

The Impact of Social Security on Fertility Willingness in OECD Countries

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Abstract

The low fertility rate is a common problem faced by all countries in the world today. All countries in the world have adopted different policies to improve the fertility rate. Based on the panel data of 36 OECD member countries from 1995 to 2019, this paper studies the impact of social security level on fertility through a two-way fixed effect model, and also examines the impact of other influencing factors on fertility. The results show that there is a U-shaped relationship between social security expenditure and fertility rate, and the social security coverage rate and fertility rate have a negative relationship, and the impact effect is more indirect. The research results of this paper are helpful to understand the impact mechanism of fertility rate from a macro perspective, and provide reference for the Chinese government to improve fertility rate through multiple channels.

Keywords

Social Security, Fertility, Fertility Willingness, OECD Countries

1. Introduction

Population sustainable development is the basic condition for economic and social sustainable development. Affected by various factors, the global population presents four major trends: population growth, population aging, migration and urbanization. The aging trend of the world population is the most important trend in the change of the world's population structure. It is closely related to the decline of population fertility and birth rate, as well as the decline of mortality and the increase of life expectancy, and has become a widespread world problem. In the past few decades, almost all regions have experienced fertility decline. According to the World Population Outlook 2022, the global fertility rate will drop from 2.3 children per woman in 2021 to 2.1 in 2050.

China implemented the family planning policy after the reform and opening up in 1978, resulting in a rapid decline in the fertility rate. The total fertility rate of China's population has been lower than the 2.1 level that meets the needs of normal population replacement for a long time. The decline of fertility in OECD countries is earlier than that in China, and has been on the decline trend since 1960. The average level of comprehensive fertility rate in OECD countries was 3.332 in 1950, 2.04 in 2000, and then 1.5 in 2021 (OECD database). The continuous decline in the fertility rate will lead to the imbalance of the population structure, the reduction of the working population in the future, and the lack of effective labor supply for economic development. In addition, the problem of population aging is increasing. In the long run, the low fertility rate will also lead to the decline of population vitality and the shrinking of population size, which will have a significant negative impact on economic and social development. In order to stabilize and develop the economy, many countries have improved the social security system to increase the fertility rate, such as improving the level of social security, increasing the intensity of old-age care, and improving the level of medical care and education.

In recent years, China has continued to improve its fertility policy. After the release of the one-child policy in 2013, the CPC Central Committee and the State Council decided to implement the comprehensive two-child policy at the end of 2015. On May 31, 2021, the three-child policy was put forward. However, few policy responders have given birth to three children, resulting in the failure of policy objectives. This paper studies the current situation of fertility in OECD countries through the fixed effect model, analyzes whether the level of social security has a significant impact on improving fertility, and provides policy reference for improving fertility in China in the future.

2. Literature Review

Faced with the pressure of rising living costs, including housing, education and medical care, the reduction of fertility desire is also inevitable in China. As an important means of redistribution of national income, the social security system plays a vital role in adjusting the income gap of residents and protecting the rights and interests of citizens.

2.1. Facilitation

The positive adjustment function of social security is mainly reflected by the minimum living security system, poverty alleviation, medical assistance and other welfare measures in social security. Social security improves the income status of the people at the bottom of the society by directly transferring social wealth to a wide range of low-income groups and the poor, providing them with a direct basic source of living (Cai & Yue, 2020). The subsidy effect of basic social security has increased the total income of families, thus increasing

people's fertility desire. The research of foreign scholars generally shows that the social security system helps to reduce the income gap, but the redistribution effect of the social security system in developed countries is better than that in developing countries. In addition, due to the rich social security system, its internal systems play a regulatory role in their respective fields, such as old-age insurance to improve the income of the elderly (Jun, 2020), medical insurance to reduce the risk of family expenditure, and maternity insurance system can alleviate the tension of women in terms of economy, time and other aspects due to childbirth. The implementation of the social old-age security system can provide basic security for the elderly, improve the income of the elderly, and reduce the concerns of the insured about the elderly. In the dynastic model, it is found that because parents care about the utility of their offspring, the elders save money to ensure that the offspring are free from the risk of labor income, and choose to support them after retirement (Zhang & Zhang, 2007), thus improving the economic situation of the child-ready families and raising the fertility rate. The improvement of medical insurance coverage has significantly promoted the increase of disposable income of urban residents (Zhang & Chen, 2022). The "new agricultural insurance" can effectively reduce the incidence of rural poverty, reduce social fertility costs and improve social fertility level. Maternity insurance is not only to provide health services, medical security and economic compensation for female employees to have children and children. Its maternity leave and allowance system has a broader system protection function (Xu & Fan, 2021). In the context of the three-child policy, further strengthening the maternity insurance, improving the fertility culture, raising the fertility desire and increasing the fertility rate, alleviating the aging of the population and promoting the balanced development of the population have significant positive effects.

2.2. Inhibition

Many international and domestic documents have proved that the level of social security is negatively correlated with fertility. The introduction of social security will reduce the fertility rate (Guinnane & Streb, 2021). The higher the social security expenditure of a country, the lower the fertility will due to crowding out effect (Zhang et al., 2022). Academics generally believe that in developed countries with relatively complete social security systems, social security will reduce the ideal fertility desire. The average cost of childbearing in developed regions is generally high. Due to the improvement of social security, the implementation of the social endowment insurance system directly enables parents to no longer rely on the economic support of their children to realize the pension. The traditional old-age model has been gradually replaced by the modern socialized old-age model, so the family has gradually become the concept of childbearing without the need to raise children. Rational families are more willing to increase their total income by choosing to reduce the number

of births and participate in pension insurance (Guo, 2018), thus reducing the fertility rate. In developing countries, due to the inadequate coverage and weak security of the social pension security system, the elderly are heavily dependent on family pension in terms of economic support and spiritual comfort. From a macro perspective, in rural areas of China, families are still the main bearers of pension responsibilities. The promotion of the social pension security system has changed the way of providing for the aged and formed the pattern of “social pension and family adopted children”. In this situation, fertility, education and other factors increase the cost of raising children, reduce the income of raising children, and then promote the decline of family fertility. From the micro level, the social pension security has a certain weakening effect on the number of willing births and the preference for boys of rural residents (Ruan et al., 2021). Increasing the strength of social old-age security can reduce the dependence of the elderly on the support of their children, thus reducing the number of children born in the family. Therefore, whether from the macro or micro level, the gradual improvement of China’s social pension security system can reduce the fertility rate or fertility desire to a certain extent. In addition, due to the problems of system structure, system and even design itself, it is easy to lead to the problems of imperfect system in social security in practice, which leads to the decline of fairness and efficiency of social security itself (Liu, 2021). The social security system has not only failed to adjust the income gap, but has widened the urban-rural income gap (Li et al., 2021). Due to the inadequate and inadequate payment of maternity insurance benefits in China, the more children we have, the greater employment pressure and economic pressure will be faced by families who have children. At present, the coverage of maternity insurance fund is still very small, and many employees of small and micro enterprises have not paid maternity insurance. Relatively speaking, women will withdraw from the labor market within a certain period of time due to family problems such as marriage and childbirth, which will lead enterprises to further strengthen the discrimination and recruitment restrictions on female employees, and often prefer to choose men with higher capital investment and more continuous processes (Yan & An, 2021). They have to face the risks of unemployment, low income and low security, thus reducing women’s fertility desire. Wang (2015) and He et al. (2016) both analyzed the impact of social security on fertility from pension and education by building an intergenerational overlapping model, and believed that increasing social security expenditure would reduce fertility. Liu and Sun (2018) found that the government’s increase in social security tax rate and social security treatment will have a certain negative impact on family composition and fertility decision-making, and these negative effects can not be completely offset by intergenerational and intragenerational transfer within the family (Zhang & Zhang, 2007).

The regulatory function of the modern social security system should address the problem of low fertility. A series of fertility support policies have been im-

plemented at home and abroad. For a long time, subsidized fertility has been the policy goal of many developed countries, mainly correcting the distorted negative effects of social security through benefits such as subsidies, maternity leave, and protection of women's employment to indirectly stimulate fertility (Tudor, 2020), while the fertility policies of Asian countries are mainly direct intervention. Wang and Liang (2008), starting from the problems faced by the future population development, analyzed many contradictions faced by the design and system construction of social security, and suggested that the future social security strategy should adapt to the situation of the future population development, and the increase of pension demand and the relative shortage of labor force should be balanced with the supply of pension resources.

2.3. Literature Review

When countries around the world are generally facing the problem of low fertility, scholars at home and abroad have carried out a series of studies on the factors affecting fertility, but only part of the literature studies social security and fertility. At present, China has also faced the dual population problems of low fertility and aging. By studying and analyzing the experience of OECD countries, this paper discusses whether the level of social security has a significant impact on the improvement of fertility, and provides a reference for the future policy of China's system to improve fertility.

3. Empirical Design

3.1. Measurement Model Setting

In order to effectively test the impact of social security level on fertility. The econometric regression model is set as follows:

$$FR_{it} = \alpha + \beta SOSET_{it} + \gamma controls_{it} + \lambda_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

where i is the country and t is the year; FR_{it} is the explained variable, representing the fertility rate of i in year t ; $SOSET_{it}$ is the core explanatory variable, namely the level of social security; $Controls_{it}$ is the control variable; α is a constant term, β and γ are the regression coefficients of social security tax and other control variables; λ_i is the unobservable regional effect, μ_t is the unobservable time effect, $\varepsilon_{i,t}$ is a random interference term.

3.2. Data Description

The data used in this paper are mainly from OECD database, EPS global statistical database, global economic indicators data network. Limited by the availability of data, the sample data of this paper selects the panel data of 36 OECD member countries in China from 1995 to 2019 for a total of 25 years, and tests the impact of social security level on fertility rate through fixed effect model. The specific settings of each variable are as follows:

1) **Explained variable.** The explained variable in this paper is fertility rate,

which is measured by the number of children born per woman of childbearing age.

2) Explain variables. The explanatory variable used in the empirical analysis is social security expenditure, which is expressed by the proportion of total social security expenditure to GDP.

3) Control variables. In this paper, various factors are comprehensively considered, and the influencing factors are roughly summarized as individual characteristics, family characteristics, social characteristics and macro characteristics variables. The measurement criteria of each control variable are: a) Economic development level: GDP per capita is used to measure. b) Urbanization level: measured by the proportion of urban population. c) Medical security level: measured by the proportion of total medical expenditure to GDP. d) Public education level: the proportion of public education expenditure in GDP. e) Unemployment rate: adopt the proportion of unemployed people in the working population. f) Household economic status: measured by household disposable net income. g) Female labor participation level: the proportion of female labor force aged 15 - 64 in the labor force. A stable and harmonious marriage and family relationship helps to improve the desire to have children. However, with the development of social economy, the marriage situation has changed a lot. The decline of marriage rate, the continuous rise of divorce rate and the precipitous decline of fertility rate have become unavoidable facts. Therefore, the influence of marriage rate and divorce rate should be further considered in the control variables.

The descriptive statistics of the main variables used in this empirical analysis are shown in **Table 1**.

Table 1. Descriptive statistics of main variables.

Variable	Data sources	Number of observations	Average value	standard deviation	Maximum	Minimum
Fertility rate	OECD database	900	1.671	0.385	0.920	3.110
Social security expenditure	global economic indicators data network	900	19.20	5.937	1.610	32
Economic development level	EPS global statistical database	900	10.18	0.677	8.050	11.63
Urbanization level	EPS global statistical database	900	76.14	10.91	49.79	97.93
Medical security level	OECD database	900	7.890	2.117	2.448	17.15
Public education level	OECD database	900	4.947	1.281	1.190	8.980
Unemployment rate	EPS global statistical database	900	7.593	4.088	1.700	27.47
Family economic status	EPS global statistical database	900	9.485	0.854	6.867	11.18
Female labor participation level	EPS global statistical database	900	56.81	13.26	22	79
Marriage rate	OECD database	900	5.082	1.122	2.900	9
Divorce rate	OECD database	900	2.053	0.984	0.170	21

From the perspective of descriptive statistics, the maximum value of the total fertility rate is 3.11 and the minimum value is 0.92. The difference between the two is small, and the standard deviation is only 0.385, which indicates that people's fertility desire is low and stable. However, the difference between the maximum and the minimum of social security expenditure is large, and the value of standard deviation is large, which indicates that the level of social security in different countries has a large gap.

4. Analysis of Empirical Results

4.1. Benchmark Regression Results

Based on the regression model (1), the two-way fixed effect model is used to test the impact of social security level on fertility rate, taking into account the control variables. The regression results are shown in **Table 2**. According to the regression results in column (1), social security expenditure and fertility rate are significantly negatively correlated at the confidence level of 1%. Considering that there may be a time lag between social security expenditure and fertility rate, the explanatory variable is set as the lag value of social security expenditure in column (2). The result also shows that social security expenditure is significantly negatively correlated with fertility rate.

Table 2. Impact of social security expenditure on fertility.

Variable	(1)	(2)
Social security expenditure	-0.036*** (-3.06)	
Social security expenditure One phase behind		-0.037*** (-3.24)
Economic development level	-0.014 (-1.06)	-0.006 (-0.41)
Urbanization level	-0.382*** (-3.73)	-0.399*** (-3.79)
Medical security level	-0.036 (-1.28)	-0.027 (-0.97)
Public education level	-0.067*** (-4.21)	-0.074*** (-4.53)
unemployment rate	-0.028*** (-2.79)	-0.027*** (-2.62)
Family economic status	0.014** (2.56)	0.015*** (2.70)
Female labor participation level	0.128*** (2.92)	0.103** (2.27)
Marriage rate	0.178*** (7.79)	0.187*** (8.06)

Continued

divorce rate	-0.054*** (-5.34)	-0.046*** (-4.46)
Constant	0.279 (1.39)	0.217 (1.05)
Number of observation	900	864
Goodness of fit	0.366	0.387
Individual fixed effect	control	control
Time fixed effect	control	control
P	0	0
R2	0.314	0.335
F	14.12	15.21

Note: The standard error of robustness is shown in brackets, and *, ** and *** respectively represent significant coefficients at the level of 10%, 5% and 1%.

The regression results of other control variables show that unemployment rate and divorce rate have a significant negative impact on fertility, while marriage rate has a significant positive impact on fertility. The impact of economic development level, urbanization level, medical security level, public education level, family economic status and female labor participation level on fertility is not stable, because the impact of economic, family and social factors on fertility is not a single linear relationship, and there may be regional heterogeneity.

4.2. Robustness Test

4.2.1. Analysis of Economic Development Level

For countries with different levels of economic development, the impact of social security level on fertility may vary greatly. Therefore, on the basis of the two-way fixed effect model, this paper adds the interactive item of economic development level and social security level to carry out the regression again. The regression results are shown in **Table 3**. **Table 3** (1) shows that the social security expenditure of different countries has a significant negative impact on the fertility rate. The fertility rate will decrease by about 0.175 for each unit of economic development level increase; in column (2), the explanatory variable is set as the lag value of social security expenditure. The result also shows that social security expenditure and fertility rate are significantly negative and significant. The reason may be that after the economic level is improved, people will pay more attention to improving the quality of life, pay more attention to the healthy growth of children, and raise the cost of childbearing, which leads to a decline in the demand of families for the number of children. From the regression coefficient of the interaction between social security expenditure and economic development level, it can be seen that with the improvement of economic development level, the marginal effect of social security expenditure on fertility is positive, that is, the stronger the impact of social security expenditure on fertility.

Table 3. The impact of social security on fertility at the level of economic development.

Variable	(1)	(2)
Social security expenditure	-0.987*** (-8.35)	
Social security expenditure One phase behind		-0.876*** (-9.29)
Economic development level	-0.175*** (-6.57)	-0.121*** (-6.21)
Economic development level × Social security expenditure	0.095*** (8.09)	0.089*** (9.16)
Urbanization level	-0.256** (-2.56)	-0.294*** (-2.98)
Medical security level	-0.013 (-0.49)	-0.052** (-1.97)
Public education level	-0.045*** (-2.90)	-0.050*** (-3.24)
unemployment rate	-0.029*** (-2.99)	-0.037*** (-3.90)
Family economic status	0.020*** (3.57)	0.014** (2.55)
Female labor participation level	0.086** (2.02)	0.125*** (2.87)
Marriage rate	0.188*** (8.51)	0.155*** (6.98)
divorce rate	-0.038*** (-3.83)	-0.061*** (-6.41)
Constant	-1.448*** (-5.02)	-1.066*** (-4.41)
Number of observation	900	900
Goodness of fit	0.413	0.420
Individual fixed effect	control	control
Time fixed effec	control	control
P	0	0
R2	0.363	0.371
F	16.63	17.11

Note: The standard error of robustness is shown in brackets, and *, ** and *** respectively represent significant coefficients at the level of 10%, 5% and 1%.

4.2.2. Replace Variable

In order to avoid endogenous problems caused by data measurement errors in the model, this paper regresses the above conclusions by replacing explanatory variables. Social security covers social insurance, social assistance, social subsidies and so on. In view of the important role of pension security in social securi-

ty, pension expenditure is used as a new explanatory variable to test the impact of social security level on fertility, in which pension expenditure is expressed by the proportion of pension expenditure to GDP. The two-way fixed effect model is also used to test the impact of social security level on fertility, and the specific results are shown in **Table 4**. Both columns (1) and (2) of the regression results show that pension expenditure has a significant negative correlation with fertility, which is consistent with the benchmark regression results.

Table 4. Effect of pension expenditure on fertility.

Variable	(1)	(2)
Pension expenditure	-0.050*** (-5.98)	
Pension expenditure One phase behind		-0.047*** (-5.87)
Economic development level	-0.038*** (-2.79)	-0.032** (-2.27)
Urbanization level	-0.296*** (-2.73)	-0.322*** (-2.87)
Medical security level	-0.015 (-0.52)	-0.011 (-0.39)
Public education level	-0.054*** (-3.45)	-0.056*** (-3.45)
Unemployment rate	-0.006 (-0.58)	-0.004 (-0.42)
Family economic status	0.018*** (3.22)	0.017*** (3.16)
Female labor participation level	0.197*** (4.26)	0.191*** (3.97)
Marriage rate	0.194*** (8.26)	0.207*** (8.69)
Divorce rate	-0.051*** (-5.11)	-0.047*** (-4.62)
Constant	1.016* (1.93)	1.049* (1.93)
Number of observation	809	768
Goodness of fit	0.401	0.418
Individual fixed effect	control	control
Time fixed effect	control	control
P	0	0
R2	0.345	0.361
F	14.54	15.21

Note: The standard error of robustness is shown in brackets, and *, ** and *** respectively represent significant coefficients at the level of 10%, 5% and 1%.

5. Conclusion and Enlightenment

5.1. Main Research Conclusions

Although there are differences between foreign social security systems and China's social security systems, their implementation is a long process, so the reform of foreign social security systems can provide reference for China's social security system reform. Therefore, based on the macro data of 36 OECD member countries from 1995 to 2019, this paper analyzes the impact of social security level on fertility rate through a two-way fixed effect model.

The main research of this paper is as follows: First, social security expenditure has a significant negative relationship with fertility. Second, with the improvement of the level of economic development, the impact of social security expenditure on fertility will become stronger. Thirdly, as an important part of social security, pension expenditure and fertility rate also show significant negative correlation. The increase of old-age security in social security can reduce the dependence of the elderly on the support of their children, thus reducing the number of children born in the family.

5.2. Policy Implications for China

Through the previous empirical research, we found that there are many factors affecting fertility. Our government still needs to study carefully in policy and take into account our national conditions.

First, local governments at all levels should, according to the level of economic development, formulate a budget system for fiscal and social security funds, reduce social security expenditures, reduce the local financial burden, and realize the standardization and rationalization of financial social security expenditures.

Second, give full play to the advantages of human resources of the elderly, actively explore various ways of providing for the elderly, reduce the pressure of social pension, and relieve the pressure of population aging on the payment of social security funds.

Third, to improve other social welfare benefits, we can protect the current employment situation of women and alleviate the burden of childbirth through subsidies, maternity leave and other measures. In particular, the maternity allowance system should expand the scope of benefits of the maternity allowance, improve the payment standard and distribution method of the allowance, and strengthen the maternity compensation for women of childbearing age in difficult families.

5.3. Limitations

The possible limitations of this paper are as follows: First, due to the lack of unified, scientific and reasonable fertility evaluation indicators, the direct and general use of the total fertility rate cannot accurately describe the net effect of the policy adjustment. In the future, we should strengthen the dynamic detection

and investigation of the fertility will and behavior of the people of childbearing age to provide direct data support for the adjustment of the fertility policy. Second, the effect of fertility policy adjustment is lagging. However, due to the availability of data, the causal effect of policy adjustment in the medium and long term needs to be further tested.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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