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The Dynamic Relationship Between Inflation and Economic Growth – An Indian Experience

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Abstract
This study has examined the relationship between inflation and economic growth (GDP) in India. The study is applied an ex-post research design and some preliminary tests were performed to ensure data stationery, and also ascertain how well the series was distributed. Also, the Augmented Dickey-Fuller (ADF) has adopted for explaining the former and descriptive statistics. Johansson Co-Integration technique has been used to estimate macroeconomic variables like GDP, inflation dependent and independent variables. It is conformed that there is positive long run relationship between variables like GDP and inflation. Finally, the study recommended that government should adopt a tight monetary policy to maintain a low-level rate of inflation in the country from time to time. In addition, the government should maximise spending more on productive projects thanon unproductive public spending to ensure fiscal stability and sustain robust economic growth in the Indian economy.
Keywords: [Inflation Rate, India, Gross Domestic Product].

Introduction

The central aim of macroeconomic policies of country is to promote economic growth with low rate of inflation in a country. The economic performance of a country (economy) can be measured by rate of Inflation and economic growth (GDP). The both macroeconomic indicators will indicate the economy strength of the country over a period of the time. Furthermore, all the nations' macro economists, policy makers and central monetary authorities willdebate and discuss about the relationship between inflation and economic growth in order to enhance the economic performance in a country.Mostly, the bone of argument macro economists is that whether inflation is mandatory for GDP as well as whether the inflation is unfavourable to economic growth of the country.The economic growth of the country will be depending on foremost on the rate of capital formation and the rate of capital formation is determined by the rate of savings(S) and investment (I) in the economy. Thus, the basic questions are that whether inflation will be influence the economic growth and whether it is disturbingthe rate of savings and volume of investment.

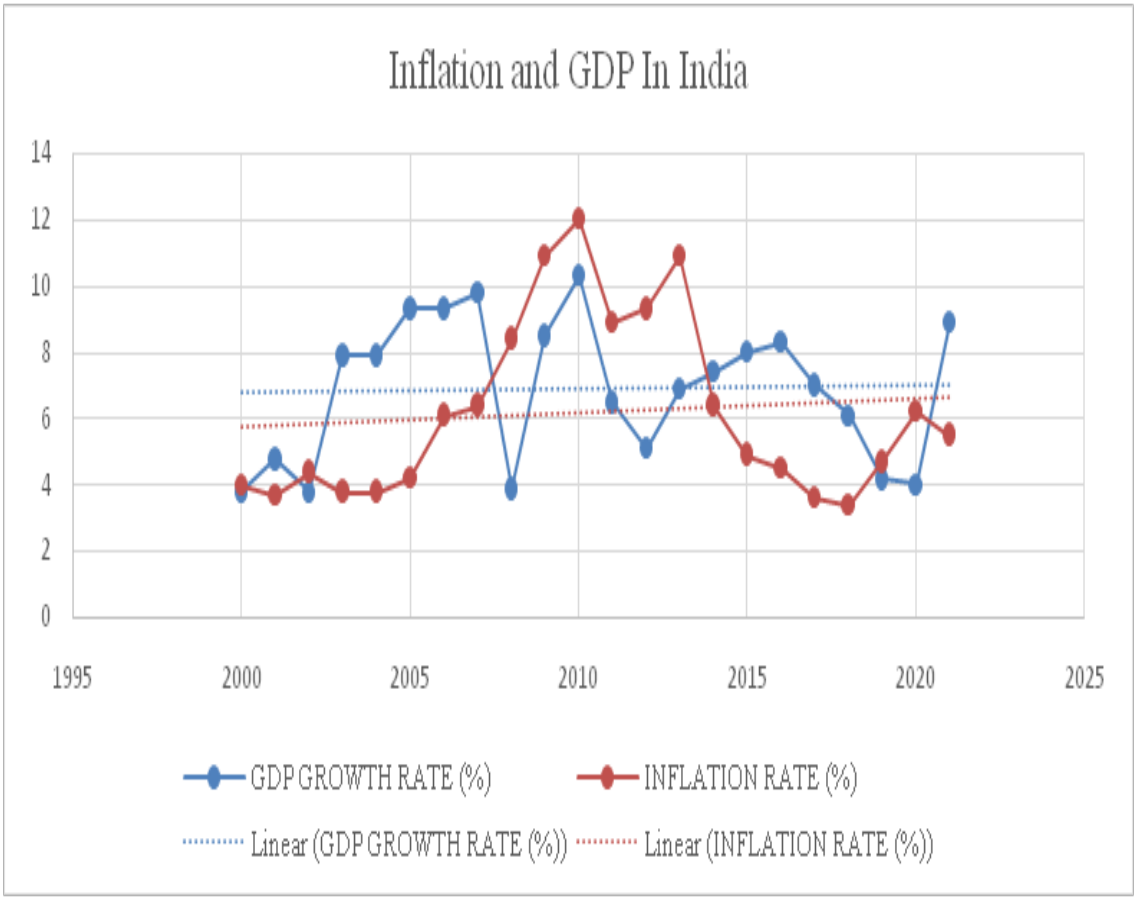
In addition, Keynesian economists have believed that inflation willnot be hurtful to economic growth. Furthermore, the low and stable inflation could promote economic growth of the country over a period of time and vice versa.Some more economists have a positive view, that there will be positive relationship between inflation and economic growth. Furthermore, the inflation is directing to redistribute incomes in favour of higher income groups whose incomes have mostly of profits and non-wage incomes. As the upper income classes are having higher propensity to save, the induced redistribution of incomes has been enhancing the total savings. As a result, the savingswill increase the supply of investible funds and lowers the rate of interest. Consequently the saving will be invigorating the investment as well as economic growth in a country. The model of Phillips curve alsohypothesizes that high inflation is a positive effect on the economic growth by contributingwith low unemployment rate in the economy.

But on the other hand, the monetarist has argued that the cost of inflation on welfare in a country is that create the harmfulness to the economic growth. Particularly, monetarist such as Fischer (1981); Eckstein and Leiderman (1992); Gillman (1993); Simonsen and Cysne (1994); and Dotsey (1996) have argued that outcome of inflation will be unfavourable to the economy like the distributive effects from creditors to debtors, increasing uncertainty disturbing the consumption, savings, borrowing and investment decisions and the most significant costs associated with unanticipated inflation of distortions on relative prices of commodity.Monetarists also think that the long-run prices has been affecting by the growth of money supply with no real effect on economic growth. However, in reality the inflation makes the real harmfulness for other macro economic variables like the impact on capital accumulation, export and investment, and also negatively impact of country's growth rate.

As well as the scholars like Smyth (1992, 1994, and 1995), De Gregorio (1993), and Barro (1995) have been recently estimated that the impact of inflation on investment and productivity have small and negative in the

economy. Predominantly Smyth (1992) has established that if one percentage point increases in the USA inflation, the annual growth rate has reduced by 0.22%. Also Smyth (1994) exposed that in the USA each one percentage point increase in acceleration causing a reduction of 0.16% in growth. By this above economic controversial background, the researcher has motivatedto carry out the investigation on relation between inflation and economic growth in Indian context. From figure below shows the time plot of growth and inflation.

Figure 1: Growth and Inflation in India



Authors' Computation, 2022

The graph in Figure 1 presents pictorially the trend of inflation rate (INFR) and economic growth (GDP) in India for the sampled period from 2010 to 2021

Empirical Review

A considerable number of empirical works had been reviewed in the course of this study as
Encapsulated.

Madurapperuma (2016) aimed to study the impact of inflation on economic growth in Sri Lanka for the period of 1988 – 2015 by applied the framework of Johansen co integration test and Error Correction model. The study results indicate that there was a long run negative and significant relationship between economic growth and inflation in Sri Lanka during the study period.

Hussain and Kashif (2016) havestudied the impact of macroeconomic indicators like inflation and GDP of Pakistan since1980 to 2011. The data has been collected from website of the State Bank of Pakistan and the World Bank. The study is applied the Descriptive statistics and multiple regressions for analysis. It found that inflation rate and interest rate has made a significant negative impact on GDP, though exchange rate has created significant and positive impact GDP.

Chughtai and Aftab (2015) have investigated the effects of major economic variables in Pakistan. The study has adopted the Secondary data since 1981 to 2013 and applied multiple linear regression revealed model. The researcher found that both inflation and interest rates related negatively with economic growth, whereas exchange rate has made a significant positive effect on the Pakistan economy.

Kasidi and Nwakanemela (2013)have studied the impact of inflation on economic growth in Tanzania with help of Annual time-series data form 1990 to 2011. The study has employed the Correlation coefficient and co

integration techniques to establish the relationship between inflation and GDP. It found that inflation has a negative effect on economic growth. Further, the study has proven that there is no co-integration between inflation and economic growth in Tanzania during the period of study.

Umaru and Zubairu (2012) have examined the effect of inflation on economic growth and development in Nigeria since 1970 to 2010. The study has been applied the ADF techniques to determine the stationarity of the variables and Granger causality test to find causal relationship between inflation and GDP. The study Result affirmed that there is a unidirectional causal link between GDP and inflation rather than between inflation and GDP.

Datta (2011) ismade a study on thedirection of causality from inflation to economic growth in Malaysia. The study has employed the ADF, PP Unit Root Test, Vector Error Correction, Vector Auto Regression, Impulse response function and Variance Decomposition test. The test result shows that in the short-run, there is causality between the variables and direction of causality inflation to economic growth but in the long-run economic growth Granger Causes inflation.

Prasanna and Gopakumar (2010) have investigated the relationship between inflation and GDP growth with the help of annual data sourced from the Reserve Bank of India in India. The study Empirical result has been established based on the co-integration and error correction tests. It indicated that there is a long-run negative relationship between inflation and GDP growth rate in India.

Based on the foregoing studies, it has appeared the following gap still exist in the literature with regard to the problem under investigation. Firstly, there were empirical results such as M. W. Madurapperuma (2016) Kasidi and Nwakanemela (2013) Prasanna and Gopakumar (2010) indicated that there is no co-integration between inflation and economic growth in their deferent country and deferent period of the study. Secondly, most of the study has been carried out in other jurisdictions, but just a few were conducted in India. Thirdly, in terms of data applied in the study, our study has made use of data that extended to 2021, whereas none of the studies reviewed met that standard.

Data and Methodology

The study has applied data from secondary sources that have gathered entirely from the World Bank report 2021 and www.statista.com covered the period from 2010 – 2021. The obtained data has deals with GDP and rate of inflation. Our dependant variable is the GDP, whereas the inflation rate is our independent variable. Our model was estimated using the Johansson Co-Integration method. As we are making use of annualized time-series data and the study cover a long sample period, we made sure our data set were not impaired by unit root; so we tested for stationary of the series by employing the Augmented Dickey-Fuller (ADF).

3.1 Model Specification

This study is being applied the economic model previously used by Chughtai, et al (2015) that examined the macroeconomic variable like –growth (GDP) nexus of Pakistan. The study has been reviewed in the preceding section are specified below:

$Y = \alpha + \beta 1X1 + \varepsilon i$ …… …..... (1)

The model is rewritten as $GDP = \alpha + \beta 1INFL + \varepsilon i$..... (2)

Where GDP is Gross Domestic Product, α = Constant, β1and β2 are coefficients. INFR is inflation rate and ε is error term.

Results and Analysis

Unit Root Test

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variables	Level	Level	1st difference	1st difference
	C	C&T	C	C&T
GDP	0.02	0.10	0.00	0.01
Inflation	0.03	0.82	0.01	0.03
Interest	0.77	0.47	0.00	0.02

Source: Authors' Computation aided by E-views, 2022

The table 1 shows the data series of GDP at level isnon –stationary whereas it is stationary at 1st deference. In the case of inflation, the data series of inflation at level isnon –stationary though it is stationary at 1st deference.

Descriptive Statistics

Table 2: Descriptive statistics Test Results

Variables	GDP	Inflation	Interest
Mean	6.89	6.18	10.07
Median	7.20	5.20	10.45
Maximum	10.30	12.00	13.30
Minimum	3.80	3.40	4.00
Std.Dev.	2.13	2.6	2.4
Skewness	-0.17	0.88	-1.06
Kurtosis	1.72	2.47	3.48
Jarque-Bera	1.6	3.14	4.35
Probability	0.44	0.20	0.11
Sum	151.70	136.00	123.67
Sum Sq.Dev.	95.84	151.41	123.67
Observations	22	22	22

Source: Authors' computation aided by E-views, 2022

Table 2 shows descriptive statistics about individual characteristics of the macroeconomic variables like GDP and inflation. The mean value of GDP and inflation is 6.89 and 6.18. Whereas, the median values is 7.20 and 5.20 of inflation and economic growth. In the case of maximum, the GDP is 10.30 and inflation is 12.00. On the other hand of Minimum value, GDP has 3.80 and inflation has 3.40. It is observed that the mean and median of the variables can be observed to be approximately equal – to the series seem to be normally distributed.

Co-Integration test

In order to establish the relationship between inflation and GDP, the co integration techniques have been employed and the result explored below table 3.

Table 3: Johansson Co-Integration Test Result

Unrestricted Co-Integration Rank Test (Trace)				
Hypothesized No.f CEs	Eigen Value	Trace Statistics	0.05% Critical Value	Probability
None	0.838206	61.81516	35.01090	0.0000
Atmost 1	0.699490	27.28195	18.39731	0.0020
Atmost 2	0.208585	4.74731	3.8465	0.0350
Unrestricted Co-Integration Rank Test (Maximum Eigen Value)				
Hypothesized No. of Ces	Eigen Value	Trace Statistics	0.05% Critical Value	Probability
None	0.838206	34.60721	24.25202	0.0015
Atmost 1	0.699490	22.84322	17.14769	0.0570
Atmost 2	0.208585	4.74731	3.8465	0.0350

Source: Authors' computation aided by E-views, 2022

As per the Trace value and critical value criteria from the above table 3:if the trace statistic is greater than 0.05 critical values, then the null hypothesis will be rejected. In the above case, those values are greater than 0.05 critical values like 61.89 and 35.10, 27.28 and 18.39, 4.44 and 3.84. So, the null is being rejected and it is conformed that there is long run relationship between the dependent variable (GDP) and independent variable inflation. In addition to this, as per the Maximum Eigen-value and critical valuecriteria: Maximum Eigen-value values are greater than 0.05 critical values like 34.60 and 24.25, 22.24 and 17.14, 4.44 and 3.84. Hence, the null is being rejected and it is conformed that there is long run relationship between the dependent variable (GDP) and independent variable such as inflation rate. Also, in terms of Probability value, the calculated value are much lesser than 5%critical value. Thus it is conformed that there is positive long run relationship between variables like GDP and inflation.

Discussion of Results

The finding of the study in Table 3 indicates that there is positive long run relationship between variables like GDP and inflation in India during the period of the study. The result shows that Maximum Eigen-value values are greater than 0.05 critical values study is conformed that there is long run relationship between the dependent variable (GDP) and independent variable such as inflation rate. Moreover, in terms of Probability value, it has confirmed that there is positive long run relationship (co-integration) between variables GDP and inflation in India. In that regard, the contradicted the study of M. W. Madurapperuma (2016) Kasidi and Nwakanemela (2013) Prasanna and Gopakumar (2010) have indicated that there is no co-integration between inflation and economic growth in their deferent country and deferent period of the study has taken in India, Pakistan, Tanzania respectively.

Conclusions and Recommendations

One of the key objectives of macroeconomic variables is to estimate the health condition of a home economy as a whole in connection with how a particular factor affects the overall performance of an economy. Therefore, the study has considered it suitably beneficial to disaggregate the factors to explore how inflation has influenced the GDP. An assorted analytical approach has been used to carry out the study objective. The inflation rate (causal variable) has all regressed on GDP (effect variable) in India. The study revealed that inflation has a positive relation on GDP in India. So, the study has concluded that a high inflation rate is unfavourable rather than beneficial to the economy. The study is suggesting that the RBI can adopt an appropriate monetary policy to maintain a low-level rate of inflation in the country from time to time. Besides, the government should maximise spending more on productive projects and minimize unproductive public spending in order to maintain fiscal stability and steady economic growth in the Indian economy.

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