



# Reform of Fertility Encouragement Policy System in Macao Based on Incentive Compatibility Theory

Ieong Fat Fai<sup>(✉)</sup>

Macao Polytechnic University, Macao, Macao  
i9691393@yahoo.com.hk

**Abstract.** Macao's population policy and economic and social development plan always go hand in hand, and as a part of Macao's economic and social development plan, it regulates the population quantity, quality and distribution, creating a suitable population environment for the realization of development goals. Based on the theory of incentive compatibility, this paper discusses the reform path of birth encouragement policy system in Macao. Using sampling survey, through descriptive analysis and binary Logistic regression, this paper analyzes the fertility will of women of childbearing age and its influencing factors from multiple dimensional variables. Through data analysis, Nearly 40% of professional women believe that Macao needs to support relevant fertility support policies in terms of reproduction. The results of binary Logistic regression show that the age of individual and children, the age of one child, the experience of one child, and the difference between household registration nature and job nature in social background factors have a significant impact on the fertility willingness of two children. Based on the research results of women of childbearing age's desire to have two children, this paper puts forward some suggestions on the reform of Macao's fertility encouragement policy system: adhere to the people-centered development thought, improve the medical policy and improve the interest-oriented system of population policy.

**Keywords:** Incentive compatibility · Macao · Fertility encouragement policy

## 1 Introduction

Birth encouragement policy has always been an important part of China's population and family planning work. According to relevant data from the Statistics and Census Service of Macau, there will be a total of 4,344 new-born babies in 2022, a year-on-year decrease of 682; for the first time since 1985, Macau birth rate falls to 6.4%, the lowest figure in Macau's history. The median age of mothers who gave birth to their first child was 31 years old, an increase of 0.9 years year-on-year [1]. As a basic national policy to promote the long-term balanced development of the population and solve the structural contradictions of the population, the comprehensive liberalization of the two-child policy plays a very important role in actively responding to social problems and social contradictions such as the aging population, declining birthrate, labour shortage and serious

imbalance in sex ratio [2]. Today, in the face of a series of changed population, economic and social environments, such as the aging trend is becoming more and more serious, the fertility rate continues to be lower than the replacement level, the demographic dividend disappears, the economic growth slows down, and the structural adjustment needs to be deepened, will Macao continue to adhere to the original fertility policy or make major adjustments? How to adjust? These important practical problems related to the sustainable development of Macao's economy and society need to be seriously considered and answered by scholars and decision makers.

With the continuous improvement of Macao's economic development level, the differentiation trend of characteristic groups in society is becoming more and more obvious. The academic circles began to pay attention to the study of fertility wishes of different groups of people, but the study of fertility wishes of professional women who have given birth to one child is still in its infancy. Literature points out that the ideal number of children in most families and the number of children they hope to have are two, but in real life, the number of families that actually have two children is decreasing. The study pointed out that larger cities and cities with a higher degree of economic development will increase the cost of childbearing, which will have an impact on the willingness of young people to have a second child [3]. Literature points out that improving the research on the willingness to bear children of working women is of great value in improving childbearing policies. In 2017, Zhang Yong Mei conducted a survey on professional women of childbearing age in Zhejiang Province, and they divided professional women into two categories: "knowledge women" and "other women". In the study, it was found that the difference between them was not very large. The two-child willingness of "educated women" and "other women" were 28.1% and 26.6%, respectively. However, there are significant differences among them in terms of family planning, childbearing motivation, and subjective cognition. The reproductive motivation of "letting children have companions" has a significant positive impact on the willingness of "educated women" to have two children. The reproductive motivations of "good family economic situation", "having raised one girl", and "raising children for old age" have a significant positive impact on the willingness of "other women" to have two children [4]. At the same time, the greater the supportive attitude of parents for their children to have a second child, the stronger the willingness of working women to have a second child [5]. In 2017, Li Jingya conducted a sample survey of professional women who have had one child in Xiamen, Fujian. The results of the study show that the overall willingness of professional women who have one child to have a second child is not strong; the main factors that affect them to have a second child are: the change of concept of childbearing, and having a second child will increase their career development cost and interpersonal relationship cost later [6]. Research on increasing the willingness of professional women to have a "second child" (Wang Dongyu, 2020; Zhang Ya, 2021) pointed out that occupational factors are one of the reasons that most affect women to have a second child. Because, working women who give birth to a "second child" may be forced to withdraw from the labor market, income decline, job demotion, employment discrimination and other negative impacts [7, 8]. Zhang Ya (2021) also pointed out in her research that the older, the higher the education and the higher the position of professional women, the lower

their willingness to have another child [7]. Literature points out that fertility support will have an impact on the fertility intentions of young professional women [9].

Macao's population policy and economic and social development plan always go hand in hand, and as a part of Macao's economic and social development plan, it regulates the population quantity, quality and distribution, creating a suitable population environment for the realization of development goals. The description of China's birth encouragement policy should not only be quantified, but also be compared and analysed by regions, so as to have a concrete understanding of the diversification of birth encouragement policies. But this requires enough detailed data and a lot of calculations. The implementation of the policy of encouraging births in Macao, China, has great reference value for the Chinese government. Based on the theory of incentive compatibility, this paper discusses the reform path of Macao's fertility encouragement policy system. Paying attention to the corresponding relationship between policy supply and policy demand, and building a people-oriented support system for encouraging childbearing policies are the main methods to solve the current continuous decline in the fertility rate in Macau.

## **2 Fertility Policy and Application of Incentive Compatibility Theory**

South Korea is a good example of the incompatibility of incentives between fertility policy and individual decision-making. South Korea's low fertility problem is very similar to China's. Their total fertility rate has dropped rapidly below the population replacement level in a very short period of time. In order to increase the fertility rate, the South Korean government has formulated a series of fertility policy incentive mechanisms with reference to OECD countries. From 2006 to 2010, in order to create a social environment conducive to childbearing, the South Korean government proposed a policy framework to encourage childbearing. From 2011 to 2015, the Korean government gradually improved the policy content in the policy framework. From 2016 to 2020, the South Korean government hopes to raise the fertility rate to the average level of OECD countries, and the core of the policy is to build a happy society. The incentive mechanism of South Korea's childbirth policy mainly uses cash subsidies to reduce family childcare costs, increase vacation incentives for both men and women after giving birth, improve childcare services, guarantee women's jobs, and improve health care services for mothers, infants and young children. The main reason for the incompatibility of the Korean government's fertility policy incentives is that it only addresses basic survival needs and fails to address deep-seated social problems in South Korea, such as lack of confidence in the country, changes in traditional family division of labor, and difficulties in choosing between childbearing and work for educated women, etc. [10].

The example of "incentive-compatibility" of South Korea's childbearing policy provides a reference value for improving the optimization direction of the Macau government's measures to encourage childbearing.

### 3 Analysis of Influencing Factors of Fertility

#### 3.1 Model Design

In this study, women of childbearing age will be investigated, which can more accurately find out the reasons for the low fertility willingness of two children.

In this study, a binary linear logistic regression model was constructed to study the influencing factors of career women who have given birth to one child.

$$\log \frac{p_1}{p_2} = \alpha_0 + \sum_{i=1}^m \alpha_i X_i + \sum_{i=m+1}^{m'} \alpha_i \text{Control}_i \quad (1)$$

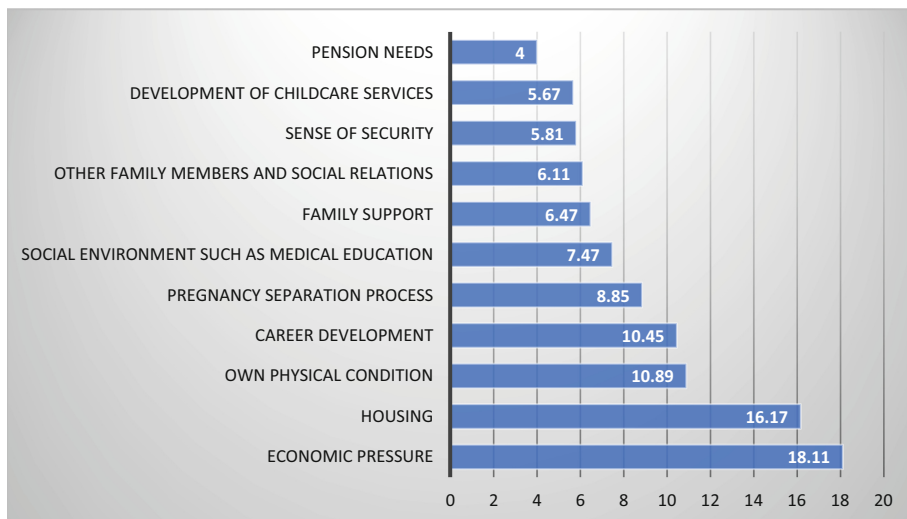
Among them,  $p_1$ ,  $p_2$  stands for “having a reproductive plan” and “not having a reproductive plan”, and  $X_i$  stands for the  $i$ -th independent variable of individual characteristics of the professional women interviewed.  $\text{Control}_i$  represents the  $i$ -th individual characteristic control variable in the model,  $\alpha_0$  is a constant term, and  $\alpha_i$  is the coefficient to be regressed.

In order to study the fertility desire of married women of childbearing age and its influencing factors, a survey was conducted in a certain area of Macao, and information about the fertility desire of married women of childbearing age and its influencing factors was collected from various angles. In this study, a random sample questionnaire survey was conducted in a certain area of Macau from January to March 2023. The survey objects are mainly professional women aged 30–49. This study mainly studies the fertility intention of married women of childbearing age and the factors that affect the second child. A total of 1020 questionnaires were distributed in this survey. Afterwards, the questionnaires were entered and screened, and female samples who were incomplete, too old, had not yet given birth to a child, and had never participated in work were excluded. The final number of valid questionnaires was 881, with an effective rate of 86.37%. The questionnaire survey is divided into three parts. The first part is the basic information, the second part is the childbearing willingness of women of childbearing age and the factors affecting the second child, and the third part is the childbirth subsidy policy questionnaire.

#### 3.2 Result Analysis

Regarding the research on the influencing factors of career women’s reproduction, in addition to setting related independent variables in the questionnaire, multiple-choice questions are set in the questionnaire for preliminary exploration. The statistical results are shown in Fig. 1.

It can be seen that “economic pressure”, “housing” and “own physical condition” are the three most important factors affecting the decision of professional women whether to have another child, accounting for 45.17% in total; According to statistics, among the most important influencing factors of career women’s reproductive choice, economic conditions and age health status can be regarded as realistic constraints, which are difficult to change in a short time; The influencing factor of “housing” can be improved by seeking family or social support. At the same time, professional women also attach great



**Fig. 1.** Influencing factors of career women's reproduction

importance to their career development, accounting for 10.45%; they are also very concerned about the process of their pregnancy, accounting for 8.85%; medical education (7.47%), family support (6.47%), social environment such as other family members and social relations (6.11%), sense of security (5.81%), development of childcare services (5.67), pension needs(4%).

As a direct policy target for having a second child, professional women's understanding of the policy will affect the final implementation effect of the policy. Therefore, by investigating the professional women's understanding of the having a second child and the demand for fertility support policies, it will help to better design the supporting policies of the second child policy and enhance the professional women's willingness to give birth again. In this study, the childbirth subsidy policy questionnaire was launched again, and 881 valid questionnaires have been received, among which "assuming that the government subsidizes 1,000 MOP per month for the first/second/third child, are you willing to have the first/second/third child?" Very willing (1.19%), willing (37.52%), indifferent (5.09%), unwilling (49.92%), and very unwilling (6.28%).

For families with two or three children, if the Macau government distributes a maternity subsidy policy of 10,000 MOP to each child each year, will it increase your willingness to have a second or third child? Very willing (1.45%), willing (42.36%), indifferent (4.91%), unwilling (45.64%), very unwilling (5.64%).

If the government establishes a child growth account (starting from the birth of a child, the government injects capital at a ratio of 1:1 every year, if the parents inject 1,000 MOP into the account, the government also injects 1,000 MOP), and the child can freely use this fund after the age of 18. Will it increase your willingness to have a second child? Very willing (19.29%), willing (31.43%), indifferent (15.71%), unwilling (25.36%), very unwilling (8.21%).The demand of professional women for maternity support policy is shown in Fig. 2.

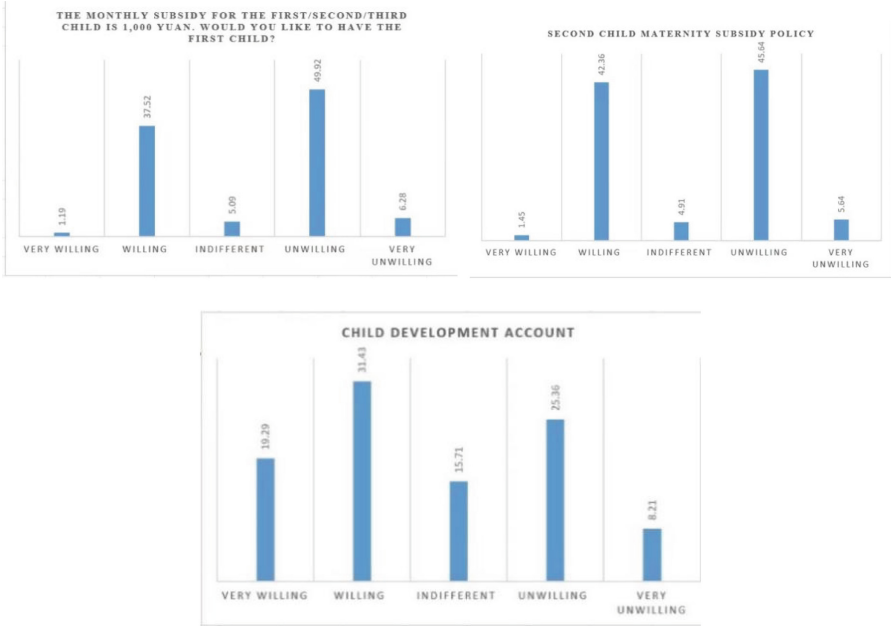


Fig. 2. Demands of maternity support policy for professional women

Nearly 40% of professional women believe that Macau needs to support relevant fertility support policies in terms of reproduction. It can be seen that professional women have a very high demand for the state to introduce fertility support policies to encourage re-fertility. It can be seen that during this period, the proportion of the target policy population who really understand the policy is still slightly insufficient. If it is difficult for the policy object to have a deep understanding of the policy connotation, the implementation of the policy is often not optimistic.

Using spss26.0 software to bring variables into the regression equation, the results are shown in Table 1. Among them, the dependent variable is whether you want to have two children, and the independent variables are age, education level, one-child experience, one-child sex, one-child age, family annual income, spouse annual income, employment situation, occupation type, job nature differences and household registration nature differences, which reflect the characteristics of individuals and children, family economic characteristics and social background.

From the binary Logistic regression results of the influencing factors of two children’s fertility desire, it is found that the age of individual and children, the age of one child, the experience of the only child, and the differences between job nature in social background factors have a significant impact on the fertility desire of two children. However, the factors reflecting the economic characteristics of the family have no significant influence on the fertility willingness of the two children, which proves that the economic status of the family is not the main factor to determine whether the women of childbearing age intend to have two children.

**Table 1.** Logistic regression results of influencing factors of fertility willingness of two children

Variable			B	S.E.	Exp(B)
personal characteristic	age	30–35	-1.036***	0.268	0.368
		36–49	-1.328***	0.441	0.259
	Level of education	Secondary education	0.524	0.412	1.688
		highly educated	0.369	0.517	1.423
	Is it an only child	Both parties are independent	0.669***	0.274	2.013
		alone	0.436*	0.258	1.527
Family economic characteristics		Annual household income	0.000	0.000	1.000
		Spouse income	0.000	0.000	1.000
		employment status	-1.026	1.187	0.296
Social background characteristics		Do you work in shifts?	1.013***	0.336	2.749
		Is it a new immigrant	0.069	0.218	1.094
Constant			-0.253	0.554	0.801
-2log likelihood			653.074		
R square			0.326		
Discrimination accuracy			81.217		

Note: \* \* \* means  $P < 0.01$ , \* means  $P < 0.1$

If we can improve the labor security policy for women, prevent occupational discrimination against women, put maternity leave and maternity insurance in place, reduce the impact of giving birth to two children on career development, and then reduce their time cost by establishing a perfect “child care” service system, it will be conducive to promoting the fertility will of two children in urban occupational groups and increasing the birth rate of two children.

## 4 Suggestions on the Reform of MAcao’s Fertility Encouragement Policy System

### 4.1 Adhere to the People-Centered Development Thought

We believe that the policy of encouraging fertility has changed the institutional factors of individual fertility choice, and there can be no completely coincident incentive compatibility or completely opposite incentive incompatibility between policy influence and

fertility choice. Adhere to the people-centered development thought in policy formulation, link the birth encouragement policy with relevant economic and social policies, and put the birth of job embeddedness in various livelihood undertakings. More attention should be paid to the indirect social environment related to fertility culture. The report of the 20th National Congress of the Communist Party of China pointed out that it is necessary to establish a family support policy system, reduce the family's childbirth, parenting, and education costs, improve childcare, childbirth leave and treatment guarantee mechanisms, and build a childbirth-friendly employment environment. At the same time, the Macao SAR government can study more housing policy support measures for multi-children families in order to solve the housing problems of citizens, such as: introduce a mechanism for young families with two children to have extra points when applying for government housing or rent government housing at a lower price, etc. In addition, focus on the psychological needs of working women. For example, the government can support associations and social service organizations to provide more family marriage education and fertility guidance services, so as to reduce the anxiety of working women in facing marriage and childbearing issues.

#### **4.2 Improve Medical Policy**

Among the direct expenses of women's childbirth, various medical and health expenses from pregnancy to childbirth also account for a large proportion, directly affecting the future health of women and children. Therefore, it is necessary to improve relevant medical policies and improve maternal and child health care and health service systems.

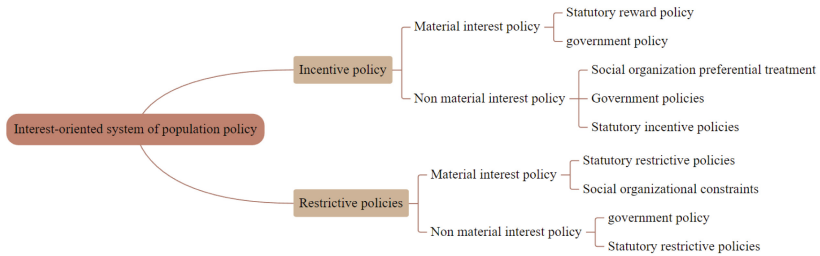
In terms of health supply, we must give full play to the leading role of the government and focus on solving the problem of insufficient supply of reproductive health services and maternal and child health services. Under the leadership of the government, communities and various medical institutions provide women with inclusive or free health services, covering the entire process before, during and after pregnancy.

In terms of medical services, we must focus on the construction of pediatrics and obstetrics and gynecology, and strengthen the corresponding medical team. At the same time, according to social needs and health conditions, rationally allocate professional talents, information and materials. To strengthen the training of pediatric obstetricians, the government should also strengthen cooperation with non-profit medical institutions, optimize the allocation of public resources, improve the accessibility of medical resources, study the policy of shunting patients to the community, reduce the medical costs of families with many children, and alleviate the current The ubiquitous pressure to see a doctor is difficult and expensive.

#### **4.3 Improve the Interest-Oriented System of Population Policy**

The population interest-oriented system has been upgraded from simply controlling the population to regulating fertility behavior (which can be restricted and encouraged) to achieve the policy goal of unifying social development and family planning. Without compulsory intervention in the choice of citizens' reproductive rights, the participation of all citizens will have the widest fairness, so that the masses can decide to abstain or actively give birth in different times according to the different needs of public interests





**Fig. 3.** Interest-oriented system structure of population policy

to the greatest extent, and the family planning encouragement policy will also become an inter-generational public policy.

Interest-oriented policy focusing on economic constraints and restrictive measures for citizens. Under the condition of market economy, citizens are urged to implement family planning by economic means, and a certain amount of social support is levied on those who have children that do not conform to the population policy, so as to ensure and promote the implementation of the national macro population policy. Figure 3 shows the benefit-oriented architecture of population policy.

Interest-oriented policies, which mainly reward and encourage citizens, are mainly divided into material interest policies and intangible interest policies. The material benefit incentive policy mainly includes statutory policy, government and related department policy and social organization policy.

Non-material benefit incentive policies mainly include statutory policies, government policies and social organization policies. Of course, to implement the interest-oriented mechanism, we must have a set of mature evaluation mechanisms, so that the interest-oriented mechanism can really guide governments and departments at all levels to implement fertility encouragement policies and make the population of Macao develop healthily.

Childbirth benefit-oriented policies can be mainly divided into five categories: First, optimize the childbirth subsidy policy, not only giving birth allowances to parents, but also considering other continuous economic assistance for low-income families with two or more children, such as: milk powder, diapers; The second is to promote the concept of male parenting and encourage husbands to accompany their wives for prenatal checkups. At the same time, improve male paternity leave and promote flexible working system; the third is to protect the employment rights of professional women after childbirth; the fourth is to provide more policy support for families with two children, and study policies that are conducive to promoting the balance of sex ratio at birth. The fifth is to explore and optimize the old-age security mechanism, such as: study the feasibility of trial implementation of time banks in Macau, etc. When promoting volunteer services in Macao, Macao associations can also promote the concept of mutual assistance in the elderly, which is conducive to the establishment of policies to deal with aging.

## 5 Conclusion

Based on the theory of incentive compatibility, this paper discusses the reform path of Macao's fertility encouragement policy system. More than 40% of professional women think that Macao needs to support relevant fertility support policies in terms of re-fertility. It can be seen that professional women have a very high demand for the state to introduce fertility support policies to encourage re-fertility. From the binary Logistic regression results of the influencing factors of two children's fertility desire, it is found that the age of individual and children, the age of one child, the experience of the only child, and the differences between job nature in social background factors have a significant impact on the fertility desire of two children. In order to implement the interest-oriented policy with citizens as the main reward and encouragement, we must have a set of mature evaluation mechanism, so that only an interest-oriented mechanism can truly guide the Macao SAR government and various departments to implement the policy of encouraging births, so that the population of Macao can develop healthily.

## References

1. Government of Macao Special Administrative Region Statistics and Census Service from <https://www.dsec.gov.mo/zh-MO/Statistic?id=101>
2. Deng Nan. Research on the Significance of the Open Two-Child Policy for my country's Social Development. *Special Zone Economy*. 2021(01): 95–98.
3. Jia Zhike, Feng Xiaotian. The willingness of urban "single couples" to have a second child—Based on the investigation and analysis of 558 young people in five industries in Nanjing and Baoding [J]. *Population Journal*, 2015, 37(03): 5–15.
4. Zhang Yongmei. Professional Women's Willingness to Have Two Children and Its Policy Implications—Based on the Perspective of "Intellectual Women" and "Other Women". *Zhejiang Social Sciences*, 2018 (12): 68–76.
5. Zhang Huifang, Cheng Chuanyin, Ren Jun. Analysis of Influencing Factors of Professional Women Having a Second Child Based on Regression Analysis. *Mathematics in Practice and Theory*, 2019, 49(21): 198–205.
6. Li Jingya. A study on the willingness to have a second child among professional women who have had one child—An empirical analysis based on the utility of childbearing and the cost of rebirth. *Journal of Chinese Women's Studies*, 2017 (03): 27–39.
7. Wang Dongyu. Research on the Employment Security Mechanism of Professional Women Based on the Willingness to Have a "Second Child". Liaoning University, 2020.
8. Zhang Ya. Research on the Employment Security Mechanism from the Perspective of Postpartum Women's Rebirth Willingness in Shanxi Province. Shanxi University of Finance and Economics, 2021.
9. Zhu Wenting, Wang Mei. Research on the Influence of Fertility Support on Young Professional Women's Willingness to Have a Third Child. *Chinese Youth Social Sciences*, 2022.
10. Zhu Hui, Su Yang. Review of Korea's Fertility Policy Practice Based on Incentive Compatibility Theory—Also on the Enlightenment to China. *Population & Economics*, 2019(03): 48–61.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

