

IMPACT OF INFLATION AND UNEMPLOYMENT ON POPULATION GROWTH OF IRAN

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ABSTRACT: Assessment of the condition of inflation and unemployment in the Iranian economy has always attracted the attention of many economic experts. This paper seeks to answer the question of whether inflation and unemployment have an impact on population growth in Iran. In other words, the questions discussed in this study, are as follows:

1- What is the relationship between population growth and inflation in Iran?

2- What is the relationship between population growth and unemployment in Iran?

In this study, population growth and its relation to inflation and unemployment in the years 1996 to 2010 are discussed. The statistical population of the research includes the Islamic Republic of Iran. Here, the population growth is the dependent variable, and the independent variables are inflation and unemployment. Our methods are a combination of the library method and secondary analysis. Time series data of population, inflation, and unemployment are collected from the Central Bank of Iran and UNCTAD website, and then determination of the relation between proposed variables, data analysis, and estimation of the model have been carried out using Eviews software and time-series model.

Results and findings of the research show that both inflation and unemployment have a negative and reverse relation with population. This means that 1% rise in inflation, causes the decrease of population by 0.0026 million people, and 1% rise in the first order difference of unemployment rate, leads to a reduction of 0.0094 million in population.

KEYWORDS: Inflation rate, unemployment rate, population, time series model

INTRODUCTION

Population and related issues are among multidimensional and complex issues of human communities which are either affected by economic, social, cultural, political, and other factors and affect them. It can be said that the population and relating changes are so widespread and extensive so that it cannot be included by a theory or a certain formula, but population trends in a particular direction in different times and places may probably have different and sometimes conflicting reasons.

In other words, population and relating issues as a social issue, is listed among problems with the greatest points of view, and against, governments impose numerous and diverse population policies. For example, fertility is one of the important aspects of population, which some countries apply incentive policies to elevate it while in another society or country due to the high population, punitive policies are applied. In this case, China's one-child policy and incentive policy of the Western European countries can be mentioned ([Becker et al., 1999](#)). In fact, a major concerning of economists in

recent years is to explore the relationship of inflation and unemployment with population growth. It is important to know whether economic problems such as unemployment and inflation slow down the population growth. Therefore, the basic questions are: "What is the relationship between inflation and unemployment with population growth? How can it be expressed? How strong is the relationship? And in what direction it operates?" This article is scheduled as follows: Firstly, unemployment, inflation and population are explained. Then, each of the indicators are figured out in a 15-year interval. After that, the experimental model estimation is discussed. Finally, after the estimations and related statistical analyses, data interpretation, conclusion, and suggestions are presented.

UNEMPLOYMENT

Human resources constitute the foundation of the wealth of nations. Indeed, the process of economic and social development of any country is determined by the human resources. Therefore, the full and appropriate utilization of

human resources and the country need to be considered as one of the strategic purposes of the country development. Thus, unemployment is undoubtedly the largest and most comprehensive economic and even social and political problems of the present and the future decades. Even though unemployment in an advanced industrial society may cause great economic and social costs, in the third world countries, widespread layoffs associated with economic poverty can lead to a lot of risks to the society. Joblessness in addition to being followed by cutting off the income of the unemployed groups, it may also cause very important social consequences and can be the origin of strengthening social corruptions (Kelley, 1988). From the point of view of the statistical center of Iran, unemployment consists of those who seek a job at time of census. Therefore, jobless people who are looking for work for any reason are not considered as unemployed (Abbasi Nejad and Kazemy Zadeh, 2000).

To better understand the unemployment phenomenon, which is caused by an imbalance in the labor market, we first briefly introduce these mechanisms. A market is characterized by demand and supply mechanisms. Labor supply in the labor market depends on population growth, sex and age composition, and participation rate for each population groups and migration issue (whether domestic or international). Labor supply in Iran has grown substantially. The major factors for this problem can include the increasing population growth rate in the 50s, the rise of female participation in the labor market, and international migration to the country (Mehrabian and Sedghi Sigarchi, 2010).

Labor demand is a function of economic growth, labor productivity, the type of applied technology, and also the relative prices of labor and capital. Unfortunately, in this country, labor demand has not grown as much as labor supply, since structural barriers have reduced economic growth in recent decades and in some cases the growth even has been negative. In addition, on one hand, due to imports (which has often brought the capital off) (Abrishami, 1996), as well as a number of institutional and political reasons, and interference of the government, the real labor price has been more, and the price of capital has been less than their real value. Therefore, labor supply is more than labor demand (Ziaee Bigdeli *et al.*, 2008).

In the following chart, the unemployment rate of the country is depicted for a 15-year period (1996-2010). As it can be seen, in recent years, the unemployment rate has increased.

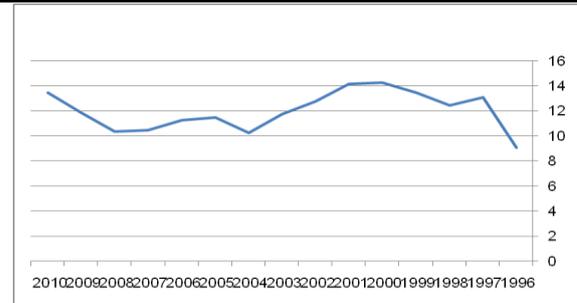


Figure 1: Unemployment rate between 1996 and 2010 in Iran

INFLATION

Inflation is one of the fundamental problems of the economy and society in various countries, especially in the developing countries. High inflation can adversely affect the growth process, economic development, and social justice. Regardless of the economic aspect, inflation can have great social and political effects, since inflation (like unemployment) has a daily direct contact with the life of each individual, and since most people have to make appropriate decisions and actions with the increase of wages and prices, they anyway get involved in inflation.

Inflation in the economics literature contains various definitions and classifications, but the purpose of this article is not to define inflation, so in the most general expression, inflation is the growth rate of price index (Nazari, 2002) and the continuous rise in the price level or auto-increase of prices (Qadiri Asli, 2003).

Each economic school has given a kind of expression about the causes of inflation. For instance, in the point of view of the monetary school, inflation arises from the growth of nominal money supply. Also, followers of Keynes school know the cause of inflation as the result of an inflationary gap arising from the present goods market. In the last few years, inflation has had a dramatic and alarming increase rate, and this has become as one of the serious economic problems of the country. According to the following chart, inflation of Iran over the past 15 years (1996-2010) is given.

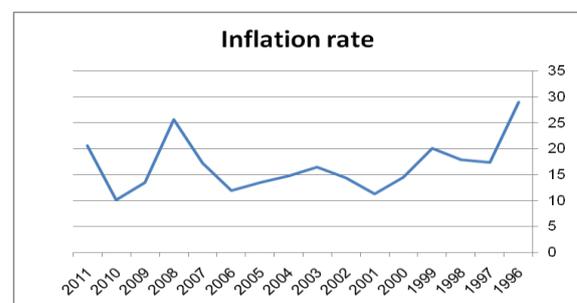


Figure 2: Inflation rate between 1996 and 2010 in Iran

3.1. Status of the population of Iran and the population growth rate

One of the most important factors that influence the rate of economic growth is the population and birth rate in these countries. Iran was among the most populous countries in the very distant past. According to historians, the population of Iran in 500 BC was 40-50 million people, and there were many populous cities in Iran. Gradually, after several wars, with the loss of the vast territories and large lands and change of geographical territories, changes and also bloody massacres, epidemic diseases, and natural disasters, in the remaining territories around 8 million Iranian people were living. In the late 19th century about 8-10 million people were living in Iran with the present borders. Annual population growth in this period was less than 0.5% that the main reason was the very high rate of mortality in Iran.

In 1901 about 10 million Iranians were living in Iran. After less than a century, the population became six times the population in 1996 and exceeded 60 million people.

3.2. Natural Growth Rate of Population

Natural population growth rate shows the population growth rate based on the difference of mortality and fertility by assuming that the society is not affected by fluctuations due to migration:

$$\text{Natural growth rate of population} = \frac{\text{Number of births minus deaths within 1 year}}{\text{Mid year population}} \times 100 \text{ or } 1000$$

Based on the numbers given by the formula, one can comment on the population in the future and its increase or decrease. According to a general classification, population growth can be categorized as follows:

Population growth of 0.1%:	fixed population
Population growth of 0.1-0.5%:	weak growth
Population growth of 0.5-1%:	average growth
Population growth of 1-1.5%:	rapid growth
Population growth of 1.5-2%:	very rapid growth
Population growth of more than 2%:	explosive growth

Population growth in developing countries depends almost exclusively on the difference between birth and death rates. Now, the average annual growth rate of population in developing countries is about 2.1 percent, while the annual growth rate of population in most developed countries is about 0.6 percent. Apparently, developed countries have been able to forbid dramatic population growth while developing countries have not been successful. However, the truth is that in developed countries the alarm has started to sound that by the very low

population growth rate and aging population, birth rates will come down so that in the future, it will not be compensable and a great danger such as the social and population decline will threaten their countries. Therefore, in these countries, recently some special incentives have been imposed for births and population enhancement.

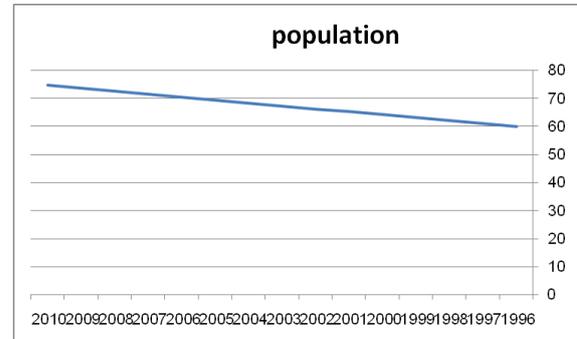


Figure 3: Population between 1996 and 2010 in Iran

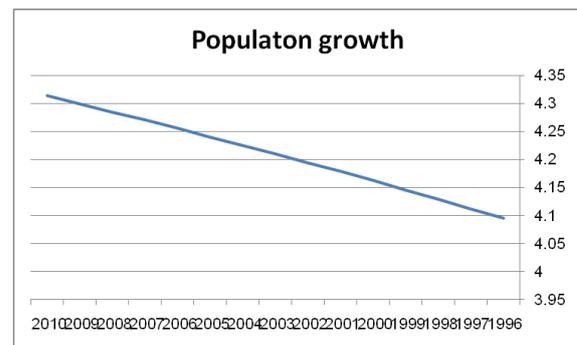


Figure 4: Population growth rate between 1996 and 2010 in Iran

3.3. A review of empirical studies on the subject

In this part of the research, a series of studies carried out in Iran and other countries in relation to population growth will be discussed.

INTERNATIONAL STUDIES

- 1- [Brander and Dowrick. \(1994\)](#) examined the impact of population growth and breeding on economic growth using the panel data model. They performed their calculations using data of 107 countries in the years 1960-1985 and concluded that high birth rates reduces economic growth through its influence on the investment and capital erosion, but low birth rates have a strong positive effect on per capita income growth through the labor supply. The two authors in another part of their study discussed the relationship between birth rate and economic growth through the effect on investments, and came to the conclusion that increase in the birth rate results in the decreased investment and

therefore the decreased national income.

- 2- [Kelly and Schmidt Robert, \(1995\)](#) examined the correlation between total population and economic growth. In the research, physical capital, labor, human capital, natural resources, and technology are considered as the explanatory variables, and per capita Gross Domestic Product (GDP) are considered as the dependent variable. The results showed a significant negative relationship between population growth and economic growth among 89 countries of more than a million people in 1960.
- 2- [Al-Yousif and Darrot, \(1995\)](#) investigated a long-run relationship between population and economic growth in 20 developing countries in the interval 1950-1996. They applied the Granger causality method to assess the long-term relationship. The results of the investigation have shown that if a country is more in its early stages of development, population growth leads to a more poverty, but in the higher stages of development, population growth increases the per capita income and leads to higher economic welfare.
- 3- [Mohammad Hasan, \(2010\)](#) studied the long-run relationship between population and per capita income growth in China. To estimate the model, he employed the Granger causality and co-integration methods. The results showed a negative long-term relationship between these two variables. The short-term relationship between these two variables was dissimilar in different samples. Neoclassical growth model reports the impact of population growth on per capita income as positive, while the endogenous growth model shows a negative relationship between these two variables. The long-term relationship is in accordance with Becker's belief who suggests that with a higher income, households prefer to have children with higher quality and better specifications to more numbers of children.
- 4- [Soori, \(2010\)](#) in his article discussed the impact of population growth on economic development in Thailand for the years 1961-2003. Through the Granger test, he examined the long-term relationship between population growth and economic development, and concluded that population growth in the country affects positively on the development and performance of economic factors.

DOMESTIC STUDIES

- 1- [Amaani and Hamadani, \(1994\)](#) studied the mutual interactions of population growth and

economic development in the Iranian economy. The findings have shown that the population growth of Iran not only does not contribute to improvement of the development process, but also it has led to decrease, collapse, and loss of many economic indicators and social welfare.

- 2- [Arabmazar and Keshvari Shad, \(2005\)](#) in their study investigated structural changes in population on economic growth. This study is performed in Iran during 1959-2001, and model estimation is done using ARDL method. The results show the 1% increase in the ratio of population of ages between 15-64 years and the total population causes to 1.27% increase in economic growth. Also, if the ratio of the employed labor force to the total population of 15-64 year rises by 1%, per capita GDP rises by 1.89%.

EXPERIMENTAL MODEL ESTIMATION

In this part of the research, the relationship of inflation and unemployment with population growth in Iran in a 15-year period is investigated. Thus, in this study we seek to evaluate the procedure and the amount of influence of the factors mentioned above on the Iranian population growth. Therefore, with what presented, we state our model as follows:

$$LPOP_t = \alpha_0 + \alpha_1 LP_t + \alpha_2 LUNEM_t + \varepsilon_t$$

Where, LPOP is the logarithm of population per million people, LP is the logarithm of inflation, LUNEM is the logarithm of unemployment, and ε_t is the disturb component.

Time series statistics of population, inflation, and unemployment is gathered from the Central Bank of the Islamic Republic of Iran and the unctad website. Also, for the model estimation the Eviews7 software is used.

6.1. Interpretation of the model

6.1.1. The practical result

6.1.1.1. Scatter diagram of variables

In this section, the scatter plots of independent variables of the model are given compared with the dependent variable.

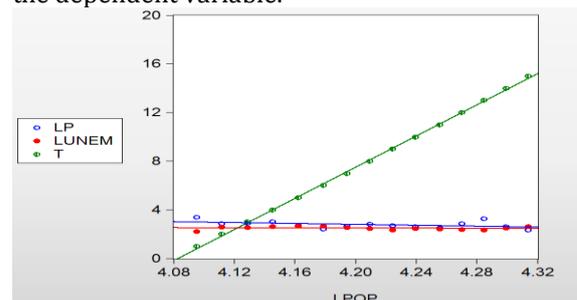


Figure 5: The scatter of variables.

Figure 5 indicates the population scatter diagram for inflation, unemployment and time trend. As it is clear, the maximum scatter is for the inflation variable.

6.1.1.2. Durability test

The durability test is done mainly to avoid spurious regressions. To forbid spurious regression, variables must be durable; otherwise one has to use the differences of the variables which are usually durable.

6.1.1.3. Why the durability test is necessary

Definition of durability: Durable data have been the ones with constant mean, constant variance, and constant auto-covariance for any given lags. Durability or indurability of a time series may have a serious impact on its behavior and properties. For example, when a shock enters a durable time series, its impact on a given variable is damping and gradually disappears, i.e. the effect of the shock at the time t is less than the time $t - 1$. In contrast, indurable data are the ones in which stability of the shock is unbounded, so that in an indurable series, the impact of a shock at time t is not less than its impact time $t - 1$.

The use of indurable data can lead to spurious regressions. With two durable variables which are independent random series, when one of them is fitted on the other, they will have a low amount of t and R_2 . This behavior of independent variables is evident, but if the two variables had a time trend with no logical connection with each other, regression of one on the other will have a high R_2 . Therefore, in such circumstances, if the standard regression techniques are applied well, the results may indicate a good regression in which all coefficients are significant and R_2 is also high, but clearly this is a spurious regression with a tidy appearance.

6.2. Durability test of variables

To avoid spurious regressions in the above estimations, one has to firstly make sure if the variable are durable. If the variables are durable, the estimations will not have any problem due to dummy regressions. For this purpose, durability or indurability of the variables is first assessed using panel unit root test.

Table 1: Durability test in level

Variable	Level	Prob.
Lpop	7.123	0.0001
Lp	3.860	0.0129
Lumen	1.466	0.5179
T	-	-

Source: Calculations of the research

Results of durability test in level indicate that variables lpop and lp has a probability of less than 0.05 so they are durable, and lunem has a probability of higher than 0.05 showing that it is not durable. Thus, to make it durable we use the first order difference. Results of durability are presented in Table (2).

6.3. LLC unit root test

For the durability test of model variables, in this part, the Levin, Lin and Chu (LLC) test statistic has been used. The results are given in Table (2).

Table 2: Results of the LLC unit root test

Variable	Level	Prob.
Lpop	7.123	0.0001
Lp	3.860	0.0129
D(lumen)	4.746	0.0031
T	-	-

Source: Calculations of the research

The findings of the durability tests show that all variables have a probability of lower than 0.005 so all of them are stationary (durable) and thus the null hypothesis suggesting the existence of a unit root can be ruled out.

6.4. Initial model estimation

Table 3: Initial estimation of the model

Variables	Estimated coefficients	t-statistic	Probability
Lpop	-	-	-
C	4.090316	988.5610	0.0000
Lp	-0.001960	-1.377299	0.1985
D(lumen)	-0.009291	-3.594939	0.0049
T	0.015404	185.2690	0.0000

Source: Calculations of the research

6.5. Variance heteroskedasticity test

If the variance of the error term is not constant, the Ordinary Least Squares (OLS) estimators may still be unbiased but will not include the minimum variance. Generally, ignorance of the variance heteroskedasticity increases the intercept variance, while variance of the slope may have a positive or negative bias.

Table 4: Variance heteroskedasticity test

Heteroskedasticity Test: White			
F-statistic	0.217024	Prob. F(3,10)	0.8824
Obs*R-squared	0.855783	Prob. Chi-Square(3)	0.8361
Scaled explained SS	0.628515	Prob. Chi-Square(3)	0.8899

Source: Calculations of the research

According to the results reported in Table 4, the value $f=0.217024$ and the relating possibility $p=0.8824$ related shows that this model has the variance likelihood. In fact, according to F, at the 5% level the existence of variance likelihood could not be rejected.

6.6. Autocorrelation test

If there is a correlation, while it is ignored, the estimation of coefficients will be unbiased but inefficient. This inefficiency does not disappear even in larger samples and standard deviations may contain errors which can lead to incorrect inferences.

Table 5: Autocorrelation test

Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.104008	Prob. F(2,8)	0.9024
Obs*R-squared	0.354802	Prob. Chi-Square(2)	0.8374

Source: Calculations of the research

According to the results in Table 5, the value $f=0.104008$ and the relating probability $p=0.9024$ which is more than 0.05 indicates that this model have no autocorrelation and so the H_0 hypothesis is rejected.

6.7. The final model estimation

The final model obtained is as presented in Table (6).

Table 6: The final model estimation

Variables	Estimated coefficients	t-statistic	Probability
Lpop	-	-	-
C	4.092591	1797.785	0.0000
Lp	-0.002613	-3.182074	0.0130
D(lumen)	-0.009410	-6.372023	0.0002
T	0.015389	286.8247	0.0000
Dumm77	-0.002872	-3.870335	0.0047
Dum89	-0.002268	-2.634959	0.0299
Prob=0.0000	F=28842.03	R-2=0.99	R-2=0.99 DW=2.9116

Source: Calculations of the research

Table 7: The final model estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.092591	0.002276	1797.785	0.0000
LP	-0.002613	0.000821	-3.182074	0.0130
D(LUNEM)	-0.009410	0.001477	-6.372023	0.0002
T	0.015389	5.37E-05	286.8247	0.0000
DUM77	-0.002872	0.000742	-3.870335	0.0047
DUM89	-0.002268	0.000861	-2.634959	0.0299
R-squared	0.999945	Mean dependent var	4.215661	
Adjusted R-squared	0.999910	S.D. dependent var	0.064774	
S.E. of regression	0.000615	Akaike info criterion	-11.65243	
Sum squared resid	3.03E-06	Schwarz criterion	-11.37855	
Log likelihood	87.56702	Hannan-Quinn criter.	-11.67778	
F-statistic	28842.03	Durbin-Watson stat	2.911673	
Prob(F-statistic)	0.000000			

Source: Calculations of the research

0.000 is significant, and dummy variables DUM77, DUM89, have probabilities of less than 0.05 and thus they are significant.

RESULTS OF THE RESEARCH QUESTIONS

This section presents the results for the questions of the investigation. The present study attempted to examine the following two questions:

- 1- What is the relationship between inflation and population growth of Iran?
- 2- What is the relationship between unemployment and population growth of Iran?

Questions of the research were considered based on time series data of Iran during the period 1996-2010. Accordingly, with the achieved results about the first research question, it can be said that there is a negative and inverse relation between population and inflation, and about the second question it was shown that there is negative and reverse relation between population and employment variables. The results indicated that the impact of inflation and unemployment variables on population growth have been in coincidence with theoretical expectations because economic problems such as inflation and unemployment can lead to slower population growth.

Inflation and unemployment phenomena are two major economic problems of the various countries in the world. The detrimental effects of these two problems are very high so that sometimes the misery index of countries is calculated by inflation and unemployment rates.

DISCUSSION AND ANALYSIS OF FINDINGS

This section is devoted to discussion and analysis of our results. Findings of the relationship between population and the effective variables in Iran during 1996-2010 using time series data can be analyzed as follows:

The value of R^2 statistic indicates that 0.99 of the changes in population variable are explained in the included variables of the model. Also, with respect to the value $f=28842.03$ and the probabilities associated with all the variables which is smaller than 0.05, the significance of the whole model is confirmed.

According to the results of Table (6), with a one percent increase of inflation, population decreases by 0.0026 million people, and with a one percent increase of the first difference of unemployment rate, population decreases by 0.0094 million people. Also, since the time variable in the model has the probability of

Inflation, on the one hand, imposes more welfare costs of people by reducing the value of their financial assets, and on the other hand damagingly affects the production by removing any insurance in institutions' decision-making for investments and other costs. Inflation will be followed by non-optimal allocation of resources, economic inefficiency, and disorganization of social, cultural, and political state of the community. Unemployment as well as inflation causes chaos in the economic conditions of the society. Jobless people appear in the community as a burden and have no contribution in the production of goods and services. In addition, unemployment makes people involve in social problems such as crime, addiction, and moral corruption, and is followed by the clutter of the cultural fabric of society.

A glance at the statistics of unemployment and inflation of Iran notices the existence of two problems in the economy, because the performance of an economy is judged with three overall measures namely the inflation, unemployment, and economic growth. With the points presented about inflation and unemployment variables it can be concluded that their increase leads to a reduced population growth.

POLICY RECOMMENDATIONS

If developing countries such as Iran, take the wrong policies adopted by developed countries, and do not control their declining population growth, in the next few years they will face the large problem of population aging and dangerous decline of population. Human force is considered as an important factor in economic growth, which if it is not regarded in developing countries and their population growth is lost they will not be able to continue their economic growth. Developed countries compensate a huge fraction of the labor force needed for economic growth through migrations, but developing countries due to their fewer attractions for migrants have to rely on their domestic labor force, and therefore the decline of population growth will be a great danger for them. Since labor demand in Iran has not grown along with labor supply and has caused unemployment, the imports, which have usually taken out the Iranian capital must be prevented to benefit from user technology.

To combat inflation, it should be attempted to increase investments and production of essential goods and services, and also benefit from legal support of the legislatures of units and agents of the private sector, serious work in the realization of meritocracy in the managements, the independence of the central bank, etc.

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