



## Development, Fertility, The economic indicators

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### Abstract

Reportedly fertility rate has significantly declined in many parts of Iran since early 2000s. This paper studies the covariates of fertility levels and fertility decline, using panel data of the 30 Iranian provinces in 200<sup>1</sup> and 20<sup>06</sup>. The data were derived from the consensus databank and were separately analyzed for rural and urban areas. The effect of education of women and men, urbanization, son preference, access to potable water and mortality among children under five with the original variable "fertility" was investigated.

We found that education of women was the most important factor explaining fertility differences across the country and over time. The results of this study in urban area indicate a significant negative correlation between the level of fertility and average educational level of women. In the rural areas, the data indicate a significant negative association between the level of women's education and son preference factor with fertility.

Aside from the intrinsic importance of understanding these patterns of fertility decline, the diversity of the Iran experience is a valuable opportunity to reexamine various interpretations of the fertility transition. Over time, the focus shifted from economic growth to 'social development', with the latter calling for economic growth to be supplemented with direct action in fields such as public health, elementary education and social security.

Fertility is often higher in poorer families within a society, and across countries those with higher average fertility tend to have lower average income. Do these associations imply that high fertility causes poverty among family members, or that poverty contributes to higher fertility, or both?

**Keywords:** fertility, education, Iran rural and urban areas, Panel data



## Introduction

Increasing the population in developing countries and the consequences of economic, social, cultural, environmental, and political, undoubtedly the largest, most important and most critical issue for human kind. Considering the situation and problems of developing countries and their limited resources, both domestic and international levels that Iran is one of those countries, Problems such as poverty, lack of investment, urbanization, destruction of the natural resources and the loss of national wealth for the consumer goods, Studies of the population, particularly fertility as one of the main development in today's society.

The active population in agriculture part, in 1700 are likely to be over 80 percent. In 1900, this ratio reached almost to 60 percent, and then rapidly declining institution. Note that in agricultural communities, most members still engaged in agricultural activities, in an industrial society 30 to 50 percent of the population work in the industrial sector, the relatively high number of residues in a variety of administrative activities such as banking, insurance, employment and production activities are involved. Development of automated equipment or devices in today's industrialized countries to reduce the proportion of industrial activity and caused people unemployment in this sector, So that many of the industrialized countries are faced with this problem and the future is very risky.

## 2. Issues and Hypotheses

### 2.1 Theoretical framework

That human societies are much more disadvantaged in terms of social and economic development as more children are an obvious fact.

#### 2.1.1 *Proponents of population increase*

With elapse of ancient times, the opposing insights increase with plurality of the population was formed, during the thirteenth century until the end of the fifteenth century to know more attention to ethical issues. In this period theories are agrees became more obvious with the population increase, But not because it is a force more children, But also the dignity and strength of the family was placed in the opinion of scholars. Role of the Church and theologians thought was undeniable.

Almost all religions, Zoroastrianism, Christianity, Buddhism, and Islam, as well as some of ancient empires such as Iran, Rome and ancient Greece who knew the basic amplification of the target population. Machiavelli, trade school, Socialist Kent, and major international sociologist Emile Durkheim and even Italian and German fascists and Hitler and contemporary economists, all were in favor of increasing population.

#### 2.1.2 *Insights agree with Crowd Control*

If we ignore the history of this idea, first as a fundamental problem posed by growing populations and in the late eighteenth century and early nineteenth century to comment on this payment, the English economist Robert Malthus was on duty. Founder Robert Malthus should know this mentality.

Malthus was born in the second half of the 18th century. He was a proponent of private property in the face of socialists, he believed that the establishment of equality between people and remove the property leads to inaction and motivation to work is denied. Malthus says the generous nature of life



on earth can break the eggs, but the location and food loves niggardliness. Additional child for fear of man is a virtue that the instincts takeover of food to the population growth is limited. In his view, the literate man who would be wise to monitor your children, then we promote literacy.

### **2.1.3 Holistic Vision of the population**

After World War II, the need for attention to human values became more visible, both insights ((Population function economy)) and ((economy function Population)) replaced with a new mindset. If it is optimum Determination of the minimum Population for certain land resources is known, it is simply not possible. City where the main source of the city's workforce, whatever the subject of innovation and technology that not only the production but also social interaction and communication between the inhabitants of the city are changed. Do not accept that in Determination of optimal level Population in addition to the population, There are many and varied issues That the formation of their You can create or eliminate many of the problems that have caused the problem of optimal level Population, to be effective?

## **2.2 Economic theories of fertility**

### **2.2.1 Microeconomic theory Gary Baker**

Most influential explanation of rational choice to study the relationship between economic, social and reproductive behavior, taken from Baker. In his opinion, the parents like other commodities evaluated children. One of the values that parents are going to be at the top of it, maximizing wealth. It seems that parents are seeking more wealth, educated parents who rated their job and their opportunity cost is too high and also due to its parents' income, easier access to fertility control tools demanding fewer children. Alternatively, low-income parents have jobs and have no access to the departments of low fertility control, the operation will have more children.

Baker argues that, under the conditions of children as commodities and net cost increases have children. Accordingly children of families will be determined by income and wealthy families should have more children result. However, empirical evidence suggests that not the shape. Baker answer to this question is that there is a fundamental confounding variables, including access to contraception. The operating income is directly related to the relationship between income and family size, there will be lost.

### **2.2.2 Leivenstein**

Assumes that economic benefit or lack of benefit children, factors influencing parents to decide on the number of children. Leivenstein theory have a three types of benefits and there are two types of cost for children, namely:

#### **Benefit children**

- 1- The goods are as fun for parents (consumer).
- 2- Profits and income derived from child labor (production).
- 3- The provision and maintenance of aging parents or other conditions such as illness and disability (security)

#### **Costs of children**



Direct costs: the cost of maintenance and care of the child until they reach the stage of economic benefit. Indirect costs: in fact the opportunities that their mother lost the child maintenance. Concludes that the economic interests of the child if it is more than double the cost, which motivated families to have more children.

This suggests that the lower fertility rates decline, the minimum effort necessary for economic development is low. When the second stage begins the level of income Established as the point where the fertility decline.

## 2.3 Social and cultural theories of fertility

### 2.3.1 Modernization theory

This theory it will follow the progress and development of technology on people's lives, even in the affective and normative influences and can also be effective in terms of reducing the birthrate. Modernization theory of social theory - cultural and physical environment of fertility and suggests that modernization and restructuring of the economic, social and cultural in various communities as well as the ability to change in fertility.

## 2.4 Social and economic theories of fertility

One of the most popular theories of fertility by Richard Easterlin provided that economic factors and social factors are considered to explain fertility. He believed that fertility patterns following the forty-year cycle form means that large groups are born by creating small groups, or vice versa. Easterlin belief is based on the fact that the proportion of young adults in every twenty years, reflecting the birth rate of twenty years ago. Easterlin says that people born at a low birth rate period can be easy entry into the labor market, wage fairly rapid progress in the field anticipate. In contrast, those born in large groups results in less than optimal conditions for economic gain experience. Easterlin theory is the assumption that women are essentially passive role in fertility patterns play.

- 1- If you wish more than income, the effect is poor and cannot afford to have more children.
- 2- If you wish to be low and high income, income can rise in the rate of fertility.

## 2.5 Explaining fertility

Unfortunately, today, less research on the relationship between various social – economic events and population phenomena. They often do not think seriously about the events and feelings of responsibility for them. This failure is partly due to the failure of prohibition and cultural taboos that exist around the world.

This failure is partly due to the failure of prohibition and cultural patterns that exist around the world. Over millions of years of evolution and growth and to increase the quality and quantity of human beings to the present day, such prohibitions and taboos have been broken and the subsequent adjustment of designs, models and criteria by which it can be used to achieve the desired population. Forgetting in order to endanger the population of civilizations, countries fall into the trap of the population, followed by famines, Deforestation, uncontrolled change of geographical, environmental pollution, international tensions, addiction, crime increases, wandering sewage waste, and other adverse movements in spreads.





## 2.6 Literature

In a survey by the “Luciano Fanti - Luca Spataro “University di Pisa in 2009 by title "Fertility and public debt" was published. Fertility and public debt are two of the major concerns in the ongoing debate about economic policy, especially in countries with low fertility and large debts. Research now shows that public debt is generally detrimental to fertility, population decline and high debt. Inverse relationship occurs only if the debt is low enough and the share capital (labor) in the economy sufficiently low (top). Therefore, in the present study analysis suggests that, with capital intensive developed economies (such as the countries of OECD) to improve productivity to reduce the national debt, While developing countries, labor-intensive economy, with the goal of reducing fertility, should the national debt only if the debt virtue (void) should increase (decrease).

In a survey by the “Helmuth Cremer, Firouz Gahvari, Pierre Pestieau “at CES Magazine July 2009 by title "fertility, human capital accumulation, and the pension system" has been published. Present study is to provide a unified effect of side effects related to fertility and human capital accumulation and retirement pay system. Selected certain children, but children's future ability of random set of family background, and others involved in education. The results obtained includes:

- 1- Investment in education and the ability to more or less the parents should be covered by government subsidies.
- 2- Subsidized child directly to one or both parents should not to be paid in the form of tax breaks applied instead.

## 3. Statistical Analysis

### 3.1 Estimation

The data used in this analysis using a panel of 30 provinces in 200<sup>1</sup> and 20<sup>0</sup> are the two census periods. The analysis separately included urban and rural areas. After collecting data from the statistics of the Ministry of Health and the Department of Registration using STATA software package to analyze the relationships between the variables. The main results of the regression panel data obtained in the following form:

$$TFR_{dt} = \alpha_d + \beta X_{dt} + \varepsilon_{dt}$$

Where is a vector  $\beta$  specific effect, -is a district  $\alpha_d$  total fertility in district d at time t,  $TFR_{dt}$  of coefficients,  $X_{dt}$  is a vector of explanatory variables, and  $\varepsilon_{dt}$  is an error term. Our explanatory variables are adult female literacy, adult male literacy, urbanization, son preference, Access to drinking water and child mortality.

The variables in this analysis have been studied in a total of seven main variable, and can be expressed as follows, on top of dependent variable, is total fertility rate.

To calculate the total fertility rate must calculate the age-specific fertility rates, the number of live births per year in the age group of women in the same age group in the population can be measured in the same year.

$$ASFR_{\alpha} = (B_{\alpha} / E_{\alpha}) * 100$$

$B_{\alpha}$  , The number of live births in that year age groups (number of live births for each specific age group)



$E_{\alpha}$  , Women of the same age group in the same year

$\alpha$  , Indicates the specific age group

Age-specific fertility rate TFR values obtained using the following equation:

$$TFR = 5 \sum ASFR_{\alpha} / 1000$$

ASFR values obtained for each of the groups on TFR are together and multiplied by five. Because of the above five multiplied by five-year age groups.

To obtain a literacy rate of men and women are as follows:

$$\text{literacy rate} = \frac{\text{Literate population}}{\text{Population of 6 years and more}} * 100$$

The mortality rate for children under five years of research is the next variable.

$$\text{mortality rate for children under five years} = \frac{\text{number of deaths of children under 5 years}}{\text{Live births in the same year}} * 1000$$

The role of urbanization is also emphasized. Urbanization, fertility decline has stressed because the productive life of the city and hardly causes reduced fertility.

$$\text{urbanization} = \frac{\text{People living in the city}}{\text{Total population}} * 100$$

In addition to the factors affecting fertility should be noted that the possible role of "son preference" in raising the fertility examined.

$$\text{son preference} = \frac{\text{Female child mortality}}{\text{boy child mortality}}$$

To analyze the results separately to reflect the results of the urban and rural areas, we then examine the results

### 3.2 Urban area

The results of estimating the model using panel data for 30 provinces for the census year period (2001 and 2006) in Table 1 for the urban area is reflected.



Table 1. Fertility in Iran (urban area): main results

Variables	OLS:2005 ( 1 )	OLS:2010 (2)	Panel 2001-2006 GLS-FE ( 3 )
Female 15+ literacy	۰,۴۰۸۱ ( ۰۱ )	-۰,۰۲۵۴ ( ۰۴۲ )	۰,۰۱۲۴ ( ۰۰۳ )
Male 15+ literacy	-۰,۰۹۸۴ ( ۰۰۶ )	-۰,۰۱۰۶ ( ۰۷۶ )	-۰,۰۳۹۳ ( ۰۰ )
Child mortality	۰,۰۰۰۷ ( ۰۸۶ )	-۰,۰۲۰۴ ( ۰۲ )	-۰,۰۰۴۷ ( ۰۰ )
Urbanization	-۰,۰۰۹۸ ( ۰۰۲ )	-۰,۰۱۰۶ ( ۰۰۶ )	-۰,۰۰۸۸ ( ۰۰ )
Access to drinking water	-۰,۰۱۴۰ ( ۰۱ )	-۰,۰۱۲۵ ( ۰۱ )	-۰,۰۱۰۷ ( ۰۰ )
Son preference	-۰,۲۵۶۴ ( ۰۲۶ )	-۰,۰۱۴۵ ( ۰۱ )	-۰,۴۴۹۱ ( ۰۰ )
$R^2$	۰,۴۸	۰,۴۰	
Wald $\chi^2$			۲۵۸
Adjusted $R^2$	۰,۳۵	۰,۲۵	

Table 1 presents the main results of the estimation. Two columns (1) and (2) estimates for the years 2001 and 2006 are reflected. According to the first column of above table are calculated for all explanatory variables controls provinces in 2005. Female literacy rate is positive and significant. Male literacy rate is negative and highly significant and substantial. Urbanization coefficient is negative and highly significant, and access to drinking water is negative and significant. In contrast, Child mortality and Son preference would not have any significant relationship with fertility. Unexpectedly female literacy is a positive sign, because the literacy cause reduced fertility. Column (2) shows that the Estimates for 2006 are estimated for the entire province of Iran. Interpretation of the results is that all coefficient is negative, the difference is that male and female literacy, and child mortality have no significant relationship with fertility. But the relationship between fertility and access to drinking water, urbanization, and there is a preference for sons. In column (3), results similar to the results of column (1) and 2001.

The literacy rate of women is positive and highly significant. In contrast, male literacy, urbanization, mortality, access to drinking water, preference for male children and highly significant negative coefficient reflected. Stating these results, we have shown that female literacy rate is associated with high fertility. The result in this case our hypothesis that the increase in female literacy rates reduced fertility denies, but it should be noted that in 2006, the literacy rate is negative. It is important that these results reflect only the criterion of reduced fertility in women's literacy, in



Addition to raising awareness of women's education and literacy, but also need to use a contraceptive method more.

Son preference has increased over time, but the coefficient is negative. It can be argued that in urban areas do not differ between male and female children. Due to the increased age of marriage for boys and want to continue studying at the higher levels to achieve more job prospects, it will increase the age of marriage. With increased awareness and education becomes more common in men of reproductive control methods. Access to drinking water at the time the census was negative and significant. Access to drinking water is one of the factors that increase the availability of child mortality rates decreased.

### 3.3 Rural area

The results of estimating the model using panel data for 30 provinces for the census year period (2001 and 2006) in Table 2 for the rural area is reflected.

**Table 2. Fertility in Iran (rural area): main results (Dependent variable: TFR)**

Variables	OLS:2005 (1)	OLS:2010 (2)	Panel 2001-2006 GLS-FE (3)
Female 15+ literacy	۰,۰۰۷۰ (۰.۶۷)	-۰,۰۰۶۵ (۰.۰۰۷)	-۰,۰۱۱۶ (۰.۰۰۶)
Male 15+ literacy	-۰,۰۲۶۴ (۰.۰۰۶)	۰,۰۱۲۴ (۰.۰۱۶)	۰,۰۰۰۷ (۰.۰۰۸)
Child mortality	-۰,۰۱۲۵ (۰.۰۰۶)	۰,۰۱۱۳ (۰.۰۰۷)	۰,۰۰۲۵ (۰.۰۰۰)
Access to drinking water	-۰,۰۰۳۲ (۰.۰۰۶)	-۰,۰۱۵۷ (۰.۰۰۶)	-۰,۰۱۸۳ (0.00)
Son preference	۰,۴۰۷۲ (۰.۰۰۱)	۰,۴۰۶ (۰.۰۰۶)	۰,۱۱۴۷ (۰.۰۰۱)
$R^2$	۰,۳۹	۰,۴۴	
Wald $\chi^2$			۵۴,۷۳
Adjusted $R^2$	۰,۲۶	۰,۳۰	

Table 2 presents the main results of the estimation. Two columns (1) and (2) estimates for the years 2001 and 2006 are reflected. According to the first column of above table, calculate the explanatory variables for the provinces in 2001 (rural areas) are seen. Female literacy rate is positive





And significant relationship between fertility. Male literacy rate is negative and highly significant and substantial. Access to drinking water is negative. In contrast, child mortality, no significant relationship with fertility. Son preference significant positive correlation with fertility.

Column (2) shows that the estimates for 2006 are estimated for the entire province of Iran. The results suggest that the female literacy rate is negative and highly significant and strong correlation with fertility. Son preference and Male 15+ literacy have a positive coefficient, but no association was found between them and fertility and are meaningless. Positive and highly significant factor in fertility with child mortality. And finally the negative coefficient of access to safe drinking water, and very significant.

In column (3), results similar to the results of column (2) of the 2006. Female literacy rates and access to safe drinking water is negative and highly significant. Male literacy have no relation to fertility and meaningless. Positive and highly significant of child mortality factor is reflected in the results. And finally the coefficient of Son preference is positive and significant correlation with fertility. According to the second and third column our hypothesis that the inverse relation between fertility and female literacy is accepted. Provision of education and higher education for women in rural areas the opportunity cost of keeping children to enhance education and for their efforts to achieve a higher status. Male literacy has an Effect on the fertility, for this reason that women are responsible for the educating of their children are responsible in the first place.

You may view the theoretical framework discussed in mind that credit sons, Outlook security and social insurance for old age parents are considered. Son preference Coefficient is positive but declined over time. This indicates that in rural areas there is still gender bias for having a son. In simpler terms, positive coefficient of correlation between fertility and biases directly there, For example, the family of the girl child is born as a son of the family's vision focuses on having a son to have a repeat pregnancy.

## 4. Statistical Analysis

### 4.1 Results of the urban area:

Research findings indicate a significant positive relationship between women's education and fertility rates, which confirmed the hypothesis. Represents the decision variables such interests, traditions and beliefs and knowledge of contraceptive methods is the effect on fertility. As well as fixed effects at the municipal level, indicating that the correlation between women's education and fertility as other factors such as taste and beliefs. These findings help to resolve the doubts about the role of women's education on fertility.

Second, the male literacy is a decisive factor in fertility. Findings of the initial hypothesis that the negative relationship between education and fertility in men firmly confirmed. Because men of higher education in the age of marriage has risen, and thus delayed the first child is born.

Third, the effects of the strong Male literacy, child mortality, urbanization, access to drinking water, Son preference, the positive association of Female literacy.



Fourth, the negative coefficient indicates that son preference between male and female children in urban areas and different traditions and values in the area is gone.

#### **4.2 Results of the rural area:**

Research findings indicate a significant negative correlation between women's education and fertility rate, which rejects the hypothesis. With increasing levels of literacy and education for women in rural areas having a high opportunity cost, increase in the value of the cost of having children increases, and reduce the demand for children.

Second, declined, Son preference over time, but still has a direct relationship with fertility. Because the son is still in rural areas due to capital asset visibility and security for old age parents to a baby boy. This vision led to frequent childbearing.

Third, access to drinking water in the table (2) is significantly negatively correlated with fertility. In recent years, due to more rural households have access to safe drinking water is one of the main lever, increase access to safe drinking water and child mortality reduced disease as a result of increased fertility.



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