

RE-EXAMINE THE INTER-LINKAGE BETWEEN ECONOMIC GROWTH AND INFLATION:EVIDENCE FROM INDIA

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ABSTRACT

The purpose of this study is to investigate the inter-linkage between economic growth and inflation in India. The investigation is based on secondary data. The data on GDP are compiled from the Planning commission of India and data on annual average inflation rate are collected from ‘Indian Economy Related’ published by Planning Commission, Government of India (PC, 2014), Data on Annual Average inflation (AAI) rate has been taken from (<http://www.inflation.eu/inflation-rates/india/historic-inflation/cpi-inflation-india.aspx>). I have used Granger causality test in order to address the objective. results show that there is uni-directional short-run relationship between economic growth and inflation that is economic growth granger causes the inflation rate without any feedback effect.

Keywords: Inflation; Economic Growth; Granger causality test; and India.

1. INTRODUCTION

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The relationship between inflation and economic growth is one of the most important macroeconomic controversies among the macro economists, policy makers and central monetary authorities of all the nations. The question of the bone of contention is that whether inflation is necessary for economic growth or it is detrimental to growth. A group of economists including Keynes were of the opinion that inflation is a factor which helps in economic growth. It is argued that inflation tends to redistribute income and wealth. Keynes favoured mild inflation on the ground that it tends to stimulate business optimism through rising prices, resulting in high profit expectation which stimulates further investments, employment, output and income. A bulk of economists hold the view that inflation is a child of the growth process. According to them, some degree of inflation cannot be avoided in the process of economic development. Another group of economists, on the other hand, are of the view that inflation does not stimulate economic progress but on the contrary, works as an inhibitory factor. Milton Friedman, for instance, totally disagrees with the policy of "development through inflation".

There are several strands of literatures which can be found on the linkage between inflation and economic growth. Some studies are of the view that Inflation has an adverse impact on economic growth (Turkey, Hasan, 2001; Gokal and Hanif, 2004). For instance, Turkey, Hasan (2001), finds that inflation adversely affects both private investments and the economic growth in Turkey. Gokal and Hanif (2004) in their study show a negative relation between inflation and economic growth but the correlation is found to be very weak. Contrary to this, a study by Fakia and Carneiro (2001) show that although inflation affects negatively on output but such adverse impact is valid only for the shortrun as in the longrun the impact is observed positive. Girija and Anis (2001) also finds a longrun positive relation between inflation and economic growth in the South Asian countries. In their study, they found a very interesting fact that inflation is although helpful to growth, but faster economic growth feeds back into inflation. Some other studies, focused on the inter linkage between inflation and growth. Datta and Mukhopadhyay, (2011) in their study shown that there exist short-run causality between the variables and direction of causality is from inflation to economic growth but in the long-run economic growth Granger causes inflation. While the study by Richard et al. (2000) proves that the effects of inflation on growth change substantially as the inflation rate rises. In this study the empirical results support the view that the effect of inflation on growth is nonlinear and the nonlinearities are quite different for developed countries than for developing countries.

Besides this few literatures can be observed in India too regarding the relation between inflation and economic growth. For instance, Veni and Choudhury (2007) examined the relationship between inflation and growth of the Indian economy during 1981-2004. The results of the causality test prove that the variables, viz., growth and inflation are independent of each other in India. The results also suggest that there is no long run relationship between these two variables in India. Another study by Kaur (2014) shows a long run negative relationship between inflation and GDP growth in India.

However, the above studies although made a significant contribution to understand the relationship between inflation and economic growth in India but these studies concentrated only on the long run relationship between inflation and economic growth in India. But the short-run causal relationship is not undertaken properly whereas the short run relationship is equally important in a country like India which shows an increasing rate of economic growth on the one hand and high rate of inflation on the other. Given this background, the present study seeks to investigate the inter-linkages between economic growth and inflation in India. Moreover the study is organised into the following sections. Section 2 is devoted to the discussion of the methodology followed and data used in the present study, Section 3 presents the results and finally Section 4 summarises the study and offer concluding remarks.

2. DATA SOURCE AND METHODOLOGY

The study is based on secondary data covering the period 1981 to 2014. Data on Gross Domestic Product (GDP) in Rupees at 2004-05 price, which is a proxy to economic growth, has been collected from “Indian Economy Related” published by Planning Commission, Government of India (PC, 2014). To calculate the growth of GDP, the simple one period growth rate formula² has been used. Data on Annual Average inflation (AAI) rate has been taken from (<http://www.inflation.eu/inflation-rates/india/historic-inflation/cpi-inflation-india.aspx>). The statistical software Eviews 7 is used to analyse the data.

² In order to calculate the growth rate of a variable (Y) in period t over period t-1, following simple method has been applied: $(y_t - y_{t-1} / y_{t-1}) \times 100$

Since our study is concentrating on the inter linkage between inflation and economic growth, we shall be using Granger causality test. The Granger causality test (Granger 1969) has been generally used to find the causality relationship between variables. This test told that if past values of a variable (y) significantly contribute to forecast the future value of another variable (x) then y is said to Granger cause x. Conversely, if past values of x statistically improve the prediction of y, then we can conclude that x Granger causes y (ibid). This paper uses Granger causality test to examine the causality relationship between GDP growth and inflation rate. The test is based on the following equations:

$$GDP_t = \alpha + \sum_{i=1}^n \beta_i GDP_{t-i} + \sum_{j=1}^m \gamma_j IFA_{t-j} + u_t \dots \dots \dots (1)$$

$$IFA_t = \alpha + \sum_{i=1}^q \delta_i IFA_{t-i} + \sum_{j=1}^r \theta_j GDP_{t-j} + v_t \dots \dots \dots (2)$$

Where GDP_t denotes Gross Domestic Product for time period t , IFA_t denotes inflation for time period t, j and i are number of lag lengths. The optimum lag length m, n, q, and r are selected on the basis of Akaike’s (AIC) and/or Schwarz Bayesian (SBC) and/or log-likelihood ratio test (LR) Criterion.

Now, from Equations (1) and (2), Economic growth Granger causes (GC) inflation if,

$$H_0 = \gamma_1 = \gamma_2 = \dots \dots \dots \gamma_m = 0 , \text{ is rejected}$$

Against

$$H_1: \gamma_j \neq 0, j = 1, 2, \dots, m$$

And inflation GC economic growth if,

$$H_0: \theta_1 = \theta_2 = \dots \dots \dots \theta_r = 0 \text{ is rejected}$$

Against

$$H_1: \theta_j \neq 0, j = 1, 2, \dots, r.$$

3. RESULTS

Before estimating Granger causality it is necessary to check the stationary property of the variables otherwise the results would not be reliable. The stationary property of time series is tested by using Phillips-Perron (PP) unit root tests as PP-test has greater power than the Augmented Dickey and Fuller (ADF) test (Banerjee et al 1993). Another advantage of the PP tests over the ADF test is that the PP tests are robust to general forms of heteroskedasticity in the error term U_t (Phillips and Perron 1988). Besides, unlike the ADF technique, the user does not have to specify a lag length for the test regression in the PP technique (Debnath, A., and N. Roy 2012). The result of PP is shown in Table1:

Table1: Unit root test

Variables	Augmented Dickey-Fuller Test	Phillips-Perron Test
	I(0)	I(0)
GDP growth rate	-4.30***(P=0.001)	-6.86***(P=0.000)
Annual average inflation rate	-3.71***(P=0.008)	-3.45**(P=0.015)

Source: author's calculation.

Note. *** and ** represents 1 and 5 percent level of significance respectively.

Table 1 presents the results of unit root tests on the natural logarithms of the levels of the two time series viz. GDP growth and annual average inflation rate. On the basis of the Augmented Dickey Fuller and Phillips–Perron statistics, the null hypothesis of a unit root is rejected at levels. This indicates that both series are stationary and thus it is possible to estimate Granger causality Test. On the basis of Schwarz Bayesian (SBC) and adjusted log-likelihood ratio (LR) test criteria, the optimal lag order of the VAR is chosen as 1. The absence of residual serial correlation, absence of heteroskedasticity of the individual equations has also confirmed the correct order of VAR selection. Finally, Granger causality test to the bivariate VAR has been examined in table 2.

Table 2: Granger causality test

Null Hypothesis	Degrees of freedom	Chi square (Probability value)
AAI does not Granger cause GDP	2	0.73(P=0.69)
GDP does not Granger cause AAI	2	6.00**(P=0.04)
Diagnostic tests:		
LM test (null = no autocorrelation)	4	7.45 (0.11)
Jarque-Bera test (null = normal distribution)	4	0.44 (0.98)

Source: author's calculation

Note: (1). According to AIC and SIC, optimal lag length is 1.

(2). ** represents 5 percent level of significance.

In Table 2, we have observed that the null hypothesis of non-causality of the annual average inflation rate in the GDP growth is rejected. This is true from the fact that the LR ratio statistic which is asymptotically distributed as a chi square variate with two degree of freedom is clearly not statistically significant. In the contrary, testing of the non-causality of GDP growth in annual average inflation rate equation the observed LR statistic (follows chi-square distribution with one degree of freedom) 6.00 is found to be statistically significant. This indicates the existence of causality running from GDP growth to annual average inflation rate without any feedback effect.

4. CONCLUSION

This paper has investigated the existence and direction of causality between inflation and economic growth in India using the annual data covering the period 1981 to 2014. To examine causality between inflation and economic growth, we have used the standard econometric model of Granger causality test. In the first step, we have tested the stationary property of the variables using the Phillips-Perron unit root test. Secondly, we have tested the Granger causality test to explore causality relationship. The main findings of our study are as follows:

(a) The Phillips-Perron unit root test results indicate that both variables (inflation and GDP) are stationary at levels. This implies that both variables are free of the problem of unit-root. So, our variables have satisfied one of important property of time series data for conducting the Granger causality test. (b) The empirical result of the Granger causality test suggests that, there is one

directional causality running from economic growth to inflation without any feedback effect. Thus, we can say a growth in income in India is responsible for a high level inflation.

In India, average inflation is 5.65 percent in 2016 (<http://www.inflation.eu/inflation-rates/india/historic-inflation/cpi-inflation-india-2016.aspx>) and India will grow by a robust 7.8 per cent in 2016 (<http://indiatoday.intoday.in/story/india-to-grow-at-7-8-per-cent-in-2016-world-bank/1/564427.html>). In this situation, the existence of unidirectional causality running from economic growth to inflation in India has serious consequences. This is explained by the fact that with the growth of Indian economy, the income of the higher income earners has also been increasing and as a result their demand for goods and services also increase. This increase in demand may expect to result in high level of inflation. Due to this fact, India has been recording a gradual increase in inflation over some decades. In this situation, the poor masses have been suffering because of this increasing rate of inflation. Thus it becomes necessary to control inflation for this portion of population. This finding has immense importance for decision makers as the decision-makers can make optimum policy to control inflation without affecting the economic growth of India for restoring the welfare of the poor masses.

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