

INVESTIGATING THE EFFECTS OF ECONOMIC FACTORS AFFECTING THE FERTILITY RATE IN IRAN DURING THE YEARS 1365-1390 WITH THE PANEL DATA APPROACH

R Nasrpour Parvin

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ABSTRACT

The aim of this study was to recognize the economic factors affecting the fertility rate. The study population is 10 provinces selected during the years 1365-1390. Data acquisition procedure was library based. In this study, using the panel data approach, the effects of economic factors on fertility rate was evaluated using the STATA software. To assess, first the Hausman test was performed. Results showed that for the estimation of the patterns, it is required to use the fixed effects model. Results imply that there is a positive correlation between the working-women's remuneration and also working-men's remuneration and fertility rate, but there was no correlation between the family income and fertility rate. The results of multivariate regression analysis shows that the independent variables account for 47.8 per cent of fertility rate, collectively.

Keywords: economic factors, fertility rate, data panel

Author Correspondence, e-mail: nasrpour90615177@gmail.com

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1. INTRODUCTION

Population and its related issues are amongst the multidimensional and complex issues of the human societies that are affected by economic, social, cultural and political factors. Population is one of the main factors helping the authorities to make careful decisions and plan wisely for their countries. Governments also have several different policies regarding the population. For instance, fertility is one of the important aspects of the population which in some countries, the governments adopt some persuasive policies to increase their population while on others they apply punitive policies for the increase in their population, such as China, which apply the one-child policy and countries of western Europe that apply the



persuasive policies. Fertility is the main factor to increase the population and plays a fundamental role. It is possible that some specific reason leads to an increased rate of fertility in a specified period of time and then it is replaced by some other reasons in another time. The importance of fertility as the main factor contributing to alterations in the built and size of the population has made the studies of fertility and its contributing factors to be in the spotlight of the demographic studies. The aim of this study was to determine the effects of economic factors on fertility rate in 10 provinces of Iran during the years 1365-1390.

Theoretical Basics

Economic theories related to the population

Some Economists, have mainly theoretically investigated the link between economic factors and increase/decrease in the population. The pioneer studies on fertility behavior in families have mainly been developed by Gary Becker, Chicago and Columbia, Liebenstein, Davis, Caldwell. Based on the consumer behavior theory and the fertility economy of the household, it is believed that human behavior has been economic and reasonable and since his decisions of having a baby is also of economic origins, then the consumer behavior theory has also been applied to one's desire for having kids. The microeconomics theory of fertility is based on the fact that due to many reasons, kids are pretty much like other consumption and capital goods. Thus, the demand for having kids in the scale of a family is affected by the followings:

- A) The number of kids that can survive
- B) The costs of bringing up the kids
- C) Family income

In this theory, the costs of having more kids include the following two:

1. The mother's time cost, which means that if the Mother doesn't stay at home to take care of the kids and instead busy herself working, how much money can she make?
2. Costs of raising and educating kids, which is a comparison between fewer kids with better quality of education and more kids with less quality of education, which one is the best.

Using the traditional consumerism behavior theory for the reproduction of the family in microeconomics leads to the fact that every time the costs increase due to an increase in the level of education or job opportunities for women or an increase in the school fees or applying the legal working age or elderly insurance paying system or etc,...., then the parents would demand fewer kids. In fact parents would prefer the better quality of life for the kids than the number of the kids. So, we can see that one way of reducing the number of the kids in a family is to make well-paid job opportunities for the young women and providing them with

more chances of education. In Gary Becker's theory, demanding for kids, is linked to the family income and costs of the children, specially the value of the time you spend taking care of them, and also the general policies and other factors changing the costs of the children. Plus, demanding kids, is also linked to the rate of investments in human capital or any other factor that is known as the quality child. The cost of children, other than the costs of the food, clothing and housing, also depends on the amount of time parents, for instance moms, spend taking care of them. But in recent years, the economic growth not only has increased the incomes, but also the costs of the children. This is due to an increased number of working women and the increased value of the time they spend taking care of their kids. The increased costs of the children leads to replacement of the children with other goods in the parents' demand for kids. Becker says that children might be looked at as a long-lasting high quality goods. It means that the family makes its decision for having a kid based on the calculations of the costs and benefits of the children, considering the income and prices, which leads to. So, this decision is a function based on income, women's salary, employment of women and finally education of parents. Other views on the popularity index or the universality of marriage, which indicates the prevalence of marriage in the society, suggest that the people of the society are not reluctant to marry, and they simply procrastinate it. Several economic theories exist regarding the marriage age up. The increased rate of women's participation in the labor market and the increased social supports to women and moms are amongst these factors. The parents' level of education, especially women's, has a great impact on determining the number of children they will have. Education increases the cost-opportunity of the childbearing. Another factor of great importance, affecting family's desire for kids is the costs of raising children. The increased costs of living, along with alterations in parents' expenditure leaning towards increasing the quality instead of the quantity of children, has led to a reduction in family's desire for having kids.

The government's policies that change the costs of children can also affect the fertility rate. For example, in the United States, lower income taxes, regarding the number of children, by reducing the costs of children, has affected the desire for having kids. The increased fertility rate in Sweden in the recent years is due to the significant child care subsidies and the increased parental leave for the new baby. The Chinese government, since 1970, has also begun the implementation of population policies with economic incentives which has led to a decrease in total fertility rate from 5.8 children to 2 children during the years 1970-1993. Another theory related to the microeconomics theory of fertility is Chicago and Columbia. In this theory, the demanding for kids, like the demand for durable consumer goods, is affected

by several factors such as the number of children that can survive, the costs of raising and educating them, the lost opportunity cost and the family income. In this theory, the value of the women's time and the costs of childbearing opportunity have been emphasized as the factor that can affect the couple's desired number of children. The women's pay rise has a negative effect on demanding for kids. When a woman's devoted time to a specific work is appreciated with a higher pay and then considered as more valuable, the relative value of the time she spends at home would necessarily decrease and the opportunity cost of having a baby for woman in labor market increases. Davis, in his theory of change and response in population says that people respond differently considering the facilities they have, such as increased celibacy, procrastination of marriage, preventing pregnancy, intentional abortion and migration. Another theory in this regard is the exchange theory. The most basic assumptions of this theory are that groups are merely collections of people that the anticipation and explanation of their behaviors is done based on the studies of their motivations and people are always motivated by self-interest, which means that people count the benefits and costs of everything. Harvey Leibenstein's theory is based on this fact that economic benefit or lack of economic benefit of the children is a factor that affects parents' decisions on the number of the children. Leibenstein considers the cost-benefit issue and says that parents would analyze the costs and benefits of having a kid. If the benefits outweigh the costs, then their attitude would be positive. Caldwell, in his theory of intergenerational wealth flows considers the following factors as the reducers of the fertility rate:

1. Reduction of the potential children work force
2. Increased educational fees of the children
3. Increased importance of the investment for the children
4. Cultural alterations
5. Developing the values of the mid-class families in child-centered families

Iran's population structure

The annual population growth of Iran during the years 1346-1355, by applying family planning programs, literacy rate, women's employment, reached the 7.2 per cent in the year 1355. After the Islamic revolution, due to the cessation of the family planning programs, applying some indirect incentive policies by the government and the war, the birth rate increased in Iran and the normal annual rate of population growth reached 4.3 percent by the year 1365. In the year 1368, one more time, the family planning programs were executed in the country and from this year on, the rapid decline in fertility rate was observed, in a way

that the total fertility rate fall from 5.6 children in 1365 to 7.2 in 1375 and 8.1 in 1385. After the war and especially from the year 1370 on, that several anomalies were observed due to overpopulation, the birth rate decreased drastically, for which one of the reasons is the inflation. What happened in Iran was the coincidence of the inflation after the war and the increased knowledge of the families about the population control and family planning which was manifested as a decline in the population and on the other hand led to marriage age up, which other than economic issues, is also affected by the continuation of the education.

Table 1. The average annual population growth (per cent)

1335-45	1345-55	1345-65	1365-70	1370-75	1375-80
13.3	71.2	91.3	5.2	47.1	62.1

Reference: General Population and Housing Census and current census

So far, the estimations show that the normal population growth of the country in the year 1389, compared to that of 1388, is almost 47.1 per cent in the year, which if continues at the same rate, the population of Iran would be doubled every 47 years.

Demographic policy

The demographic fact of Iran implies that the objectives of the family planning programs have been fulfilled earlier than expected. The crude birth rate in 2010 reached 19000 and the rate of annual population growth reached 1.3 per cent in the year. In fact, we can say that the family planning program has exceeded the defined objectives. This condition along with the demographic changes in recent decades has led to the development of new approaches regarding the population of Iran and the increase/decrease of its annual growth, and due to its importance, especially for the future of the country, it's been in the spotlight of the academic societies.

Research basics

Regarding the population and population policies and the factors affecting them, some researches have been conducted. According to the opinions expressed in the theoretical section, here's a list of experimental researches conducted in this area.

Experimental estimation of the model

In this section of the study, the relation between the economic factors and the fertility rate (birth rate) would be investigated experimentally. This study is conducted based on the

Schultz model in 1986. Schultz has studied the effects of economic factors on fertility rate, considering the existing data from 1967. The model is defined as:

$$n_i = \alpha_0 + \alpha_1 \ln w_{fi} + \alpha_2 w_{mi} + \alpha_3 y_i + e_i$$

The working male income (w_{mi}) and working female income (w_{fi}) and Birth rate indicator (n_i). In this equation, the relation between birth rate as the dependant variable and y_i (male and female and family income) as the explanatory variable is investigated. The aim of this equation is to finally investigate the effects of economic factors on the fertility rate. The sample size and the period of investigation This study is conducted on 10 provinces during the years 1365-1390. All data used in this study were obtained from the statistics and information provided by the statistical center of Iran.

Estimation and model selection

Considering the fact that this study is conducted among several groups in different provinces of Iran, then we use the panel data for the estimation of the model. To assess, first the Hausmann test was performed. The results showed that for the estimation of the patterns, it is required to use the fixed effects model. Then for the estimation of the model the variance heterogeneity test was performed and the results showed that there is heterogeneity between the variables that after resolving this heterogeneity, the model was estimated. Table 1 shows the results of the implementation of this model.

variable	coefficient	Z	Significance
w_f	0.085	2.35	0.019
w_m	0.0292	1.80	0.071
y	0	-1.16	0.244
constant	46439.21	4	0

Regression analysis of the impact of economic factors on fertility rate

In this regression analysis, the coefficient of the household income is not statistically significant. Other coefficients are significant at $p < 0.05$.

Now the interpretation of the results of the regression analysis:

There is a positive correlation between the birth rate and working male/female income. The study by Mirzaei et al, 1390, which suggests that there is a significant correlation between working women's attitude towards fertility. If the men's and women's income increase, parents would provide a better quality of life for their children. So, they can increase their demand for

kids. According to Becker's theory, since parents look at their child as a durable goods, the increased income of men and women, based on the microeconomics theory leads to income and substitution effects, which increases both the quality and quantity of the children.

The household income coefficient in this model is not statistically significant, which means that no correlations were observed between the level of family income and the fertility rate. According to the results of a study by Adibi et al, 1390, we can confirm this conclusion.

Conclusion and suggestions

The results of this study suggest that in 10 provinces of Iran, there is direct link between the fertility rate and the men's and women's income. This fact also shows that the more the number of the working women in a society as the family allowance, the more their desire for having kids. The increased income of men as bread-winners can also be directly linked to childbearing. Given the data obtained from Iranian statistical center from 1365 to 1390, this trend is quite significant. The results also show that there is no significant relation between the family income and fertility rate, which means we cannot conclude that the family income can work as a factor in increasing/decreasing the fertility rate. Based on the results of this study, it can also be suggested that:

Based on the results of this study, there is a positive link between the working male/female's incomes and the fertility rate. So, it is suggested that to meet the costs of living and to increase the fertility rate, the government should apply some certain policies to increase the employment rate. In this study we only used three explanatory variables that plus some other independent variables can increase the power to anticipate the changes in fertility and achieve better results in this area.

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