rural pension insurance as explanatory variable, fertility intention and fertility decision as the explained variables. The results show that residents' participation in endowment insurance has a negative impact on their fertility intention and fertility decision. There is moral hazard existing in China's basic endowment insurance market. As for policy implementation, in alleviating the economical burden brought by pensions, the role of maternity welfare and commercial insurance should be considered comprehensively.

Keywords: *Basic Endowment Insurance.*

1. INTRODUCTION

With the continuous improvement of social endowment insurance and the gradual liberalization of family planning policy, people's attitude towards fertility is experiencing a negative conversion. Influenced by such conversion, China is now witnessing a slowdown in population growth. According to data issued by the National Bureau of statistics, the standard birth rate of China's population in 2020 is 1.7, which is lower than the standard of 2.1 calculated by the United Nations. By around 2022, China's population over 65 years old will account for 14% of the total population, and the society will complete the transformation to an aging society. The trend of aging population casts a shadow over China's economy growth as forming a healthier population

structure in which the proportion of working-age population is declining and inevitably leading to the waning of demographic dividend, therefore a economic reconstructing is demanded. Especially, under the ongoing pay-as-you-go system, such trend will increase the burden of the prospective insured and make it difficult to maintain the balance of payments of China's basic endowment insurance. Pertinent adjustments needed to be made.

In order to cope with the increasingly serious aging problem, Chinese government has introduced a number of measures, including a "separate" and "comprehensive" two-child policy, purporting to emancipate potential fertility will and guarantee the supply of future labor force for the country's economy. The measures taken have played a positive role in alleviating China's

pressure brought about by aging population to some degree and seem to abate the decline of fertility rate in the first few years of which the policy had been initially applied. However, it has been questioned that while the two-child policy has released some of the fertility potentials in short term, it has not fundamentally changed the trend of a low fertility will. Moreover, its effect on ameliorating the tension in China's pension fund pool may be rather limited. Considering both the current population composition and the foreseeing pressure in payment of basic endowment insurance, policy such as "comprehensive two-child" alone may not be a strong solution. Therefore, It is necessary to further explore the causes and correlated factors of present low fertility will.

Recently, the State Council decides to launch a comprehensive reform of the pension insurance system for the staff in organs and institutions that nearly 40 million personnel of organs and institutions will be required to pay contributions as well as employees of enterprises. After the reformation, the level of pension will be calculated according to the quantity of previous personal contributions and the length of the payment period, which ensures that the newly reformed level of pension is at least not lower than the existing level. The knowing substitution effect between social endowment and family endowment debilitates the utility of having children and therefore makes it more "expensive", reducing people's consumption of which. As China's pension insurance industry developing rapidly, its prevalence not only has the potential to change people's attitude towards supporting issues, work, and savings, but is likely to have a significant impact on fertility will. As previously stated, a decrease in fertility rate is able to worsen the condition in supporting the old people for a country, stagnating the development of whose economy. Hence, in corresponding to the national economic transition, it is of great theoretical and practical significance to explore the cause and effect relationship between the two.

Drawing from the information above, we speculate that: 1. participating in China's basic endowment insurance will have a significant negative influence on individual's fertility will. 2. A significant negative correlation between participation and the number of children born per family in China has been shown. By making a connection between the discouraging effect of social security on fertility and the risk posed by low fertility rate towards the basic endowment insurance market in turn, we draw on the concept of moral hazard to further enhance the topic. Based on the conjecture we made, this article will pay close attention to if there is moral hazard existing in China's basic endowment insurance.

This paper will make references to relevant theories, explore whether individual's participation in basic endowment insurance will reduce fertility will or

influence fertility decisions through empirical research. Specifically, based on the existing research, we use the most recent data of China General Social Survey(CGSS) since 2017 to establish Poisson regression and logistic regression models, and use Propensity Score Matching(PSM) and instrumental variables to best eliminate the ill effect of non-random grouping phenomena, reverse causality, and other possible endogenous problems. Furthermore, this article takes the actual number of children of each sample to study whether fertility decisions are really affected by social security, so as to provide a basis for better coordination of the relationship between family endowment and social endowment under the current economic transformation period.

2. THEORETICAL BASIS AND LITERATURE REVIEW

2.1. Theoretical basis

Relevant concepts mentioned are as followed.

Fertility will and related decision-making by individual are influenced by fertility policy and set a direct influence on important indicators such as fertility rate and population growth rate; China's basic endowment insurance is a compulsory social insurance system established and implemented by the state in accordance with the provisions of laws and regulations. By law, working-age employing unit and laborer are required to pay the insurance premium according. After the laborer reaches the retirement age stipulated by the state or withdraws from the labor post for other reasons, the social insurance agency pays the pension and other treatment to it according to law in order to protect its participants' basic standard of living. Compared with commercial insurance, in which people voluntarily pay premiums to insurance companies for profit purpose, China's basic endowment insurance is designed to maintain social stability and ensure the financial security for the elderly after retirement; pay-as-you-go system refers to the old-age pension required by an aging population in any given year, paid by the old-age insurance contributions of the working population of that year, which, after retirement, increases pensions by contributions from the next generation of working people, extended from generation to generation; moral hazard effect is a market inefficiency that generated from asymmetric information where a party has an incentive to take unusual risks in attempt to earn a profit before contrast settles.

In this article, we do our research with reference to the following theories.

Family fertility theory. Family fertility theory applies the theory of consumer behavior in microeconomics to fertility analysis. Modern microeconomics family

fertility theory holds that children are a special kind of consumer goods (which may be an investment in poor families), together with consumer goods such as cars and food, to meet people's consumption needs. For example, a more perfect social endowment insurance system and wider coverage will promote low-income families to dispel the worries of old age, weaken the benefits of such insurance and reduce the expected income. Children's net prices rise and demand falls.

Pension insurance related theory. Welfare theory of the elderly holds that the market is ineffective in solving the poverty of the elderly, and that the government needs to set up pension insurance exercises to help the elderly out of poverty; efficient theory of induced retirement assumes that human capital decreases with age and average human capital of the elderly will be lower than the average human capital. Young people hope for the elderly to withdraw from the labor force, in order to make the elderly willing to give up their work, arranging the endowment insurance system as a compensation mechanism; retirement insurance theory suggests that endowment insurance is a kind of protection for the population who lose income because of retirement, supporting introducing endowment insurance system by taxing the working population and paying allowances to the elderly who lose their ability to work.

2.2. Literature review

In terms of the substitution effect concerned, as early as 1988, *Barro et al.(2005)* proposed *altruism from offspring to parents* [1]. *Ehrlich et al.(2007)* then argued that intergenerational transfers could be offset by social security taxes and benefits [2]. *Cheng et al.(2013)* proposed China's new rural pension system to make participants dependent on their children's financial support [3]. From then on, *Zhang et al.(2015)* believed that participation in social security schemes enabled both generations to improve their lives with children [4].

By concentrating on the relationship between social security and fertility, *Yang(2009)*'s study showed that the individual contribution rate of public pensions has no effect on population growth [5]. While in micro study, after collecting data for more than 32 years in 57 countries, *Ehrlich (2007)* considered the pay-as-you-go social security system to be an important factor in the decline in fertility, especially in OECD countries. *Wu(2019)* thought that the implementation of the "two-child" policy is helpful in alleviating the pressure of social endowment to some extent, but the significance of the effect is not presented [6]. *Qi et al.(2017)* believed that reducing pension spending will not fundamentally affect fertility in the long run [7]. However, *Wang et al.(2015)* empirically tested the endogenous relationship among social security rate, marriage structure, and total fertility rate, and found that the change in social security rate has a negative incentive to total fertility rate that can

not be offset and intergenerational transfer [8]. Subsequently, *Liu(2017)* said that there was a serious negative impact on whether there were children and, if any, the number of children expected to have a high dependence on government pensions [9]. With further exploration, *Kang et al.(2018)* concluded that the significant negative impact of participation in basic endowment insurance on fertility will only exist in urban areas [10]. However, *Chen et al.(2019)* refuted the conclusions of Kang Chuankun and Sun Genji, implying the possibility of abusing data by whom, and claimed that such significant negative impact is displayed on general public [11].

The research of many domestic and foreign scholars has proved the correlation between social security and fertility, while the conclusion on how basic endowment insurance affects the fertility rate in China is still controversial. In this article, we will use the newly recent data to identify if such moral hazard exists in China's basic endowment market at present stage, and discuss whether the very likely existing negative impact on fertility will has already or has not been extended to people's fertility decisions.

3. EMPIRICAL ANALYSIS

3.1. Data sources

Data used in this article are from CGSS China Comprehensive Social Survey questionnaire, which is a comprehensive collection of micro data from different regions, communities, families, and individuals. In the following research, data from 2010, 2012 and 2017 are selected as research samples. After excluding invalid samples and missing values, 10179 valid samples from 2010, 9557 from 2012, and 10603 in 2017 are obtained.

3.2. Variable selection

In this paper, two explained variables, fertility will and fertility decision, are constructed. According to the CGSS questionnaire, "If there are no policy restrictions, how many children do you want to have", the answer excluding 99% of the outliers is the total fertility intention of the explained variable, and the variable is presented as 1-5. According to the question "What family member do you have", considering the implementation of family planning policy in China after 1982, whether the eldest son/daughter is included in the sample's family member is selected as the explanatory variable fertility decision. If it does the observed value is set to 1 and otherwise set to 0.

In terms of explanatory variables, the answer to the subquestion "whether you are currently participating in the following social security projects" or "participate in urban/rural endowment insurance" will be used as an explanatory variable. Set "participated" to 1 and no

participation to 0, excluding "not applicable "," do not know" and "refuse to answer ".

In terms of control variables, this paper selects individual characteristics including gender, age, residence location, education level, state of marriage, whether have participated in medical insurance, state of health, attitude of supporting issues, and family characteristics including total family income. In terms of variable setting, for gender, male is set to 1 and female is set to 0; age is calculated on the basis of the year of the questionnaire minus the year of birth; rural and formerly rural resident are set to 1, urban and formerly non-rural resident are set to 0; the answer to the question "your current highest level of education" is converted into the number of years of education; for the state of marriage, marriage is set to 1, unmarried is set to 0; for medical insurance, participant is set to 1, non participant is set to 0; using the original numerical answer of the question "what level do think of your current health status is" as a stratification for state of health; for attitude of supporting issues, according to the question "Who do you think should be mainly responsible for the support of elderly", taking the answer "government/children/self responsibility sharing" as the control group set three dummy variables, when the answer is "government-responsible", set the first dummy variable to 1, otherwise set to 0; when the answer is "children-responsible", set the second dummy variable to 1, otherwise set to 0, when the answer is "self-responsible", set the third dummy variable to 1, otherwise set to 0; the relationship between total family income and fertility will is nonlinear, taking the logarithm of which.

Table 1 Variable definitions

variable	definition of variable	mean	standard difference
Explained variables:			
Fertility will	Continuous variable (s)	2.006	0.806
Fertility decision	0=no 1=yes	0.685	0.464
Explanatory variables:			
Social Endowment Insurance	0=no 1=yes	0.741	0.438
Individual characteristics:			
Gender	0=female 1=male	0.460	0.499
Age	Continuous variable (year)	51.012	16.328
Registered permanent residence	0=non rural 1=rural	0.624	0.484
State of health	1=unhealthy 2=less healthy 3=general 4=fairly healthy 5=very healthy	3.483	1.083
Medical insurance	0=no 1=yes	0.928	0.259
Education level	continuous variable (year)	5.045	2.999
Government responsible	0=no 1=yes	0.122	0.327
Children responsible	0=no 1=yes	0.490	0.500
Self responsible	0=no 1=yes	0.061	0.240
State of marriage	0=no 1=yes	0.837	0.298
Family characteristic:			

Total annual household income continuous variable 10.438 1.942
(logarithm,yuan)

3.3. Model establishment

1. In this paper, we set the following models:

$$Ferwill_i = \beta_0 + \beta_1 ins_i + \gamma X_i + \varepsilon_i \quad (1)$$

$$Ferde_i = \beta_0' + \beta_1' ins_i + \gamma X_i + \varepsilon_i \quad (2)$$

Ferwill represents the individual's fertility will. Ferde represents the individual's fertility decision. Ins explains whether the sample participates in the urban/rural endowment insurance. X represents the control variables, including the individual characteristic and the family characteristic. ε is the random disturbance term. Explanatory variable fertility will is a counting variable, thus Poisson regression is applied; explanatory variable fertility decision is a binary variable, thus the logistic regression is applied.

2. Endogeneity

There is certain endogeneity in the selection and processing of the model, which is manifested in:

(1) Non-random grouping phenomenon. Whether or not to participate in urban/rural endowment insurance is the result of self-selection, great heterogeneity between participants and non-participants is expected.

(2) Reverse causality. Fertility will is likely to affect the decision of whether to participate in urban/rural endowment insurance. People with stronger fertility will are more likely to expect their children to provide for financial support and choose not to participate in endowment insurance.

In order to solve the problems above, this paper takes family income and attitude for supporting issues as instrumental variables of unobservable heterogeneity into the model. It is necessary then to test whether there is multiple collinearity existing and to verify the average processing effect by propensity score matching method. In terms of instrumental variables, after China implemented a comprehensive social basic endowment insurance policy in 2011, according to the data of National Bureau of Statistics, the number of people participating in endowment insurance in 2010 was 102.768 million, and the number of people participating in 2012 was 48369.54. Compared with the previous year, the breakpoint surge was achieved. Since a strong correlation lies between the year and whether the individual participates in the urban/rural endowment insurance and individual characteristics or decisions can not affect which year the sample is taken from, mixed cross-section data of CGSS 2010 and 2012 are selected to construct the regression of fertility will. Set samples from 2012 to 1 and others to 0.

3.4. Empirical test and results analysis

1. Empirical testing

Columns (1) to (3) in Table 1 represent Poisson regression estimates of the fertility will to participation in urban/rural endowment insurance using data from 2017. And Column (1) contains regression results without adding any control variables. Column (2) contains results after adding individual control variables to the regression and column (3) contains results with both individual and family control variables. Columns (4) to (6) are listed as logit regression estimates of fertility decision to participation in urban/basic endowment insurance using data from the same year.

Columns (1) to (3) show that participation in urban/rural basic endowment insurance has a significant negative impact on the fertility will of individuals at the level of 1% in 2017, and the significance has increased after adding individual and family control variables. Compared with those who did not participate in the urban/rural basic endowment insurance project, the participants' fertility will decreased by 5.4%. The data show that at the stage the substitution effect of urban/rural endowment insurance on children exceeds the effect of income effect, which is usually said to promote fertility will. Such a result inhibits fertility will. Moral hazard does exist. In addition, rural residence has a significant positive effect on total fertility will, which may be related to traditional rural family value, family structure, and lifestyle.

Columns (4) to (6) show that, according to data from 2017, participation in urban/rural basic endowment insurance has a significant negative effect on individual fertility decision. After adding control variables by turn, The negative effect of urban/rural endowment insurance on the probability of having children has been weakened, but the direction of effect has not changed. It shows that participation in social basic endowment insurance will reduce the number of children that people had, indicating that moral hazard had occurred. It can be also seen from the table that rural residence, self-rated health status, and total family income have significant positive effects on fertility decision, while the education level has significant negative effects on the number of children people have.

Table 2 Poisson and Logit regression

Variables	Fertility will			Fertility decision		
	(1)	(2)	(3)	(4)	(5)	(6)
(6)						
Social endowment insurance	-0.0791**	-0.0756***	-0.0541***	-0.4099***	-0.4091***	-0.3896***
Individual characteristic:						
Gender		0.0053	0.0063	-0.1108**	-0.1974***	
Age		0.0141***	0.034***	-0.0206***	0.0114***	
Registered permanent residence		0.2389***	0.2405***	0.3062***	0.2480***	
State of health		-0.0028	-0.0008	0.0308***	0.0227***	
Medical insurance		0.0423	0.0555	-0.0278*	0.0345	
Education level		-0.0038*	-0.0039	-0.2028***	-0.1095***	
Pension from the Government-responsible		-0.0623	-0.0731**	-0.3026*	-0.3740***	
			(1.2294)	(1.2418)		
Children-responsible		0.0230*	0.0078*	0.0439	0.0464	
		(1.3458)	(1.3492)			
Self-responsible		-0.0697*	-0.0741	-0.0020	-0.0047	
		(1.1428)	(1.1529)			
State of marriage		0.0087*	0.0079	0.0074***	0.0065***	
Family characteristic:						
Total annual household income			-0.0106***	-0.0139*		
Sample size	10603	10603	10603	3379	3379	3379

Note: (1)1*, **, *** indicate significant at the statistical levels of 10%, 5% and 1%, respectively, the same as below. (2) Variance expansion factor in parentheses.

Table 2 reports the propensity score matching processing results. Compared with the controlled group, the experimental group had a significant negative average treatment effect on fertility will and fertility decision, which is consistent with the regressions above. It shows that after controlling the endogenous problems of random grouping and missing variables, the negative effect of participating in social basic endowment insurance on fertility still exists, among which the influence on fertility will is greater than that on fertility decision.

Table 3 PSM results

	Fertility will	Fertility decision
ATT	-0.1654**	-0.1015**
Sample size	10603	3379

Table 3 reports the regression results of instrumental variables. The one-stage F value shows that there is no weak instrumental variable problem in the selection of instrumental variables. After controlling the individual and family characteristics, the degree and significance of

the effect displayed by regression using instrumental variables were lower than that of the previous regression, and the direction of the effect does not change, which is in line with the previous conclusion.

Table 4 Instrumental variable regression results

	Reproductive will
Basic endowment insurance	-0.0288*
First stage F value	5375.125
Sample size	19514

4. CONCLUSIONS AND POLICY RECOMMENDATIONS

4.1. Conclusions

Under the ongoing issue of low fertility rate, it is of great importance to study the relevant influencing factors. This paper uses the data of CGSS China Comprehensive Social Survey in 2017, using Poisson regression, logit regression and tendency score method draw the following conclusions:

(1) Whether to participate in urban/rural endowment insurance has a significant negative effect on fertility will in the current period. Social endowment has an obvious substitution effect on family endowment, and there is moral hazard existing in China's social basic endowment insurance market at present.

(2) Participation in endowment insurance has historically negatively affected people's fertility decisions, significantly reduced the number of children people have, indicating that moral hazard in the same market has played a role.

In this paper, certain aspects need to be improved:

(1) the study of fertility decision cannot better deal with the time series problem contained in the sample.

(2) failure in using more ideal data such as panel data to perfectly prove the cause and effect relationship between variables.

4.2. Policy recommendations

1.Improvement in Supporting Policy related to fertility

To make the "two-child" policy realize its due effect, government may commence stimulating the long-term fertility will of young people, so that young people should not only "can do", but also "will do". We should also further improve and implement all kinds of maternity benefits, such as avoiding discrimination against women of childbearing age in the workplace, and strive to innovate family planning policies, such as reducing fertility restrictions, appropriately encouraging fertility in the form of certain tax cuts, tax incentives, and

subsidies [12]. Thereby increasing the fertility rate and injecting new vitality into economic development.

2.Further development of commercial endowment insurance

At present stage, apart from improving the basic endowment insurance system, the government should vigorously develop occupational annuity and individual commercial supplementary endowment insurance through recruiting the talent and fiscal and taxation policy support. In addition, we should appropriately increase the breadth and depth of social basic endowment insurance and narrow the gap of the coverage of social security between urban area and rural area. In line with the new trend of people's endowment preference, major efforts should be devoted to developing commercial endowment insurance, especially from the experience of Shanghai and other first-tier cities [13]. By enhancing the system design, optimizing the level of tax and improving the quality and convenience of related service, helping expand the pilot project and realizing national promotion as soon as possible, commercial endowment insurance can better shoulder the function of the third pillar of the social endowment security system [14].With the reduction of the people's pension burden, the increase in fertility will be possible and economic development will be better.

3.Improvement in social welfare system

A better quality of public services should be provided, including continuing efforts to improve the level of public health services, increase public education expenditure and reduce the cost of raising kids, etc. In particular, from the perspective of addressing the problem fundamentally, measures concerned with basic standard of living should be weighed with great importance, such as encouraging the development of qualified trusteeship institutions and promoting the quality of public primary education; creating more job opportunities and raising the level of wages and benefits; further curbing the rapid growth of house prices [15]. Reducing the pressure of living and creating a stable and favourable social environment have a positive effect on people's willingness to bear children. A surge on people's fertility will instead guarantee the labor supply in the coming years by improving the population structure in a healthier way, shoring up the sustainability of our society's pension insurance system and hence bolstering the long-term growth of China's economy.As the level of social welfare improves, people have better expectations of their living standards, which will help stimulate fertility and promote a virtuous economic cycle.

The improvement of a country's economic development level cannot be separated from the positive effect of the fertility level. Under current culture and systems in force, in the face of an impending fund gap in the country's pension insurance system, multifaceted

measures in adjusting retirement age, payment years, payment base and fund coordination should be carried out synchronously. Only by taking actions in a fairly circumspect way can we better solve the main contradiction lying in China's basic endowment market, truly augment people's fertility will and raise the fertility rate of China in the long run, and promote economic development.

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