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**THE EFFECT OF INFLATION ON ECONOMIC GROWTH ON D-8 COUNTRIES
WITH EMPHASIS ON THE DYNAMIC PANEL THRESHOLD METHOD (1995-2011)**

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ABSTRACT

Relationship between inflation and economic growth could be began based on the famous Phillips curve. According to the Phillips curve there is a negative relationship between inflation and unemployment. In fact, between inflation and unemployment is a negative relationship but is a positive relationship between inflation and output. In any case, until the late 1960s, the original Phillips curve widely accepted and served for the purposes of economic policy. In this study, examined the effects of inflation on economic growth in D-8 countries with an emphasis on dynamic panel threshold method (1995-2011). The results show that physical capital has a positive and significant effect on growth and show that these countries need capital for economic growth and these results are consistent with classical literature of economic growth. Labor force has a significant and positive effect. The results also show that human capital variable has a positive and significant effect and suggests that knowledge and human capital is an important factor in economic growth. Inflation has a significant and negative effect on output and suggests that rising inflation, slows the economic growth, these results are consistent with the literature on the Phillips curve. Threshold variable and multiplicative threshold variable and inflation also had a significant and negative effect on inflation. The coefficients indicate that threshold variable coefficients and multiplicative threshold variable and inflation is greater than coefficient of inflation that this result indicates that if the inflation be as a threshold imposed more detrimental effects on economic growth.

Keywords: Inflation, Economic Growth, D-8 Countries, Dynamic Panel Threshold Method

INTRODUCTION

Relationship between inflation and economic growth could be began based on the famous

Phillips curve. According to the Phillips curve there is a negative relationship between

inflation and unemployment. In fact, between inflation and unemployment is a negative relationship but is a positive relationship between inflation and output. In any case, until the late 1960s, the original Phillips curve widely accepted and served for the purposes of economic policy. But from 1967 onwards and due to formation of supply shocks, economists such as Milton Friedman were found simultaneous increase in unemployment and inflation. Friedman by introducing Phillips curve and emphasizing the adaptive expectations, note that the concept of natural unemployment. Now, Phillips curve as an important element of monetary policy review, considered by most economists (**Mohsen Mousavi, Saeedi Farr, 2006: 283**). Inflation, is the challenges that always has been ahead of the authorities of Iran's economy. Due to the devastating effects of inflation, its control is one of the goals of macroeconomic policy. Inflation fluctuations in the Iranian economy and strategies for its control, requires identify factors that influencing inflation.

In the theory of economic growth, there are different views about inflation and economic growth. Two Neoclassical and Kalky-Keynesian followers believe that exist a positive causality of inflation on economic growth. Kalky- Keynesian compulsory

savings school believes if prices rise faster than wages, overall levels of savings and investment, increases through the transfer of income from wage earners by savings tend to be low income borrowers which tend to have higher savings. In addition, operation of inflation tax transfers resources from the private to the public sector. Where these resources in the principle can used to finance real investment. Tobin assuming that money is a substitute for capital, through the effect of capital-intensity is proved the positive effect of inflation on economic growth. According to Tobin model, inflation make the attractive real rate of return of investment than the returns from financial investments. Structuralism perspective including Baer, Seers, Taylor on Inflation represents reverse causality from inflation to economic growth (**Satia et al., 1997: 2008-2022**).

Against the Kalky- Keynesian perspective, advocate economists of classical doctrines believe that inflation obstacle to economic growth. This argument is based on several foundation. First inflation reduces the return of savings and therefore, is a negative persuasion for savings. Second, expressed that high and variable inflation potentially could increase production costs and investment risk. Third, high inflation can encourage bribery and when increases the pressure on the

government to establish a control range of price, directly disposes unproductive activities. Fourth, contrary to the conclusions of Tobin, high inflation may make attractive unproductive investments in real assets (such as mediation). Fifth, if the source is transmitted through the inflation tax to government is not investment, the net increase in total investment, will be lower (**Akhtar and Chaudhry, 2003: 75**). Finally, in an open economy if domestic inflation be higher than global inflation and if exchange rate is not be fully flexible, in this case, inflation worsens the trade balance. This causes the trade restrictions be severe than savings restrictions. In addition, high inflation can be caused capital flight, because create the problems in balance of payments and by reducing the rate of exchange, leads to hoarding and the outflow of capital.

Also a third view is that there is owned by Sadrosky. He by using the optimizing behavior of economic agents and by taking real money remained in the utility function, showed that monetary inflation has a neutral effect on economic growth. The idea that is known neutral theory, have been raised by rational expectations. According to this view, when inflation is anticipated, there is no effect on the real economy (**Sydrosky, 1967: 534-44**).

If inflation rate exceeds its threshold, by effect on inflation expectations can even have bigger negative effects on economic growth. This research followed this topic that review what is impact of threshold inflation on economic growth and how much more of Inflation have negative effects.

Domestic inflation rate based on the quantity theory of money can be caused by an increase in the volume of money or based on the theory of pricing can be due to rising interest rates and investment funds as an input, if relatively be different from global inflation, by an impact on exchange rates caused business changes and influence the degree of trade openness. Also rising inflation itself, if workers are suffering from lack of money illusion, according to Keynesian theory will lead to an increase in nominal wages and this has led to a decline in production and productivity in the country. Inflation it also by increasing the transaction costs can lead to decline in economic growth and productivity in the country. If Inflation exceeds from its threshold amount, by effect on inflation expectations can be even have bigger negative effects on economic growth.

Literature

Inflation and Economic Growth

Among the objectives of the economic system is access to high growth rates and economic

stability, lower inflation, full employment and equitable distribution of income in the country.

Inflation is one of economic harmful phenomena and imposes high costs on society. From negative effects of inflation could be cited to redistribution of income in favor of property owners and the loss of wage and salary earners, increased uncertainty and volatility in macroeconomic and hence shorter horizon decisions and reduce long-term investments and other factors.

High inflation and with high volatility increase transaction costs and reduce investment in productive activities and thus reduce economic growth. In addition, different views about the future inflation can be have different effects on growth. Issue of inflation uncertainty was introduced by **Okan in 1971**. He received with the aid of statistical analysis that countries with higher inflation rates, generally have a higher inflation Changes. Therefore, Okan used above changes as a measure for the uncertainty and believed that high inflation is associated by inflation uncertainty.

Uncertainty about future inflation leads to deviance in decisions of consumers and producers in savings, consumption and investment. This deviations will have an undesirable effects on efficiency of resource

allocation and the level of real economic activity. Uncertainty associated with inflation, doubled the cost of economic agents, because some of their benefits spend on forecasts of future inflation in terms of uncertainty in the market. Indeed gains or losses in the manufacturing and service firms will be affected. There is also a structural break in rate of inflation, has a different effect on the growth of the economy.

Access to high growth and steady of the production associated by lower inflation rates is a key issue of macroeconomic policies. The relationship between inflation and economic growth, is something that in the past few decades have been disputed. Theoretical and experimental studies conducted in this area show that cannot be achieved to definitive conclusion about the effect of inflation on economic growth. In response to the question what is the effect of inflation on economic growth of any country, it can be said that it depends on each country's economic structure. For this reason, in assessing a country's economic growth, assess the effects of inflation on growth, is important as one of the factors that affect economic growth.

Economists have concluded that medium level of inflation can be contribute to economic growth but purpose of this level of inflation is not a high level of prices that

causing uncertainty in economy and impede the proper functioning of the economy (Coibion and *et al*, 2011; 76).

This agreement followed this questions that what amount of inflation is too efficient? What amount of inflation impede economic growth? Does inflation should be zero?

In other words, at lower rates, can be achieved to positive relationship between Inflation and economic growth, however, on high rates of inflation is a negative relationship between these two variables. If a nonlinear relationship exist between the two variables, so it is possible that there is a turning point or threshold then sign of that relationship between the two variables change on it (San haji, 2001 ; 65).

Threshold inflation and its impact on economic growth

Access to high and steady growth of production associated by lower inflation rates is a key issue of macroeconomic policies. The relationship between inflation and economic growth, is an issue that has been discussed in recent decades (Fisher, 1993). Theoretical and experimental studies conducted in this area show that cannot be achieved to definitive conclusions about the effect of inflation on economic growth. In reply to this question what is the effect inflation on economic growth of any country can be said

that this issue depends on each country's economic structure. For this reason, in assessing a country's economic growth, assess the effects of inflation on growth, as a one of the factors that affect economic growth is important.

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Fisher (1993) showed that between low inflation rates and economic growth exists a positive relationship, but in high rate of inflation there is a negative relationship.

Inflation in the short term can be lead to economic growth, but the long-term effect is not ongoing and sustained and undoubtedly relationship between this two variables is negative in the long-run (**Barro, 1995**).

Sarel (1996) in his study find a structural failure in relationship between two inflation and economic growth variables, so that defines this structural failure in a given inflation rate in annual data which in rates lower than it inflation levels had no significant effect on economic growth or have very little positive effect, but in higher rates of this structural failure have a negative effects on economic growth. **Khan and San haji (2001)** in an extensive study estimate the threshold inflation level for the developed and developing countries. They for the developing countries that Iran was included, respectively threshold inflation level in the range of **7-11** percent.

One of the issues that have long been discussed in macroeconomics is impact of monetary economics on the real sector. Some economic schools believe that financial sector affects the real sector and changes in nominal variables changed real variables (**Barro, 1995**). For example, inflation is a nominal variable can influence real GDP growth, which is seen the amount of economic growth. On the other hand, some economic

schools believe that nominal variables cannot changed real variables. In framework of classical economics (quantity theory of money), inflation is essentially a monetary phenomenon. Being two part of classical economics causes value of money have no connection to determine the real variables, means that inflation is only reflective of changes in the volume of money. Therefore does not affect on the real part, income distribution and resource allocation. From Keynesian view. If the demand for consumer goods exceeded their supply, it excess demand create an inflationary gap and prices so much rise to fill it gap. Something that separated classical economists from Keynes is that in the Keynesian model money can affect production.

Research Model

This research in terms of target is applied and in terms of methods of research, is descriptive and analytical study. For collecting material relating to literature library method including books, journals, articles, theses, have been used and for estimate the model are used panel data techniques.

At first, effective factors on inflation have been chosen and by estimate the inflation, is obtained a threshold inflation value from relationship between the estimated averages inflation and its confidence interval of two

standard deviations from estimated inflation. Then, in equation of economic growth, dummy variable of threshold inflation entered the model as follows:

$$\text{Dum}=1 \text{ if } p \in \hat{P} \pm 2\delta$$

$$\text{Dum}=0 \text{ if } p \in /\hat{P} \pm 2\delta$$

That ultimately growth equation is as follows:

$$G=a_0+a_1k+a_2L+a_3h+a_4P+a_5\text{Dum}+a_6\text{Dum}*P$$

Dependent variable is economic growth and independent variables include physical capital, labor and human capital, inflation and threshold variable and multiplicative threshold variable and inflation.

This paper is performed for D-8 countries (such as Indonesia, Iran, Bangladesh, Pakistan, Turkey, Malaysia, Egypt and Nigeria), by using Eviews software and formation threshold regression model in panel data.

By estimating inflation equation, confidence intervals average inflation, plus and minus two standard deviations to obtained inflation, and outside from this confidence intervals known as an high inflation or threshold inflation and a dummy variable defined that if inflation was within this confidence intervals is equals to zero and out from this distance is consider equals to one.

The estimated model

Before estimating the model it is necessary to teste the stationary of all the variables used in

the estimation. Because the lack of stationary of the variables in the time series data and the panel data is causing the pseudo regression problem. But contrary to what is customary in the case of time series data, panel data cannot be used dickey-fuller test and the Augmented dickey fuller (ADF) to test the stationary of data. It might be with another way test the stationary of the collective variables. It can be used for the following tests:

The result of Levin, Lin and chu test, IM, pesaran and shin test, Breitung test and Fisher-type tests using ADF implies the stationary of all variables in the model at the surface. In this test the hypothesis H0, is based on the lack of stationary and hypotheses H1 is based on the stationary of variables.

Table 1 shows two variables, GDP and physical capital is entered into the model by difference. It should be noted that all variables are entered into the model is logarithmic.

Limer statistics F showed the number 20/3072, with zero probability indicating that the using panel data is verified, therefore, according to this statistics and analysis panel data is acceptable. Haussmann test is 15/28 with the probability of more than 5%, which represents the random effects method is verified.

The coefficient of determination indicates show a good fit of the model and the explanatory power of the model is 96% that according to the method used is panel data is a good number. D.W. statistic also revealed the lack of correlation and show the 1/89 number. F-statistics also rejected the coefficients are equal zero. Sign of the coefficients are consistent with theory and theoretical presented in second section this thesis and suggests that influence of all variables used in this study are significant. The breakdown of results is as follows:

Inflation have a significant and negative impact on economic growth. Physical capital, labor and human capital have a positive and significant impact on economic growth. Threshold inflation and threshold beat inflation variable have a negative impact on economic growth and amount of influence of threshold inflation on economic growth is greater than inflation which based on the

theoretical foundations provided is consistent with the theory.

Domestic inflation rate based on the quantity theory of money can be caused by an increase in the volume of money or based on the theory of pricing can be due to rising interest rates and investment funds as an input, if relatively be different from global inflation, by an impact on exchange rates caused business changes and influence the degree of trade openness. Also rising inflation itself, if workers are suffering from lack of money illusion, according to Keynesian theory will lead to an increase in nominal wages and this has led to a decline in production and productivity in the country. Inflation it also by increasing the transaction costs can lead to decline in economic growth and productivity in the country. If Inflation exceeds from its threshold amount, by effect on inflation expectations can be even have bigger negative effects on economic growth.

Table 1: Stationary variables results

Sign	Variable	Levin Lin Chu Statistics	Probability	Result
M	Volume of Money	-1.63382	-1.63382	I(0) -Stationary
P	Inflation	-3.26048	-3.26048	I(0) -Stationary
GDP	GDP	-2.45209	-2.45209	I(1) -Stationary
K	Physical Capital	-8.74712	-8.74712	I(1) -Stationary
LL	Labor force	-3.02900	-3.02900	I(0) -Stationary
POP	Population	-1.83783	-1.83783	I(0) -Stationary

Table 2: Results of estimation regression combined for years 1995 to 2011

Variable	S.D.	T Statistics	Coefficient	Probability
C	0.333913	68.67888	22.93276	0.0001
P	0.081838	-13.64517	-1.116692	0.0001
K	1.50E-12	5.237873	7.87E-12	0.0001
LL	0.001754	16.51016	0.028951	0.0001

H1	0.001898	2.456868	0.004663	0.0238
D1	0.093029	-12.71092	-1.182482	0.0001
DD	0.006259	-3.882368	-0.024300	0.0010
R² = 0.96		D.W Statistics = 1.89		
Adjusted R² = 0.95		F = 77.83 Prob. = 0.001		

CONCLUSIONS AND SUGGESTIONS

The results show that physical capital has a positive and significant effect on growth and show that these countries need capital for economic growth and these results are consistent with classical literature of economic growth. Labor force has a significant and positive effect. The results also show that human capital variable has a positive and significant effect and suggests that knowledge and human capital is an important factor in economic growth that these results are based on knowledge based economy and endogenous growth theories. Inflation has a significant and negative effect on output and suggests that rising inflation slows the economic growth; these results are consistent with the literature on the Phillips curve. The result also shows that threshold variable and multiplicative threshold variable and inflation also had a significant and negative effect on inflation. The coefficients indicate that threshold variable coefficients and multiplicative threshold variable and inflation is greater than coefficient of inflation that this result indicates that if the inflation be

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