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Examining the Fisher Effect in Short and Long Run: A Study of NSE Sectoral Indices

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Abstract

The belief that stock market provides hedge against inflation has been put to test by many researchers over the past few decades. The present study aims at testing the Fisher effect in the Indian context.We have used monthly data, from July 2006 to June 2016, of the National Stock Exchange sectoral indices and consumer price index. The ordinary least square regression and Johansen cointegration approach have been used to test whether or not Indian sectoral indices provide hedge against inflation in short and long run respectively. The weak exogenity test under VECM has been used to establish the hedge hypothesis in the Indian stock market. The present study has established results in support to the hedge hypothesis that stock market provides hedge against inflation.

Keywords: Inflation, Stock Returns, Johansen Cointegration, OLS Regression, Weak Exogenity

JEL Classification: G12, G14.

Introduction

There has been a considerable debate on the relationship between inflation and stock market returns since 1960s when anomalous negative relationship between the two variables where for the first time documented by many researchers. Earlier, on the basis of economic theory, the Fisher Effect, returns on common stocks were considered to provide hedge against inflation. Extending the Fisher Effect to common stocks which represent claim against the real assets, any increase in the price levels should be accompanied by equal increase in nominal rates of return in order to maintain the real rate of return under assumption of perfect foresight. However, during 1970s a number of empirical evidence contradicting the above mentioned intuition came forth where it was found that returns on common stocks were negatively correlated with both expected and unexpected inflation. Modigliani and Cohn (1979) provided explanation to the anomalous behaviour of common stocks in the form of inflation illusion hypothesis which did not gain much support from researchers and academicians since the hypothesis is mainly based on the irrational expectations of investors contradicting market efficiency. In the year 1981, Fama in his seminal work provided a plausible explanation to the negative relation between stock returns and inflation. As per Fama (1981), the negative stock returns-inflation relation is induced by the negative relationship between inflation and real activity.

Many studies have been taken over since then to establish the true relationship between these variables. However, mixed results have been established by different studies, thus keeping the problem unsolved and open for further debate. In the Indian context, many studies have been undertaken to find the impact of inflation on the aggregate stock returns.Within any market, however, the constituents of the aggregate individually impact the performance of the whole financial system. It becomes,thus, imperative to study the impact of inflation on the constituents of the stock market. In the present study, we have attempted to establish the relation of inflation with the individual sectors of the stock market. Further, a number of studies including Maysami (2004), Tripathi (2014), Saeed (2012), and others studied the impact of macroeconomic variables on the sectoral returns.Very few have tried to analyse the individual impact of inflation on the returns on sectoral indices.We have analysed the dynamics of the inflation-stock returns relationship in both short and long run for

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the eleven sectors of the Indian stock market listed on the National Stock Exchange (NSE). The main aim of this study is to examine whether or not returns on sectoral indices provide hedge against inflation.Thus, the gap in literature is intended to be filled, where researchers and academicians can have an insight regarding the allocation efficiency of the various segments of the Indian stock market. It will also provide inputs to the policy makers to regulate the flow of funds to the various sectors and develop selective monetary and fiscal policy tools. Finally, the study will also provide useful insights to the investor community in deciding their investment portfolio. The rest of the paper is organised as follows. The second section will review the empirical literature on the relationship between inflation and returns on sectoral indices. Research methodology including hypothesis, data description and methodology will be discussed in third section.The analysis and discussion of results will be followed in fourth section. Finally, fifth Section will conclude the study by presenting the main findings of the study including the policy implications in particular and suggestions to the investor community in general.

Review of Literature

The study of inflation and stock market performance has been taken up by researchers long back since 1930 when Fisher stated that returns on a nominal bond provides hedge against inflation. In the simplest form of this hypothesis also called as the Fisher effect, the real returns on stocks should be uncorrelated with inflation and that nominal returns should move one on one with inflation. In 1960s, however, many researchers while trying to forecast returns on common stocks in order to gain trading benefits found contrary results to the commonly held belief that equity provides hedge against inflation. Fama (1981) gave a plausible explanation to the negative relationship between inflation and stock returns that, the negative relationship between the two variables is induced by the positive relationship between stock returns and real activity arising from the real sector and the negative relationship between inflation and real activity arising from the monetary sector.

Chatrath, Ramchander, and Song (1996) studied the impact of inflation on the stock market returns in the Indian context. The study revealed evidence supporting the proxy hypothesis.The negative relation between the variables, however, was found to arise mainly from the unexpected component of inflation. Boyd, Levine, and Smith (2001) used data on 65 countries to establish the impact of inflation on the financial sector performance. Their results show that as inflation passes certain thresholds, the efficiency of the financial sector in allocating funds diminishes spontaneously.

Maysami et al. (2004) studied the impact of inflation on the Singapore exchange sector indices.They established the presence of long run cointegrating relationship between price levels and sectoral indices. Luintel and Paudyal (2006) investigated the relationship between the two variables using cointegration analysis. Establishing results in support to the Fisher effect, they have stated that the structural changes that took place in the world economy due to a number of reasons, including the downfall of the Breton Woods exchange rate system, the oil price shocks and others, affected the relationship between inflation and stock prices.

While examining the relationship between the two variables in the Brazilian market, Adrangi, Chatrath, and Sanvicente (2011) found the presence of negative relation in the long run while as no such relationship was established in the short run. Saeed (2012) studied the impact of macroeconomic variables including money supply on the Karachi stock exchange sectoral indices. The study used Ordinary Least Squares (OLS) regression and revealed absence of any relationship between money supply and sectoral returns.Tripathi and Kumar (2015a, b) analysed the impact of inflation on the stock market in the long run for BRICS markets. Their results confirmed absence of any relationship in the short run, however, a significant long-run relationship was found between the two variables.

Islam and Jhamb (2016) examined the relationship between the two variables for India and China.Their results show that the two variables are not related to each other in short and long run for both the countries.However, unidirectional causality running from stock index to inflation was found to exist in case of India in both pre and post financial crisis periods. Islam and Habib (2016) studied the impact of macroeconomic variable on the stock market returns using OLS regressions.They revealed that apart from exchange rate, all other variables were insignificant in explaining the changes in stock prices. However, they found a negative but statistically insignificant relationship between inflation and stock returns.

Thus, the literature on the relationship between inflation and sectoral returns provides enough reasons to further analyse the issue so that conclusive results can be

established. Further, the dearth of research on the present topic particularly in the Indian context motivates to take up the thorough analysis of the relation between inflation and returns on sectoral indices.

Research Methodology

Hypotheses

1. There is no significant relationship between nominal returns on sectoral indices and inflation.
2. There is no significant relationship between real returns on sectoral indices and inflation.
3. The sectoral price indices and consumer prices do not move together in the long run.

Data Description

We have used 120 monthly closing prices (end of month) of the 11 sectors of NSE for a period of 10 years from July: 2006 to June: 2016 taken from the official website of NSE. The sectoral indices include CNX Auto, CNX Bank, CNX Energy, CNX Finance, CNX FMCG, CNX IT, CNX Media, CNX Metal, CNX Pharma, CNX Private Bank and CNX PSU Bank.The data on consumer price index (CPI) has been taken as proxy for consumer prices from OECD's official website. For the purpose of analysis, all the variables have been converted into natural logarithm. The returns on sectoral indices were calculated by the following equation;$R_t=LogI_t-LogI_{t-1}$ where R_t is the return on sectoral index at period "t", I_t is the index value at period "t" and I_{t-1} is the index value at previous period "t-1". Inflation has been calculated by using a similar equation; $Inf_t=LogP_t-LogP_{t-1}$; where Inf_t is the price level change at period "t", P_t is the price level at period "t" and P_{t-1} is the price level at previous period "t-1".Real returns on NSE sectoral indices have been calculated by subtracting Inf_t from R_t, i.e., $RR_t=R_t-Inf_t$; where RR_t is the real return on NSE sectoral indices.

Methodology

Unit Root Test

Non-stationary series used for estimating a regression model can lead to inaccurate and biased results. Such a series, thus, cannot be used for estimating a regression model. To test for unit root properties in a data series we have employed Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP) test. The null hypothesis for both the tests is that the variable has unit root.The Akaike Information Criterion (AIC) has been used to select the optimum lag length in the ADF test. The Kernel (Bartlett) sum of covariances estimator of the residual spectrum and the Newey-West data based bandwidth parameter have been used in the PP test.

Ordinary Least Square (OLS) Regression

In order to examine whether stock returns provide hedge against inflation the following regression model has been estimated following Nelson (1976).

$$R_{i,t}=\alpha_0+ \alpha_1 Inf_t+\varepsilon_t \qquad (1)$$

where, $R_{i,t}$ is the nominal returns on NSE sectors at time t, Inf_t is the inflation at time t, ε_t is the stochastic error term. The coefficient α1, which represents the percentage change in nominal returns of sectoral index by one percent change in inflation, should be positive and significant for Fisher Effect to hold.

Further, real returns on NSE sectoral indices have been regressed on inflation to confirm that stock returns provide a complete hedge against inflation.

$$RR_{i,t}=\beta_0+\beta_1 Inf_t+vt \qquad (2)$$

where, RR_{it} is the real return on NSE sectors at time t and νt is the stochastic error term.The coefficient β_1, which represents the percentage change in real rate of return of sectoral index due to one percent change in inflation, should be insignificant to establish that stock returns provide a complete hedge against inflation.

Vector Error Correction under Johansen Framework

To analyse whether the variables are related to each other in the long run, cointegration test can be used. It is also appropriate to test the Fisher Effect where the long run unit proportionate relationship between sectoral prices and consumer prices is expected. Cointegration is said to exist if there is a linear combination between two non-stationary variables which itself is stationary. We have used Johansen cointegration test with the assumption of presence of stochastic trend in the cointegrating equation based on the error correction representation of the pth order Vector Autoregressive (VAR) model with Gaussian error:

$$\Delta X_t = \emptyset + \sum_{i=1}^{p-1} r_i \Delta X_t + \prod X_{t-p} + \varepsilon_t \quad \ldots\ldots(3)$$

The estimates of Γi explain the short run adjustments and the estimates of Π contain information regarding the long run adjustments in changes in Xt.The coefficient Π, which is a product of α and β matrices with nxr dimensions, has a reduced rank with r<(n-1) cointegrating vectors in β. The α*β represents the error correction mechanism where α is the speed of adjustment to disequilibrium and β is the long run cointegration coefficient. The rank of the Π matrix, which is the number of independent columns in the Π matrix, is tested for establishing cointegration. The two likelihood ratio tests were developed by Johansen for testing number of cointegration vectors. The decision criteria will be based on the maximum eigenvalue test statistics.

1. The Trace test given by:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{g} \ln(1-\lambda_i) \quad \ldots\ldots(4)$$

2. The Maximum eigenvalue test given by:

$$\lambda_{max}(r, r+1) = T ln(1-\lambda)_{i+1} \quad \ldots\ldots(5)$$

The Johansen approach is sensitive to the selection of appropriate lag length. The Akaike Information Criteria (AIC) has been used to decide the optimal lag length for estimating the VAR. The lag length for cointegration and the VAR should be chosen following a consistent procedure.

Once we have confirmed the presence of long run equilibrium relationship between sectoral prices and consumer prices, which partially validates the Fisher Effect, likelihood ratio (LR) test will be applied to test weak exogenity for inflation. The LR test imposes a zero restriction on the speed of adjustment term α obtained from the Johansen test. The LR test is used when we estimate a restricted model which is nested within another unrestricted model. The null hypothesis of the test is that the variable is weakly exogenous, that is, the adjustment parameter is equal to zero (α=0). The weak exogenity should be rejected for the sectoral prices and not rejected for consumer prices to establish that stocks provide a complete hedge against inflation.

Results and Discussion

One of the common issues to be dealt with while modelling financial time series data is the problem of non-stationarity. Any series is said to be non-stationary if it does not have a constant mean, variance and auto-covariance for each lag. Simply stating, the mean, variance and auto-covariance of such a series is time variant. If a non-stationary series is used for estimating a linear regression model it would lead to non-sense or spurious results. We have used Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests to check for the presence non-stationarity or unit root. The results of both these tests in Table 1 reveal that all the NSE sectors except Energy and Metal sectoral indices were found to be non-stationary at log levels. The consumer price index (CPI) was also found to be non-stationary at log level form. The variables were differenced once and tested for the presence of unit root properties. All the variables were found to be stationary at 1st difference.

Table 1: Unit Root Tests

Variables	Augmented Dickey Fuller (ADF) Test		Phillips-Perron (PP) Test	
	Log Level	1st Differenced	Log Level	1st Differenced
CNX Auto	-0.39	-9.52*	-0.61	-9.62*
CNX Bank	-1.38	-8.51*	-1.83	-9.59*
CNX Energy	-3.61*	-11.11*	-3.61*	-11.11*
CNX FMCG	-0.41	-12.17*	-0.35	-12.24*
CNX Finance	-1.50	-8.12*	-1.95	-9.33*
CNX IT	-1.04	-6.09*	-1.11	-10.19*
CNX Media	-2.63	-9.50*	-1.99	-9.63*
CNX Metal	-3.00*	-8.99*	-2.82	-9.17*
CNX Pharma	-0.49	-11.68*	-0.51	-11.65*
CNX Private Bank	-1.23	-8.33*	-1.54	-9.10
CNX PSU Bank	-2.82	-8.28*	-2.83	-9.48*
CPI	-1.27	-6.54*	-0.72	-8.54*

Source: Estimation output from Eviews.
*Note: * denotes significance at 5% level of significance.*

Table 2a presents the results of the OLS regression where nominal returns on NSE sectoral indices have been regressed on contemporaneous inflation. From the results of the regression model it is clear that the slope of the regression of nominal returns of FMCG index on inflation (1.013) was found to be statistically significant at 10% level of significance.

Table 2a: Regression of Sectoral Returns on Contemporaneous Inflation $R_{i,t} = \alpha_0 + \alpha_1 Inf_{t+1} + \varepsilon_t$

Dependent Variable	Constant (α0)	Inf (α_1)	R^2	d value
R_{Auto}	0.006	1.076	1.270%	1.75
R_{Bank}	0.014	-0.258	0.046%	1.76
R_{Energy}	0.005	-0.088	0.009%	2.04
R_{FMCG}	0.005	1.013**	2.660%	2.27
$R_{Finance}$	0.014	-0.198	0.030%	1.69
R_{IT}	0.001	1.128	1.450%	1.85
R_{Media}	0.007	-0.179	0.025%	1.73
R_{Metal}	0.005	-0.315	0.047%	1.64
R_{Pharma}	0.012	0.131	0.030%	2.13
$R_{Private\ Bank}$	0.019	-0.361	0.086%	1.67
$R_{PSU\ Bank}$	0.008	-0.314	0.054%	1.73

Source: Estimation output from Eviews.
*Note: * *denotes significance at 10% level of significance.*
R denotes nominal returns of respective sector indices

In case of some sectors the evidence supports the presence of a negative stock returns-inflation relationship which suggest that stocks are not even a partial hedge against inflation. However, the regression coefficients are not statistically significant at 10% level of significance.

The results of the regression of real returns on inflation presented in Table 2b confirm that the FMCG sector provides a complete hedge against inflation as real returns and inflation have been found to be unrelated to each other since none of the slope coefficients have been found to be significantly different form zero. The coefficient of determination has been found to be to be very low in all the cases. Further, we have regressed one period leading inflation on stock returns which includes some contemporaneous relationship between stock returns and inflation. The intuition is that inflation is calculated from middle of one month to the middle of next month while as returns are calculated on month ending closing prices.

Table 2b: Regression of Real Returns on Contemporaneous Inflation $RR_{i,t} = \beta_0 + \beta_1 Inf_t + \varepsilon_t$

Dependent Variable	Constant (α0)	Inf (α1)	R2	d value
R_{Auto}	0.006	0.076	0.006%	1.75
R_{Bank}	0.014	-1.258	1.087%	1.76
R_{Energy}	0.005	-1.088	1.342%	2.04
R_{FMCG}	0.005	0.013	0.000%	2.27
$R_{Finance}$	0.014	-1.198	1.107%	1.69
R_{IT}	0.001	0.128	0.079%	1.85
R_{Media}	0.007	-1.179	0.025%	1.73
R_{Metal}	0.005	-1.315	0.808%	1.64
R_{Pharma}	0.012	-0.869	1.324%	2.13
$R_{Private\ Bank}$	0.019	-1.361	1.202%	1.67
$R_{PSU\ Bank}$	0.008	-1.314	0.934%	1.73

Source: Estimation output from Eviews.
Note: RR denotes real return on respective sector indices.

Table 3a presents the results of the regression of sectoral returns and one period leading inflation. The results show support to the conventional Fisher hypothesis in case of auto, FMCG, finance and pharma. All the slope coefficients except energy have been found to be greater than one (α_2>1). Luintel and Paudyal (2001) have pointed out that the lope coefficient greater than 1 is consistent with the Fisher Effect as the nominal rate of return should always be greater than the inflation rate at least by the tax rate.These results show that in all the sectors the partial hedge hypothesis is valid but the statistical significance has been established for auto, FMCG, finance and pharma only.To confirm that stocks provide a complete hedge against inflation, we have regressed the real returns of the NSE sectors on one period leading inflation.

Table 3a: Regression of Sectoral Returns on leading Inflation $R_{i,t}=\alpha_0+\alpha_1 Inf_{t+1}+\varepsilon_t$

Dependent Variable	Constant (α0)	Inf (α1)	R2	d value
R_{Auto}	0.002	1.606**	2.823%	1.80
R_{Bank}	0.001	1.583	1.728%	1.78
R_{Energy}	-0.001	0.859	0.844%	2.04
R_{FMCG}	0.000	1.627*	6.878%	2.33
$R_{Finance}$	0.001	1.784**	2.395%	1.71
R_{IT}	0.000	1.237	1.744%	1.86
R_{Media}	0.002	1.258	1.269%	1.75
R_{Metal}	-0.007	1.462	1.004%	1.65
R_{Pharma}	0.003	1.373*	3.330%	2.18
$R_{Private\ Bank}$	0.005	1.671	1.820%	1.68
$R_{PSU\ Bank}$	-0.007	1.846	1.860%	1.76

Source: Estimation output from Eviews.
*Note: * & ** denotes significance at 5% & 10% level of significance respectively.*
R denotes nominal returns of respective sector indices.

The results presented in Table 3b show that there is a significant relationship between real returns and inflation as against the Fisher Effect in case of FMCG and pharma. Thus, FMCG and pharma have been found to provide partial hedge against inflation. It can also be inferred that inflation can be used to predict the real rates of return. However, the coefficient of determination (R^2) is very low in both the cases and as Luintel and Paudyal (2001) points 'trading rules on the above results are likely to yield only minimal profits'.

Table 3b: Regression of Real Returns on leading Inflation $RR_{i,t}=\beta_0+\beta_1 Inf_{t+1}+\varepsilon_t$

Dependent Variable	Constant (α0)	Inf (α1)	R2	d value
R_{Auto}	-0.003	1.387	2.132%	1.77
R_{Bank}	-0.003	1.364	1.269%	1.76
R_{Energy}	-0.006	0.639	0.462%	2.02
R_{FMCG}	-0.004	1.408*	5.290%	2.30
$R_{Finance}$	-0.004	1.565	1.823%	1.69
R_{IT}	-0.005	1.018	1.198%	1.86
R_{Media}	-0.007	1.039	0.856%	1.74
R_{Metal}	-0.012	1.246	0.719%	1.64
R_{Pharma}	-0.001	1.154**	2.321%	2.15
$R_{Private\ Bank}$	0.000	1.451	1.358%	1.67
$R_{PSU\ Bank}$	-0.012	1.627	1.432%	1.75

Source: Estimation output from Eviews.
*Note: * & ** denotes significance at 5% & 10% level of significance respectively.*
RR denotes real returns of respective sector indices.

The results contradict the earlier findings for FMCG (presented in Table 2a and 2b) where it was found that stock returns provide a complete hedge against inflation. However, in case of auto and energy the slope coefficients were not found to be significantly different from zero. Thus, it can be concluded that auto and energy provide a complete hedge against inflation.

While differencing any series we lose a considerable amount of information which could be otherwise helpful in forecasting. Cointegration framework allow for using non-stationary data for establishing long run relationship between variables. The Fisher Effect can be considered valid if the sectoral price indices move one on one with the consumer prices in the long run. As stated in the previous section, the cointegration analysis under Johansen framework is sensitive to lag length selection. Table 4 reports the optimum lag length adopted for running VECM under Johansen framework on the basis of AIC.

Table 4: Lag Length Selection (Akaike Information Criterion)

Sector	Auto	Bank	FMCG	Finance	IT	Media	Pharma	Private Bank	PSU Bank
Lags Adopted	08	0 8	13	08	14	08	10	08	08

Source: Estimation output from Eviews.

The pre-requisite for analysing the cointegration relationship between the variables is to check whether the variables are I (1), that is, non-stationary at level and stationary at first difference. From the unit root test results presented in Table 1 it can be concluded that all the variable except energy and metal were I (1). Thus, energy and metal have not been taken up for analysing the long run relationship. The Johansen cointegration test results from Table 5 show that all sectoral indices except FMCG and PSU bank were associated with consumer prices in the long run since the maximum eigenvalue statistics was found to be significant at 5% level of significance. The long-run slope coefficients were found to be significantly greater than one except in case of media. These results, thus, confirm the results presented in Table 3a. Hence, for all the sectors,except FMCG and PSU bank, it can be said that sectoral index and consumer price index have a long run equilibrium relationship. This confirms the partial hedge hypothesis. While analysing the VECM coefficients in case of those sectors where presence of cointegrating relationship was confirmed, Table 5 revealed that all the error correction coefficients representing the speed of adjustment back into long run equilibrium were found to be negative, however, statistical significance was not established in the FMCG sector at 5% level of significance. It can also be inferred from Table 5 that stock prices adjust more than consumer prices in all the cases which provides support to the Fisher Effect as per which causality should run from consumer prices to stock prices.

Table 5: Johansen Cointegration Test

Sector	Cointegrating Ranks		Cointegrating Vectors		VECM Coefficients (α)	
	r=0	R≤1	β	c	Index	CPI
Auto	24.371*	4.285*	1.893 (0.143)*	-0.673	-0.186 (0.045)*	-0.011 (0.004)*
Bank	22.601*	2.606	1.215 (0.133)*	3.520	-0.257 (0.061)*	-0.007 (0.004)
FMCG	9.389	0.037*	1.913 (0.109)*	0.272	-0.135 (0.077)	-0.022 (0.011)*
Finance	28.532*	2.458	1.205 (0.121)*	2.679	-0.267 (0.058)*	-0.008 (0.004)
IT	21.056*	6.253*	1.240 (0.100)*	2.919	-0.343 (0.095)*	-0.014 (0.009)
Media	30.379*	4.701*	0.084 (0.153)	7.016	-0.176 (0.041)*	-0.010 (0.003)*
Pharma	20.358*	3.216	1.898 (0.096)*	-0.370	-0.219 (0.062)*	-0.017 (0.007)*

Private Bank	26.085*	2.732	1.719 (0.133)*	0.349	-0.252 (0.056)*	-0.008 (0.004)
PSU Bank	10.915	3.027	0.278 (0.294)	6.669	-0.154 (0.049)*	-0.000 (0.003)

Source: Estimation output from Eviews.

*Note: * denotes significance at 5% level of significance.*

To confirm whether or not stocks provide a complete hedge against inflation for the sectors where cointegration was established, we have used the Likelihood Ratio (LR) test. The test confirms whether or not the variable is weakly exogenous to the system. If weak exogeneity is rejected in case of stock prices and accepted for inflation, it can be inferred that stocks provide complete hedge against inflation. Table 6 presents the results of the LM test. It can be seen from the results that in case of bank, finance and IT sectors the weak exogeneity of stock prices has been rejected and that of inflation has not been rejected. Thus, in these sectors the Fisher effect has been established and it can be said that in the long run stocks provide a complete hedge against inflation. However, in the other sectors causality has been found to be running from both stock prices and consumer prices. Thus, these sectors have been found to provide a partial hedge against inflation only.

Table 6: Weak Exogeneity Test

Sector	Weak exogeneity test on restricted system $\chi 2$	LR Test	P value	Weakly exogenous
Auto	Index weakly exogenous to system A(1,1)	15.189	0.000	No
	CPI weakly exogenous to system A(2,1)	6.865	0.008	No
Bank	Index weakly exogenous to system A(1,1)	17.263	0.000	No
	CPI weakly exogenous to system A(2,1)	2.920	0.087	Yes
Finance	Index weakly exogenous to system A(1,1)	20.392	0.000	No
	CPI weakly exogenous to system A(2,1)	3.116	0.077	Yes
IT	Index weakly exogenous to system A(1,1)	11.882	0.000	No
	CPI weakly exogenous to system A(2,1)	2.469	0.116	Yes
Media	Index weakly exogenous to system A(1,1)	16.826	0.000	No
	CPI weakly exogenous to system A(2,1)	8.484	0.003	No
Pharma	Index weakly exogenous to system A(1,1)	12.189	0.000	No
	CPI weakly exogenous to system A(2,1)	5.367	0.020	No
Private Bank	Index weakly exogenous to system A(1,1)	19.165	0.000	No
	CPI weakly exogenous to system A(2,1)	3.842	0.049	No

Source: Estimation output from Eviews.

These results have a number of implications to the academicians, policy makers, and investors. This study has added valuable insights to the academic literature. The old dictum that common stocks provide hedge against inflation has been established in the Indian sectoral indices. These results provide quality insights to the policy makers. A successful execution of the monetary and fiscal policy can be undertaken while addressing stock market-inflation dynamics especially targeting the various sectors for allocation of resources. Regarding the investors, this study provides an important finding that their investment may not get eroded at times of high inflation if the same has been made in the stock market.

Conclusion

The main aim behind this study was to find whether sectoral index and consumer price index were related to each other in short as well as long run. We have analysed the relationship while using data on 11 sectoral indices listed on the National Stock Exchange (NSE) and consumer price index (CPI). The sectoral indices include CNX Auto, CNX Bank, CNX Energy, CNX Finance, CNX FMCG, CNX IT, CNX Media, CNX Metal, CNX Pharma, CNX Private Bank and CNX PSU Bank. The period of the study ranges from July 2006 to June 2016 covering a period

of 10 years, chosen to study the long-run relationship between the variables. The CNX Reality sector has been excluded from our study because the data was available for less than 10 years. We have employed the Augmented Dickey Fuller (ADF), Phillips-Perron (PP), Johansen cointegration test and vector error correction mechanism apart from analysing the relationship with ordinary least square (OLS) regression.

The evidence from this study reveals that returns on sectoral indices listed on NSE including auto, FMCG, finance and pharma and inflation were related to each other in the short run. However, auto and finance sectors were found to provide a complete hedge against inflation in the short run.In the long run, the sectors including auto, bank, finance, IT, media, pharma and private bank were found to be providing a partial hedge against inflation. Further, evidence shows that returns at period t and one period leading values of inflation have a contemporaneous relationship. The VECM results show that causality runs from consumer prices to stock prices which implies that inflation can be used as a predictor of the future performance of the stock market both at the individual sector and overall market level.It was also found that weak exogeneity was not rejected for inflation in bank, finance and IT sectors. Thus, these sectors were found to provide a complete hedge against inflation. Overall these results show that for the selected sample period the Indian stock market has provides hedge against inflation both in the short as well as long run.

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