How Inflation and Interest Rates Are Related to Economic Growth? A Case of India

Amalendu Bhunia[*]

Department of Commerce, University of Kalyani, Nadia, West Bengal
*Corresponding author: bhunia.amalendu@gmail.com

Abstract This study investigates how inflation and interest rates are related to economic growth of India. The different economic theories state that inflation and interest rates are associated with economic growth based on economic conditions of the nation. Based on the above, this research examines the influence of inflation and interest rates on India's economic growth. This study is based on annual time series data for the period from 1992 to 2015. While analyse the data, correlation, ADF and PP unit root tests, cointegration test, vector error correction model and Granger causality test have been used. The empirical results confirm that there exists long run causality from economic growth to inflation and interest rates and also exist a unidirectional causal movement from economic growth to interest rates. The findings of the studies offer a few directions for Indian government and policymakers on the consequence of keeping low inflation and most advantageous interest rate in the present condition of Indian economy so that the economic growth is promoted. The paper includes implications for the economic growth; the Reserve Bank of India controlled the inflation rate and unchanged the interest rate. This research fulfils a well-known need of how inflation rate and interest rate helpful for economic growth.

Keywords: economic growth, inflation, interest, India, vector error correction model

Cite This Article: Amalendu Bhunia, "How Inflation and Interest Rates Are Related to Economic Growth? A Case of India." *Journal of Finance and Accounting*, vol. 4, no. 2 (2016): 20-26. doi: 10.12691/jfa-4-1-3.

1. Introduction

The association between economic growth and inflation lingers a debatable one in both theory as well as empirical results because Classical Growth Theory, Keynesian Theory, Neo-classical Theory, Neo-Keynesian Theory, the Tobin Effect and Endogenous Growth Theory states that inflation is an important factor that facilitates economic growth. Money and Monetarism Theory suggests that in the long-run, prices are chiefly influenced by the growth rate in money, whilst having no genuine effect on growth. If the growth in the money supply is higher than the economic growth rate, inflation will result [6,9,27]. But Phillips curve concept put forward that higher rate of inflation confidently and positively influences the economic growth by making of a lower rate of unemployment. Then, a few empirical studies [8,15,23] wrapped up that there was no positive or negative association between economic growth and inflation. Moreover, the structuralists squabbled that inflation is important for economic growth at the same time as the monetarists hypothesized that inflation is unsafe to economic growth [7,14].

In general, rates of interest have high persuade on both economic growth and inflation. Higher the rate of interest, higher is the cost of capital and gives to hold back investment in the economy. Rates of interest are an important factor in determining the economic environment wherein investment has to take place, particularly while numerous companies are not cash affluent. High rates of interest moreover shock foreign direct investment owing to the exchange rate uncertainty since the market anticipates rates of interest ultimately go down. Again, lower the rate of interest, superior is the money supply in the economy and superior purchasing power of individuals. This will effect in increase in the goods price, because demand will be more than supply of the goods. Influencing rate of interest therefore makes a disparity in economic growth and inflation.

The relationship between economic growth and interest rates remains another debatable issue during the last decade across the globe. By and large when interest rates are augmented, consumers have a tendency to have less money to expend because of savings money. In the midst of less expending, the economy sluggish and then inflation reduces. Again, when interest rates are lesser, consumers have a tendency to have more money to expend. In the midst of more spending, the economy slows and then inflation increases. McKinnon [18] and Shaw [26] stated that higher real interest rates bring about higher levels of savings that consecutively encourage economic growth. That's why; they assured that real interest rates and economic growth are positively associated. But Barro and Becker [3] considering discounting factor in their model and confirmed that real interest rates and economic growth are negatively associated. The economic growth process controls though multiplier upshot of consumption as well as accelerator upshot of investment. Inflation unswervingly influences the non-refundable income of households that repeatedly harmfully influences both consumption and

savings or investment. However higher interest rate is likely to inspire savings, although augmented cost of credit dampens investment. Ultimately inflation persuaded decrease in non-refundable income does not go away households with the equal additional returns to set aside [22]. The latest investment decelerate has flashed a strong debate in India concerning the function of interest rates. Economists usually quarrel that real interest rates have been low down, even if nominal rates have slowly increased after the global crises. Alternatively, a few spokespersons of the business society uphold that lofty nominal lending rates of interest have played a significant role in the present investment crash. Needless to say, the two assemblies have quarrelled for diverse financial policy acts to react to the present condition [1]. The Reserve Bank of India (RBI) does not unswervingly manage the rates of interest however usually a tighter financial policy causes higher rates of interest. Consequently how do rates of interest influence the movement of inflation? Higher rates of interest put less using control in the hands of consumers (business). Accordingly consumers expend less; the demand sluggish down, by this means controlling inflation. If the RBI makes a decision that the economy is decelerating - so as to demand is decelerating -at that moment it can decrease rates of interest, raising the cash amount inflowing the economy [13].

What about the current condition of Indian economy in terms of interest rate and inflation? The worldwide financial activities have sluggish and risks linger lofty, in recent times due to uncertainty over policies of wide-ranging central banks. In India, macroeconomic situations hang about feeble, together with supply limitations, monotonous domestic demand and fragile investment outlook. A yearly rate of inflation based on wholesale price index has been presently demonstrating a descending trend. In addition the international gold prices are decreasing. These offer Reserve Bank of India a space to inconsiderate the rate of interest to flourish economic growth. Because of the extraordinary economic growth of India over the current years compared to other countries, augment in foreign currency inflow caused the demand in multiples in India. Inflation has restrained while proposed though the rupee depreciation as well as discrepancies in the commodity markets pretence a huge challenge [12]. Keeping in view of the above, this study examines how interest rates and inflation are related to economic growth in India.

2. Literature Review

Obamuyi [20] and Hasanov [10] observed the likelihood of threshold upshot of inflation rate on economic growth. The empirical test results indicated that there was a non-linear association between economic growth and inflation and threshold echelon of inflation for GDP growth. Less than threshold level inflation rate had statistically significant positive upshot on GDP growth, nevertheless the positive association turned into negative while inflation is more than 13%. Udoka and Roland [28] and Mutinda [19] explored the upshot of rates of interest rise and fall on the economic growth comparing before and after rate of interest deregulation administration using

statistical results. The empirical results confirmed that there subsisted an association between interest rate and economic growth and suggested that a sturdy financial policy should be developed, which would increase providing to the economy of real sector for dynamic financial activities. Saymeh and Orabi [24] observed the influence rate of interest, inflation rate and GDP on real economic growth in Jordan for the period from 2000 to 2010 using financial econometrics. Johansen cointegration test results confirmed that all the variables were associated in the long-run. Moreover, regression test results illustrated that interest rate and inflation rates had a shock on economic growth rate. Semuel and Nurina [25] examined the influence of inflation rate, rates of interest and exchange rates on gross domestic product in Indonesia based on monthly time series data between 2005 (June) and 2013 (December) using statistical techniques. The results demonstrated that there was a noteworthy negative association between interest rates and GDP as well as an important positive association between exchange rates and the GDP, whereas inflation was not a momentous persuade on GDP.

2.1. Research Question

The present research work is planned to explore the influence of the necessary economic indicators, rates of interest and inflation rate on India's economic growth by replying the two questions:

(i) Is the influence of inflation rate on India's economic growth significant?

(ii) Is the influence of rates of interest on India's economic growth significant?

2.2. Hypothesis Taken

For getting the answer of two questions, this study considers two research hypotheses.

H_1: There is noteworthy influence of inflation rate on India's economic growth.

H_2: There is noteworthy influence of rates of interest on India's economic growth.

3. Research Methodology

3.1. Data Source

The present study considers yearly time series data of three macroeconomic variables in terms of GDP growth rate of India, rates of interest and inflation rate of India, which has been acquired from yahoo. finance. The yearly time series data has been occupied for the period from 1992 to 2015 for three macroeconomic variables under study. Subsequently, the time series data of three macroeconomic variables have been transformed into natural logarithm for reducing the heteroskedasticity problem (Bhunia, 2015).

3.2. Sample Selection

With the object of monitor the associations among three macroeconomic variables, this study picks GDP growth rate of India, rates of interest and inflation rate of India.

After taking natural logarithm, these series have been used in this study as GDP growth rate (LGDP), inflation rates (LINF) and interest rates (LINT).

3.3. Tools Used

All through testing of the present research study, statistics include descriptive statistics and correlation statistics, econometric tools include Augmented Dickey Fuller and Philips-Perron unit root tests both at levels and 1st differenced, Johansen cointegration test, vector error correction model and Granger pairwise causality test have been used [4].

3.4. Descriptive Statistics

To make a good reason concerning yearly time series data more straightforward and faultless, the descriptive statistics have been designed from the natural log values of GDP growth rate, inflation rates and interest rates. Descriptive statistics explains that mean and standard deviation alters with time and the particular series are normally distributed, which have been depicted in Table 1.

3.5. Correlation Statistics

To build an investigation the association among interest rates, inflation and economic growth of India, the correlation statistics have been considered from the natural log values of the particular series, which has been revealed in Table 2. The correlation statistics test results disclosed that economic growth of India (LGDP) is lowly negatively linked with inflation (LINF) and highly negatively linked with interest rates, which is significant statistically at 5 per cent level.

4. Empirical Results and Analysis

4.1. Optimum Lag Length Selection

The optimum lag length is significant for testing unit root tests, vector error correction estimates and causality test. The three generally exhaustively utilized information criteria are the Akaike Information Criterion (AIC), the Schwarz-Bayesian Criterion (SBC) and the Hannan-Quinn Criterion (HQC). For variety of optimum lag length (lower the value, better the model) maximum lag order 2 has been evaluated. The results are tabularized in the Table 3. The asterisks underside reveal the best (minimised) values of the exacting information criteria. From Table 3, it has been detected that AIC value at lag 2 is the lowest value.

4.2. Unit Root Test Results

By way of fundamental theory of the stationarity test, Augmented Dickey-Fuller unit and Philips-Perron root test techniques have been exercised in the levels and first differenced of three macroeconomic variables under study covering the precondition with the intention that the null hypothesis is stationary, consequently buoyant respond of the unit root hypothesis supports stationarity, as supported in, Bhunia [5]. ADF and PP unit root test results based on AIC are illustrated in Table 4. The results exhibit that three macroeconomic variables are not stationary at level but stationary at 1st differenced.

Since the selected time series data is non-stationary at levels, it is apparent that running ordinary regression may generate unauthentic regression. Subsequently it is well again to confirm cointegration test under Johansen approach for explaining long-run associations among three macroeconomic variables under study.

Table 1. Descriptive Statistics

	LGDP	LINF	LINT
Mean	10.20487	5.019334	2.230738
Median	10.11894	5.013366	2.165394
Maximum	11.65705	5.512622	2.611906
Minimum	8.721811	4.649187	1.702017
Std. Dev.	0.885130	0.229588	0.256367
Skewness	0.047106	0.356730	-0.089266
Kurtosis	1.905128	2.414494	1.984810
Jarque-Bera	1.207620	0.851842	1.062485
Probability	0.546725	0.653168	0.587874
Observations	24	24	24

Table 2. Correlation Statistics

	LGDP	LINF	LINT
LGDP	1		
LINF	-0.1866	1	
LINT	-0.6730	0.06684	1

Table 3. Optimum Lag Selection

Lag	LogL	LR	AIC	SBC	HQC
1	50.1087	NA	-4.1917	-3.9933	-4.1449
2	55.0995	0.0015	-4.5545*	-4.3065*	-4.4961*
* indicates lag order selected by the criterion			LR test statistic (each test at 5% level)		

Table 4. ADF and PP Unit Root Test Results

Variable	At level				At 1st differenced			
	ADF t-stat	PP t-stat	C.V. at 5%	Decision	ADF t-stat	PP t-stat	C.V. at 5%	Decision
lgdp	-0.63	-0.39	-2.99	NS	-3.15	-3.05	-3.00	S
linf	-2.66	-2.61	-2.99	NS	-5.14	-5.14	-3.00	S
lint	-1.23	-1.23	-2.99	NS	-3.82	-3.80	-3.00	S

*NS = Non-stationary and S = Stationary.

4.3. Johansen Cointegration Test Results

Cointegration test under Johansen approach is pertinent for examining clear-cut long-run association among three macroeconomic variables of India (GDP growth rate, inflation rate and interest rate) as particular variables are non-stationary at levels but stationary at 1st differenced and in addition integrated in the same order. In this research work, linear deterministic trend has been believed to determine how these deterministic factors are actually integrated in the explanations. Lag length 2 has been considered based on Akaike Information Criterion (AIC). A critical value of Osterwald-Lenum [21] at 5 percent level has been measured for the test. Additionally, an accompanying creative deduction method of the deterministic factors has been calculated on the condition that the linear trend can be assumed to be at essentially linear and not quadratic, as supported in, [17].

The cointegration test results have been divulged in Table 5. Two likelihood ratios of the maximum-eigen value statistics and the trace statistics have been considered here. The results shows that that both the test statistics is more than its critical value while r ≤ 1, which indicates there exists a long-run association among GDP growth rate, inflation rate and interest rate as supported in, Bhunia [5].

Table 5. Johansen Cointegration Test Results (Lag length - 2)

| Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.879186	62.98173	29.79707	0.0000
At most 1 *	0.559748	18.59820	15.49471	0.0165
At most 2	0.063138	1.369609	3.841466	0.2419
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.879186	44.38353	21.13162	0.0000
At most 1 *	0.559748	17.22859	14.26460	0.0165
At most 2	0.063138	1.369609	3.841466	0.2419
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
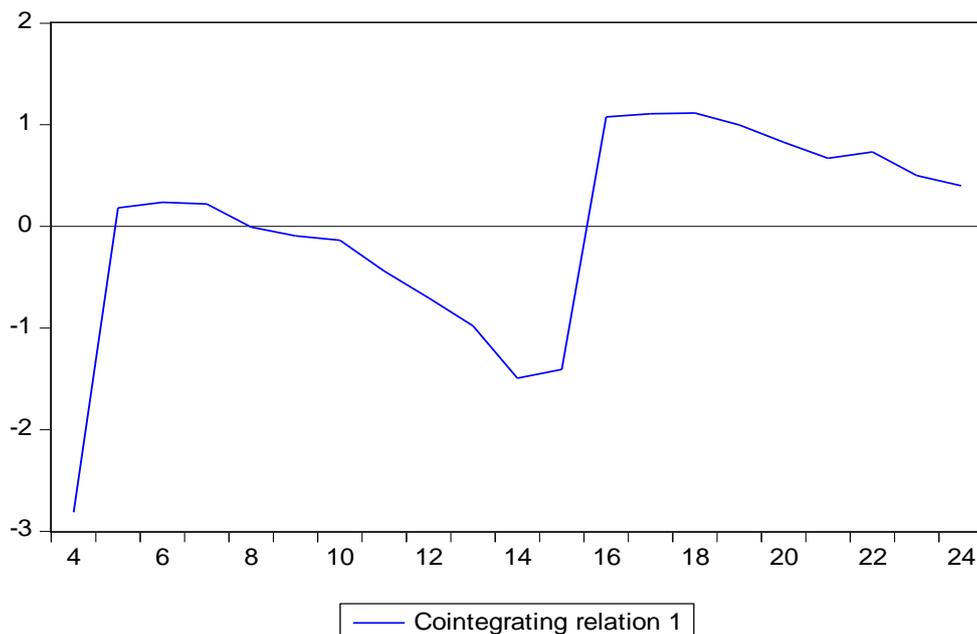
Figure 1.

Table 6. Vector Error Correction Estimates

Error Correction:	D(LGDP)	D(LINT)	D(LINF)
CointEq1	-0.0044	0.0200	0.2115
Std. Error	(0.0067)	(0.0289)	(0.0268)
t-statistic	[-0.6540]	[0.6921]	[7.8656]
probability	**0.0245**	0.0000	0.5010
D(LGDP(-1))	0.4762	3.2536	-2.0377
Std. Error	(0.2724)	(1.1692)	(1.0881)
t-statistic	[1.7485]	[2.7828]	[-1.8726]
probability	0.1039	0.0838	0.0155
D(LGDP(-2))	0.2516	-0.5970	0.6459
Std. Error	(0.3265)	(1.4015)	(1.3043)
t-statistic	[0.7707]	[-0.4260]	[0.4952]
probability	0.4547	0.6287	0.6771
D(LINT(-1))	-0.0349	-0.0877	-0.9797
Std. Error	(0.0579)	(0.2486)	(0.2314)
t-statistic	[-0.6036]	[-0.3529]	[-4.2339]
probability	0.5564	0.4644	0.1811
D(LINT(-2))	0.0100	-0.3634	-0.2135
Std. Error	(0.0544)	(0.2335)	(0.2173)
t-statistic	[0.1854]	[-1.5563]	[-0.9826]
probability	0.8557	0.1299	0.7295
D(LINF(-1))	-0.0344	-0.1591	-0.0790
Std. Error	(0.0262)	(0.1126)	(0.1048)
t-statistic	[-1.3129]	[-1.4130]	[-0.7537]
probability	0.2119	0.0010	0.7298
D(LINF(-2))	-0.0244	0.0413	-0.1761
Std. Error	(0.0272)	(0.1170)	(0.1089)
t-statistic	[-0.8958]	[0.3532]	[-1.6169]
probability	0.3866	0.3437	0.1436
C	0.0311	-0.3696	0.1389
Std. Error	(0.0422)	(0.1811)	(0.1686)
t-statistic	[0.7375]	[-2.0402]	[0.8237]
probability	0.4739	0.4250	0.0622
R-squared	0.6247	0.8208	0.6698
Adjusted R-squared	0.5831	0.7819	0.6402

4.4. Vector Error Correction Model Test Results

The particular time series data was not stationary at levels and at the same time when we transformed it into the first differenced, it was stationary. Simultaneously, the cointegration test results for GDP growth rate, inflation rate and interest rate demonstrates that all the series are cointegrated with 2 cointegrating equations. Hence, unrestricted vector autocorrelation model is not extremely supportive. Thus, vector error correction (VECM) model based on AIC with lag length 2 for this model and for the

residuals of the model is helpful. The result and extent of the coefficients on the cointegrating equation incarcerate the reaction of each variable in the model to eccentric from the long-run relationship. The test results explain t-statistics with lag length 2 with the value of probability (Table 6) and specify that there is a long-run causality running from GDP growth rate to inflation and interest rate, which is statistically significant. Whilst this study considers GDP growth rate of India as a dependent variable and inflation and interest rate as independent variables, the error correction model is:

$$
\begin{aligned}
D&(LGDP) \\
&= -0.0044 \begin{pmatrix} LGDP(-1) + 1.32197209263\ LINT(-1) \\ -\ 3.74074172556\ LINF(-1) \\ +5.42022665601 \end{pmatrix} \\
&+0.4762\ D(LGDP(-1)) + 0.2516\ D(LGDP(-2)) \\
&-0.0349\ D(LINT(-1)) + 0.01D(LINT(-2)) \\
&-0.0344\ D(LINF(-1)) - 0.0244D(LINF(-2)) + 0.0311.
\end{aligned}
$$

Since error term is negative and significant, therefore there exists a long-run causality from GDP growth rate to inflation and interest rate with less than 1% speed of adjustment. The time series data is fitted well in the model as both R^2 and adjusted R^2 are more than 0.60.

Then short-run associations are disclosed by the coefficients on the lagged differenced terms by using Wald statistic. Table 7 demonstrates that there is no short-run causality running from GDP growth rate to inflation and GDP growth rate to interest rate.

Table 8 illustrates three residual test results. Breusch-Godfrey Serial Correlation LM Test result indicates that there is no serial correlation because the probability of observed R-square is more than 0.05.

Table 7. Short-run Causality under VECM

Wald Test			
Equation: GDP Growth Rate and Inflation			
Test Statistic	Value	df	Probability
F-statistic	1.0686	(2, 13)	0.3718
Chi-square	2.1372	2	0.3435
Equation: GDP Growth Rate and Inflation			
F-statistic	0.2216	(2, 13)	0.8041
Chi-square	0.4433	2	0.8012

Table 8. Residual Test Results

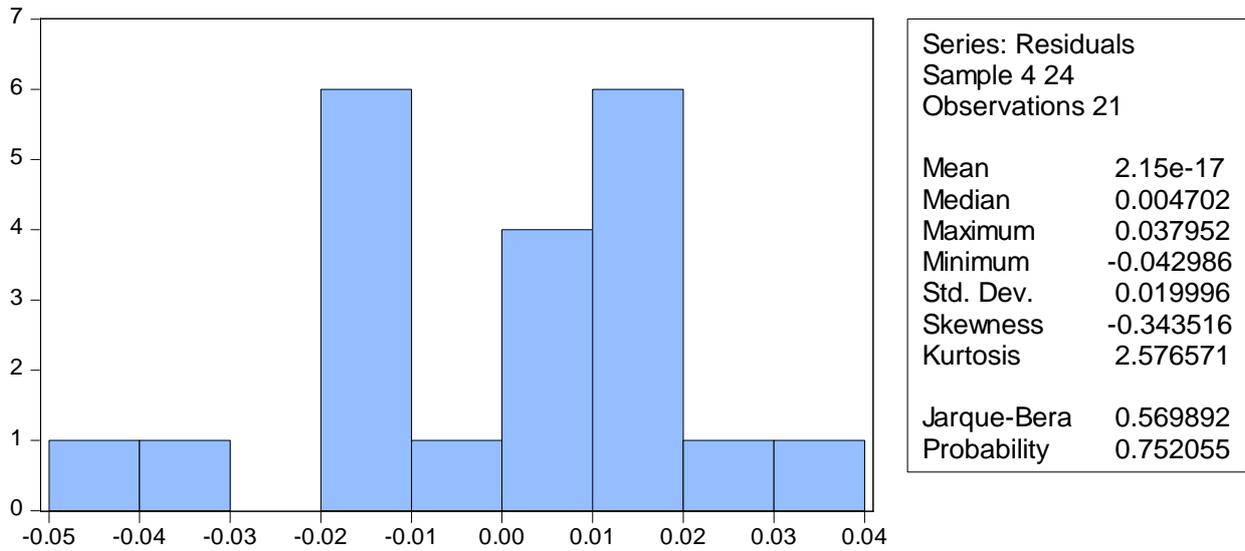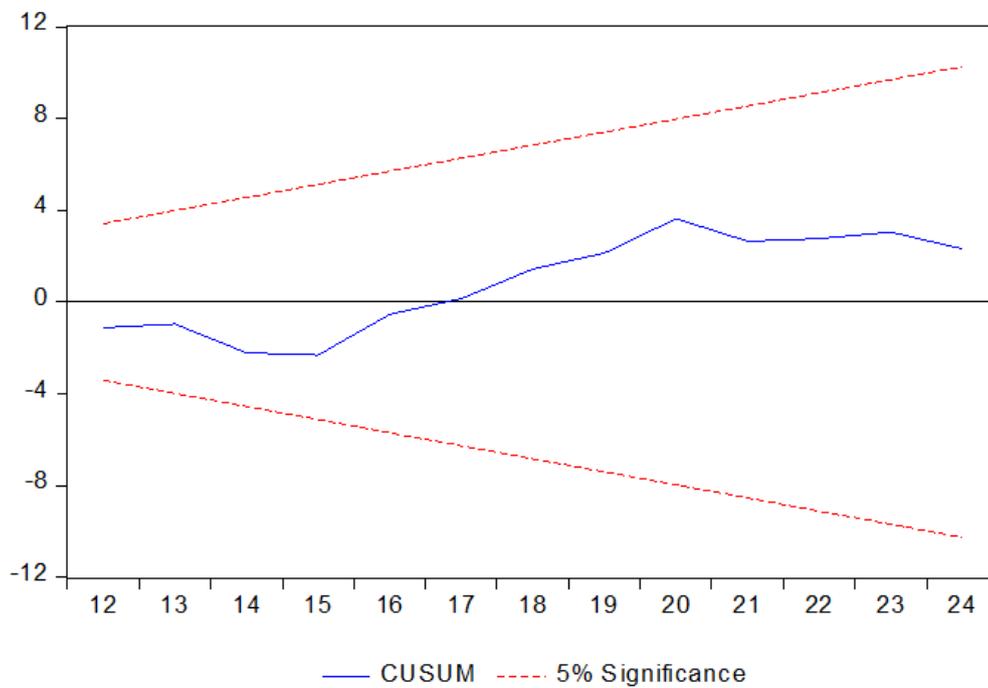| Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.9742	Prob. F(2,11)	0.4078
Obs*R-squared	3.1600	Prob. Chi-Square(2)	0.2060
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.4629	Prob. F(9,11)	0.8713
Obs*R-squared	5.7691	Prob. Chi-Square(9)	0.7628
Scaled explained SS	1.7427	Prob. Chi-Square(9)	0.9949
Histogram-Normality Test			

Series: Residuals	
Sample 4 24	
Observations 21	
Mean	2.15e-17
Median	0.004702
Maximum	0.037952
Minimum	-0.042986
Std. Dev.	0.019996
Skewness	-0.343516
Kurtosis	2.576571
Jarque-Bera	0.569892
Probability	0.752055

Figure 2.

Figure 3.

Table 9. Pairwise Granger Causality Tests (Lags-2)

Null Hypothesis:	Obs	F-Statistic	Prob.	
LINF does not Granger Cause LGDP	22	0.63920	0.5399	No Causality
LGDP does not Granger Cause LINF		1.17647	0.3322	
LINT does not Granger Cause LGDP	22	1.64137	0.2230	Uni-directional
LGDP does not Granger Cause LINT		6.52378	0.0079	

Breusch-Pagan-Godfrey test result regarding heteroskedasticity confirms that the residuals are homoskedastic and Histogram-Normality test result specifies that the residuals are normal since probability of Jarque-Bera is more than 0.05.

CUSUM test results confirm that the whole model is stable for explaining the influence of inflation and interest rate on GDP growth of India.

4.5. Pairwise Causality Test Results

Granger causality test is supportive to find out the causal relationship with causation movement from GDP growth rate to inflation and interest rate. Table 9 exhibits the causal test results and signify that there is no causal relationship between GDP growth rate and inflation since the probability is more than 0.05 and there is a

unidirectional causal movement from GDP growth rate to interest rate because the probability is less than 0.05 in this direction, as supported in [2].

5. Conclusions

The primary findings the study is that mean and variance changes with time in case of all the selected variables in addition to the meticulous time series are distributed normally, which indicates selected variables follows a random walk theory. Correlation statistics signifies that economic growth of India is negatively correlated significantly with inflation and interest rates under the study. High correlation between economic growth and interest rates illustrates that these variables follow a random walk model. ADF and PP unit root test results demonstrates that the time series is not stationary at levels but after converting the data into 1st differenced, it is stationary. The cointegration test results confirm that the three macroeconomic variables are associated in the long-run in the same order, which signifies that selected variables follows a random walk theory. Again, vector error correction model test results show that there exists a long-run causality significantly from economic growth to inflation and interest rates but wald test results points out that there is no short-run causality from economic growth to inflation and economic growth to interest rates. Finally, pairwise causality test results corroborate there exists a unidirectional causality from economic growth to interest rates. Since almost all the variables follow the random walk model, therefore, markets are more or less efficient and in this condition economic growth of India might be improved if both inflation rates and rates of interest are controlled ina significant manner. These findings authenticate that there are important opportunities for Indian government to revise their economic polic, in terms of inflation and interest.

The findings of the empirical studies offer a few directions for Indian government and policymakers on the consequence of keeping low inflation and most advantageous interest rate in the present condition of Indian economy so that the economic growth is promoted. For this, the Reserve Bank of India should need to maintain economic policy compatible with low inflation and most advantageous interest rate.

References

[1] Anand, R. and Tulin, V. (2014). Disentangling India's Investment Slowdown. *IMF Working Paper*, retrieved from https://www.imf.org/external/pubs/ft/wp/2014/wp1447.pdf.

[2] Awe, O. O. (2012). On Pairwise Granger causality Modeling and Econometric Analysis of Selected Economic Indicators, [taken online] Available: interstat statjournals.net/year/2012/articles/1208002.pdf, 1-17.

[3] Barro, R.J. and Becker, G.S. (1989). Fertility Choice in a Model of Economic Growth. *Econometrica*, 57, 481-501.

[4] Bhunia. A. (2013). Cointegration and Causal Relationship among Crude Price, Domestic Gold Price and Financial Variables: An Evidence of BSE and NSE. *Journal of Contemporary Issues in Business Research*, 2(1), 1-10.

[5] Bhunia, A. (2014). How Does WTI Crude Oil Affect Economic Growth of India?. *Applied Economics and Business Review*, 1(4), 94-98.

[6] Bruce E. H. and Ananth, S. (2013). Uncovering the Relationship between Real Interest Rates and Economic Growth. Retrieved from http://www.mrrc.isr.umich.edu/publications/papers/pdf/wp303.pdf.

[7] Doguwa, S. I. (2012). Inflation and Economic Growth in Nigeria: Detecting the Threshold Level CBN. *Journal of Applied Statistics*, 3(2), 99-114.

[8] Dorrance, G. S. (1966). Inflation and Growth. Working Paper. *International Monetary Fund*, 13, 82-102.

[9] Gokal, V. and Haniff, S. (2004). Relationship between Inflation and Economic Growth. *Working paper, Economic Department of Fiji*, 1-51.

[10] Hasanov, F. (2010). Relationship between inflation and economic growth in azerbaijani economy: Is there any threshold effect?. *Asian Journal of Business and Management Sciences*, 1(1), 01-11.

[11] Hussin, M. Y. M, Muhammad, F, A Razak, Abdul, Tha, G P and Marwan, N. (2013). The Link between Gold Price, Oil Price and Islamic Stock Market: Experience from Malaysia, *Journal of Studies in Social Sciences*, 4(2), 161-182.

[12] Ideasmakemarket (2016). RBI's Interest Rate Policy and its Impact on Indian Economy. Retrieved from http://ideasmakemarket.com/2013/07/rbis-interest-rate-policy-and-its-impact-on-indian-economy.html.

[13] IIFL (2016). Economics for Everyone - Interest Rates and Inflation. Retrieved from http://www.indiainfoline.com/article/bschool-gurugyan/economics-for-everyone-interest-rates-and-inflation-1454299_1.html.

[14] Inyiama, O. I. (2013). Does Inflation Weaken Economic Growth? Evidence from Nigeria. *European Journal of Accounting Auditing and Finance Research*, 1(4), 139-150.

[15] Johansen, S. (1988). Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, 12 (2-3), 231-254.

[16] Keynes, John Maynard (1930). Treatise on Money. *Nature* (London: Macmillan) 127(3216), 90. Bibcode:1931Natur.127..919M.

[17] Luutkepohl, H., & Saikkonen, P. (2000). Testing for the cointegrating rank of a VAR process with a time trend, *Journal of Econometrics, 95*, 177-198.

[18] McKinnon, R.I. (1973). Money and Capital in Economic Development. Washington, D.C. Brookings Institution.

[19] Mutinda, D. M. (2012). The Effect of Lending Interest Rate on Economic Growth in Kenya. Research Project, 1-45, retrieved from http://chss.uonbi.ac.ke/sites/default/files/chss/Musyoka%20Dan%20Project-2-1%20pdf.pdf.

[20] Obamuyi, T. M. (2009). An investigation of the relationship between interest rates and economic growth in Nigeria, 1970 – 2006. Journal of Economics and International Finance. 1(4), 093-098.

[21] Osterwald-Lenum, M. (1992). A Note with Quintiles of the Asymptotic Distribution of the Maximum Likelihood Co-integration Rank Test Statistic. *Oxford Bulletin of Economics and Statistics, 54*, 461-472.

[22] Prakash, S. and Sharma, S. (2010). Impact of Inflation and Interest Rate on Growth of Indian Economy: A Study in Input- Output Framework. Conference paper, 20th IIOA conference in Bratislava, retrieved from https://www.iioa.org/conferences/20th/papers/files/975.pdf.

[23] Pradana M., Bandula, J., Rathnayaka, M. and Rathnayake, K. T. (2013). Testing the Link between Inflation and Economic Growth: Evidence from Asia. Modern Economy, 4, 87-92.

[24] Saymeh, A. A. F. and Orabi, M. M. A. (2013). The Effect of Interest Rate, Inflation Rate, GDP, on Real Economic Growth Rate in Jordan. *Asian Economic and Financial Review*, 3(3), 341-354.

[25] Semuel, H. and Nurina, S. (2015). Analysis of the Effect of Inflation, Interest Rates, and Exchange Rates on Gross Domestic Product (GDP) in Indonesia. Proceedings of the International Conference on Global Business, Economics, Finance and Social Sciences (GB15_Thai Conference), Bangkok, Thailand, 20-22 February 2015 Paper ID: T507, 1-13.

[26] Shaw, E (1973). Financial Deepening in Economic Development. Oxford University Press, New York.

[27] Tanwar, R. (2014). Nexus between Inflation and Economic Development in India. *International Journal of Humanities and Social Science Invention*, 3(9), 63-67.

[28] Udoka, C. O. and Roland, A. (2012). The Effect of Interest Rate Fluctuation on the Economic Growth of Nigeria, 1970-2010. International Journal of Business and Social Science, 3(20), 295-302.