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An Analytical Analysis of Stock Index Performance and National income: Evidence from India

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ABSTRACT

This study aims to investigate whether the stock index performance leads to national income or vice versa; study also examines short-run and long-run dynamics of the stock exchange. We use yearly data of Net national product(NNP) and NSE Nifty for the time span of 1998 to 2019 and quarterly data of Gross Domestic Production (GDP) and NSE Nifty for the period of two years i.e.2019 and 2020. This gives sufficient data for analytical and empirical analysis. We undertake; Unit root tests, Granger Causality test, Johansen Cointegration test, Vector Error Correction Model and Wald test. The results of Granger causality test suggest that there is a unidirectional relationship runs from NSE Nifty to NNP. The Johansen cointegration test suggests that there is a long-run relationship between the NSE Nifty and NNP. Similarly, the results of vector error correction model reveal that when the long-run equilibrium deviates then the NSE Nifty adjusts to restore equilibrium by rectifying the disequilibrium. Wald test confirms the presence of short run relationship between the variables. Key input of the study is in recognizing the role of stock index in national income development and to investigates the journey of the Indian stock index during the period of Coronavirus pandemic.

Keywords: Stock index, National income, causality test, short-run and long-run dynamics, Coronavirus pandemic

1.INTRODUCTION

A stock market index reflects the position of the stock market. It helps investor to compare current price levels with past prices to calculate market performance (Caplinger, Dan, Jan 18, 2020). It is computed from prices of selected stocks. A stock market index is a statistical measure which shows changes taking place in the stock market (investopedia.com. march 23, 2019). In this way, a stock index reflects overall market sentiments and fluctuations in the stock price. It's a tool utilized by investors and monetary managers to explain the market and to check the comeback on specific investments.

According to Marshall, National income is defined as "The labour and capital of a country, acting upon its natural resources, produce annually a certain net aggregate of commodities, material and immaterial, including services of all kinds.

The growth of the national income depends upon the different factors which have been a matter of discussion for many years. With the growth of financial sector especially in the 20th century, the attention of researchers had moved towards the study of the impact of stock market index in the national income. Therefore, theoretically it is believed that growth in the stock index leaves its impact on the growth of national income. Though, the views of researchers toward this relationship are different.

Stiglitz (1989) and Dow and Gorton (1997) argued that banks are better option for economic growth than stock markets particularly for developing countries. Singh (1992) suggested that stock markets cause more harm than benefit, and some characteristics of mature stock markets like volatility, speculative investors and risk-averse savers would create more problems in developing countries and finally an adverse condition for economic growth.

According toLevine (1991 and Fulghieri and Rovelli, (1998), economic growth is affected by the liquidity in stock market. According to Obstfeld (1995), international risk-sharing enhance resource allocation and due to the stock market integration, rate of economic growth is advanced. On the contrary, Mayer (1988) argues that stock markets are not at all any key source of corporate finance. Tullio and Pagano (1994) suggest that with the increase in stock market liquidity uncertainty decreases and finally reduced saving rate and slow economic growth. Furthermore, Devereux and Smith (1994) demonstrate that the integration of stock markets globally and sharing of risk can slow economic growth by decreasing savings rates. According to Morck et al.,(1990), the growth of economy can be affected by stock markets by the way of corporate takeover.

According to some research work, stock market index and national income are positively related to each other and rise in stock index promotes national income whereas the result of some other research work shows the absence of any relationship between growth of stock market index and national income and in some extraordinary cases even negative relationship was found. According to some researchers, economic growths are the leading indicator of the growth of stock market. Previous research work related to the direction of cause and effect relationship between stock index development and national income growth has been inconclusive. According to Odhiambo (2008), results of the research work are sensitive to the test employed and type of data used in the study. Also, results vary also from country to country and time period. Mun et al. (2008) advised that fluctuations in the stock prices are the reflection of public outlooks towards government policies and the rise in stock prices indicates the future expansion of national income and the weakening of stock prices is related to the financial recession. Vazakidis and Adamopoulos (2009) suggests that the stock market is useful for transferring savings from savers to the companies. R. Deepak1 & M.R. Sholapur (2015) advised that the declaration of favorable or unfavorable news affects the stock market theoretically but in reality, stock markets is able to forecast the announcement of the news through leading indicators such as IIP data. Sinha et.al.(2020) concluded that the Indian stock market is negatively affected by COVID-19. Debakshi Bora and Daisy Bashista (2020) confirms the volatility in stock market during the coronavirus pandemic time. Mohammad Noor ALAM et.al.(2020) found positive abnormal return during the lockdown time.

2. Data and Methodology

The present study uses yearly data for the time period from 1998 to 2019 and quarterly data from 2019 to 2020. The required data on net national product (NNP) and Gross Domestic Product (GDP) are collected from RBI (Reserve Bank of India)'s publication of 'Handbook of Statistics on Indian Economy, 2019-20. Data on index of NSE Nifty are collected from NSE (National Stock Exchange) official websites.

Variables:

NNP (Net national product) is used to represent national income, GDP (Gross domestic product) denotes growth of the economy and NSE Nifty to reflect stock index (yearly closing prices) are used for the analysis.

OBJECTIVES

(1) To determine the causal relationship between NSE Nifty and National income(NNP)
(2) To study the impact of movement of NSE Nifty on National income(NNP)
(3) To analyze the behavior of NSE Nifty and Gross domestic product(GDP) during the Coronavirus pandemic

Research techniques: The present study applied various econometric tests for the analytical analysis such as; Unit root (ADF) tests, Granger Causality test, Johansen Cointegration method, Wald test and finally; vector Error Correction Model (ECM). These models are described as follows:

2.1. UNIT ROOT TEST -

The presence of Stochastic trend in the time series data is termed as unit root. The presence of unit root in a time series shows that it is not stationary.

If a time series is not stationary, it may show unpredictable results in the analysis of data such as: -

(a) SPURIOUS REGRESSION - It means that the test result would reflect high r-squared values whereas the data is not related.
(b) ERRANT BEHAVIOUR – It may show invalid assumptions used for analysis. For ex: t-ratios may not go after t – distribution.

It is important to convert the non –stationary time series into stationary for forecasting. A series is said to be stationary if the mean and autocovariances of the series do not depend on time.

There are many test to check the presence of unit root in a time series which are as follows: -

(a) Augmented Dicky – Fuller(ADF) test
(b) Elliott – Rothenberg – Stock test
(c) Schmidt – Phillips test
(d) Phillips – Perron test
(e) Zivot – Andrews test

The most common method which is applied for this reason is Augmented Dicky – Fuller test.

1. AUGMENTED DICKY-FULLER TEST (ADF)

HYPOTHESES - The hypotheses for the ADF test are: -

(a) The null hypothesis is that a time series sample has a unit root.
(b) The alternative hypothesis is that a time series has no unit root.

When the test result shows ADF statistic as more negative, there is a stronger possibility that null hypothesis will be rejected at any level of confidence.

Augmented Dicky Fuller test (ADF) can be shown as

$$\Delta yt = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \dots\dots\dots\dots \delta_{p-1} \Delta_{yt-p+1} + \varepsilon t$$

Where,

α = constant

β= coefficient on a time trend

p = lag order

The constraints are, α = and β = 0.Lag length p needs to be calculated while applying this test.Lag length can be determined by different information criteria .

The unit root test is applied with the null hypothesis $\gamma = 0$ and alternative hypothesis $\gamma < 0$. After determining the value of t-statistic

$$DF_r = \gamma / SE(\gamma)$$

is determined, it is compared to the critical value.In the case of test statistic is lesser than the critical value, null hypothesis is rejected that confirms the absence of unit root in time series.

2.2. Granger Causality Test

Granger (1969) explained the causality process as follows; whether y causes x and to check at what level the current value of x can be described by past values of x and examine whether adding lagged values of y can develop these estimates. It is concluded that x is Granger caused by y, if x can be foreseen from historical values of x and y than from previous values of x only. For a simple bivariate model, one can test the following equation

$$X_t = \alpha_0 + \sum_{i=1}^{n} \alpha_i \, y_{t-i} + \sum_{j=1}^{m} \beta_j \, x_{t-j} + u_t$$

$$y_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \, y_{t-i} + \sum_{j=1}^{m} \alpha_j \, y_{t-j} + \varepsilon_t$$

Where; the null hypothesis is that y does not Granger causes x in the first regression equation and x does not Granger causes y in the second regression equation.

2.3 JOHANSEN TEST

Johansen test is a process to determine the co integration among the time series. This test allows more than one co integrating relationship. In other words, it is used to determine the number of relationship and estimating the relationship (Wee & Tan,1997).

For the trace test, the null is that the co integration vectors is $r = r^* < K$, and the alternative hypothesis is that the number of co integration vectors is r = K. This test would be continued for r* = 1,2, etc. and the estimate of r is the first non-rejection point of the null.

The null hypothesis for the "maximum eigenvalue" test, the alternative hypothesis is that the $r = r^* + 1$. This test would be continued for r* = 1,2…and the first non-rejection point is an estimate for r.

To get the general VAR(p) model:

$$X_t = \mu + \varnothing D_t + \Pi_p X_{t-p} + \Pi_1 X_{t-1} + e_t,\ t = 1 \ldots, T$$

The two possible vector error correction models are:
(1) The long run VECM:

$$\Delta X_t = \mu + \emptyset D_t + \Pi X_{t-p} + T_{p-1} \Delta X_{t-p+1} + \ldots T_1 X_{t-1} + \varepsilon t,\ t = 1,\ldots,T$$

Where

$$T_i = \Pi_1 + \ldots + \Pi_i - I,\ i = 1,\ldots,p-1.$$

2. The transitory VECM:

$$\Delta X_t = \mu + \emptyset D_t - T_{p-1}\Delta X_{t-p+1} - \ldots - T_1\Delta X_{t-1} + \Pi X_{t-1} + \varepsilon t,\ t = 1,\ldots,T$$

Where

$$T_i = (\Pi_{i+1} + \ldots + \Pi_p),\ i = 1,\ldots,p-1.$$

Be aware that the two are the same. In both VECM,

$$\Pi = \Pi_1 + \ldots + \Pi_p - I.$$

Inferences are drawn on II, and they will be the same, so is the explanatory power.

2.4.ERROR CORRECTION MODEL

This model is mainly applied for those data which are co integrated. Error correction model is helpful in estimating the short term and long term influences of one-time series on another. It straightforwardly calculates the speed at which a dependent variable come back to equilibrium with a change in independent variable.

VECM

There are many shortcomings in Engle – Granger approach such as

(a) ECM is limited to a single equation only.
(b) It requires the pretesting of time series to check that variables are I (0) or I(1).

These shortcomings can be removed by using the Johansen's procedure. Its benefits include (1) Pretesting is not required (2) There can be numerous many cointegrating relationships (3) All variable are considered as endogenous and tests related to long-run are possible.

The resulting model is called as a vector error correction model(VECM). It includes error correction features to the multi-factor model called as vector auto regression.

3. Results

All the econometric models are estimated in Eviews version 11. The analytical readings are based on the ADF tests, Granger Causality test, Johansen Cointegration test and Vector error Correction Model (VECM).

3.1. Unit Root Tests Results

Table 1a: ADF Test Results (NNP series)

		Level			**1st differencing**		
		t-Statistics	Prob.	Result	t-Statistics	Prob.	Result
ADF test statistics		1.487630	0.9986	Non Stationary	-4.044028	0.0061	Stationary
Test critical values :	1% level	-3.788030			-3.808546		
	5% level	-3.012363			-3.020686		
	10% level	-2.646119			-2.650413		

Interpretation - The p-value of NNP series is more than 5% shows that we cannot reject the null hypothesis that there is unit root in series at level whereas the p-value is less than 5% at first differencing recommend that series are stationary.

Table 1b: ADF Test Results (NSE NIFTY series)

		Level			**1st differencing**		
		t-Statistics	Prob.	Result	t-Statistics	Prob.	Result
ADF test statistics		-0.879237	0.7743	Non Stationary	-3.603465	0.0160	Stationary
Test critical values :	1% level	-3.788030			-3.831511		
	5% level	-3.012363			-3.029970		
	10% level	-2.646119			-2.655194		

Interpretation - The p-value of NSE Nifty series is more than 5% shows that we cannot reject the null hypothesis that there is unit root in series at level whereas the p-value is less than 5% at first differencing recommend that series are stationary.

3.2 LAG LENGTH CRITERIA

Table 2
VAR Lag Order Selection Criteria
Endogenous variables: NNP NSE_NIFTY

Exogenous variables: C

Sample: 1998 2019
Included observations: 20

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-407.0814	NA	2.00e+15	40.90814	41.00771	40.92758
1	-363.5101	74.07126*	3.84e+13*	36.95101*	37.24973*	37.00932*
2	-363.0497	0.690545	5.57e+13	37.30497	37.80284	37.40216

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

INTERPRETATION – Akaike, Schwarz and Hannan-Quinn information criterion shows Lag 1 as suitable lag length.

3.3. Granger Causality Test Results

Table 3: Granger Causality Test Results

Null Hypothesis	Number of Lags	F-Statistics	Probability	Causal Relation
NSE NIFTY does not Granger Cause NNP	1	5.28212	0.0337	Unidirectional relation from
NNP does not Granger Cause NSE NIFTY		1.42984	0.2473	NSE NIFTY to NNP

INTERPRETATION - The causality test results on yearly series specifies that the null hypothesis of NSE Nifty does not Granger cause NNP is rejected at 5% level and the null hypothesis of NNP does not Granger cause NSE Nifty is accepted at 5 % level of significance. It confirms unidirectional relationship that runs from NSE Nifty to NNP.

3.4. Johansen Cointegration Test Results

Table 4: Johansen Cointegration test for NNP and NSE Nifty

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Null hypothesis
None *	0.454746	12.74534	12.32090	0.0424	Accepted
At most 1	0.030294	0.615257	4.129906	0.4939	Rejected

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**	Null hypothesis
None *	0.454746	12.13009	11.22480	0.0346	Accepted
At most 1	0.030294	0.615257	4.129906	0.4939	Rejected

INTERPRETATION – The probability value of trace and Max-Eigen statistics confirms the presence of long run relationship between NNP and NSE Nifty

3.5.Vector Error Correction Model Results

Table 5a: Error Correction Model for NNP and NSE Nifty

Vector Error Correction Estimates

Sample (adjusted): 2000 2019
Included observations: 20 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	
NNP(-1)	1.000000	
NSE_NIFTY(-1)	-18.28289	
	(2.64298)	
	[-6.91752]	
C	27734.76	
Error Correction:	**D(NNP)**	**D(NSE_NIFTY)**
CointEq1	-0.176474	0.012862
	(0.06957)	(0.01283)
	[-2.53656]	[1.00250]
D(NNP(-1))	-0.097073	0.016579
	(0.21721)	(0.04006)
	[-0.44691]	[0.41391]

D(NSE_NIFTY(-1))	-0.995347	-0.107811
	(1.53185)	(0.28249)
	[-0.64977]	[-0.38164]
C	6184.217	267.8871
	(1821.30)	(335.867)
	[3.39550]	[0.79760]
R-squared	0.314792	0.127092
Adj. R-squared	0.186316	-0.036578
Sum sq. resids	4.87E+08	16577843
S.E. equation	5519.725	1017.897
F-statistic	2.450192	0.776515
Log likelihood	-198.4690	-164.6572
Akaike AIC	20.24690	16.86572
Schwarz SC	20.44605	17.06487
Mean dependent	5361.724	319.1244
S.D. dependent	6119.126	999.7768
Determinant resid covariance (dof adj.)		3.13E+13
Determinant resid covariance		2.00E+13
Log likelihood		-363.0497
Akaike information criterion		37.30497
Schwarz criterion		37.80284
Number of coefficients		10

Table 5(b)

Dependent Variable: D(NNP)
Method: Least Squares (Gauss-Newton / Marquardt steps)

Sample (adjusted): 2000 2019
Included observations: 20 after adjustments
D(NNP) = C(1)*(NNP(-1) - 18.2828879766*NSE_NIFTY(-1) + 27734.7601375) + C(2)*D(NNP(-1)) + C(3)*D(NSE_NIFTY(-1)) + C(4)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.176474	0.069572	-2.536557	0.0220
C(2)	-0.097073	0.217211	-0.446906	0.6609
C(3)	-0.995347	1.531849	-0.649768	0.5251
C(4)	6184.217	1821.299	3.395498	0.0037

R-squared	0.314792	Mean dependent var	5361.724
Adjusted R-squared	0.186316	S.D. dependent var	6119.126
S.E. of regression	5519.725	Akaike info criterion	20.24690
Sum squared resid	4.87E+08	Schwarz criterion	20.44605
Log likelihood	-198.4690	Hannan-Quinn criter.	20.28578
F-statistic	2.450192	Durbin-Watson stat	1.946120
Prob(F-statistic)	0.101081		

INTERPRETATION – We assessed vector error correction models by comprising the error correction term in the equations to look how the disequilibrium is corrected in the long run. This indicates that when the NSE Nifty and NNP diverges away from the long-run equilibrium, then the NSE Nifty perform all alteration to restore the equilibrium by revising disequilibrium about 17% every year.

Estimated VECM with GDP as target variable

$$\triangle NNP_t = -0.176\ ECT_{t-1} - 0.059\ \triangle\ NNP_{t-1} - 1.121 \triangle NSE\ Nifty_{t-1} + 6867.142$$

Where,

$$ECT_{t-1} = 1.00\ NNP_{t-1} - 20.7195\ NSE\ Nifty_{t-1} + 31081.78$$

3.6. WALD TEST

Table 6

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
t-statistic	-0.649768	16	0.5251
F-statistic	0.422199	(1, 16)	0.5251
Chi-square	0.422199	1	0.5158

Null Hypothesis: C(3)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(3)	-0.995347	1.531849

Restrictions are linear in coefficients.

INTERPRETATION – The test results shows the probability value for Chi-square which is more than 0.05 confirms the presence of short run relationship between the variables.

3.7. Validity of the model

The lastphase of the study of the model is to the extent of its rationality. For this, it is required to perform some diagnostic testswhich are as follows: -

Correlogram- Q- statistics test -

Table 7(a)

Sample (adjusted): 2000 2019
Q-statistic probabilities adjusted for 3 dynamic regressors

<table>
<tr><th>Autocorrelation</th><th>Partial Correlation</th><th></th><th>AC</th><th>PAC</th><th>Q-Stat</th><th>Prob*</th></tr>
<tr><td>. | . |</td><td>. | . |</td><td>1</td><td>0.026</td><td>0.026</td><td>0.0156</td><td>0.901</td></tr>
<tr><td>. |* . |</td><td>. |* . |</td><td>2</td><td>0.147</td><td>0.147</td><td>0.5461</td><td>0.761</td></tr>
<tr><td>.**| . |</td><td>.**| . |</td><td>3</td><td>-0.217</td><td>-0.229</td><td>1.7602</td><td>0.624</td></tr>
<tr><td>.**| . |</td><td>.**| . |</td><td>4</td><td>-0.263</td><td>-0.289</td><td>3.6635</td><td>0.453</td></tr>
<tr><td>.**| . |</td><td>. *| . |</td><td>5</td><td>-0.235</td><td>-0.184</td><td>5.2833</td><td>0.382</td></tr>
<tr><td>. *| . |</td><td>. | . |</td><td>6</td><td>-0.078</td><td>-0.052</td><td>5.4749</td><td>0.484</td></tr>
<tr><td>. *| . |</td><td>.**| . |</td><td>7</td><td>-0.121</td><td>-0.214</td><td>5.9721</td><td>0.543</td></tr>
<tr><td>. |* . |</td><td>. | . |</td><td>8</td><td>0.119</td><td>-0.057</td><td>6.4892</td><td>0.593</td></tr>
<tr><td>. |* . |</td><td>. | . |</td><td>9</td><td>0.078</td><td>-0.030</td><td>6.7351</td><td>0.665</td></tr>
<tr><td>. | . |</td><td>. *| . |</td><td>10</td><td>0.070</td><td>-0.115</td><td>6.9507</td><td>0.730</td></tr>
<tr><td>. | . |</td><td>. *| . |</td><td>11</td><td>0.002</td><td>-0.150</td><td>6.9508</td><td>0.803</td></tr>
<tr><td>. | . |</td><td>. *| . |</td><td>12</td><td>-0.006</td><td>-0.076</td><td>6.9527</td><td>0.861</td></tr>
</table>

*Probabilities may not be valid for this equation specification.

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INTERPRETATION – The test result shows that there is no auto and partial correlation in the model

Table 7(b)
Histogram – Normality test

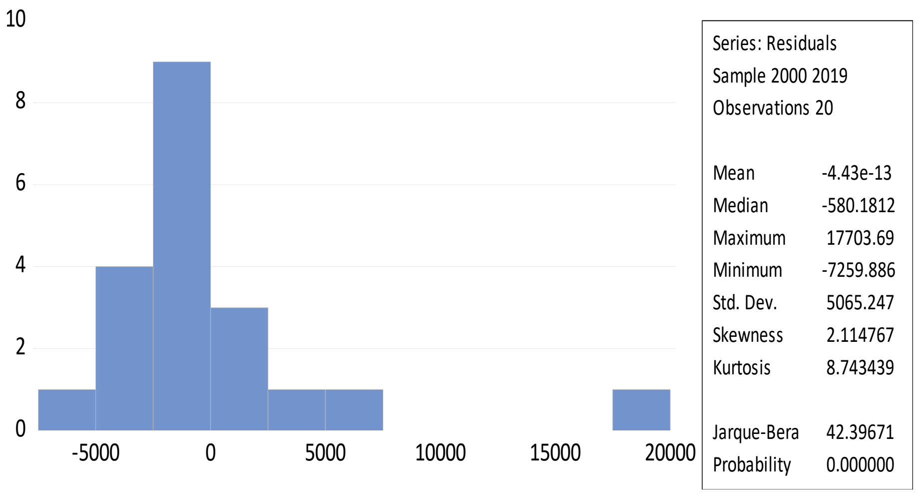


Table 7(c)
Heteroscedasticity test –

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	2.194611	Prob. F(4,15)	0.1190
Obs*R-squared	7.383531	Prob. Chi-Square(4)	0.1170
Scaled explained SS	18.29566	Prob. Chi-Square(4)	0.0011

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares

Sample: 2000 2019
Included observations: 20

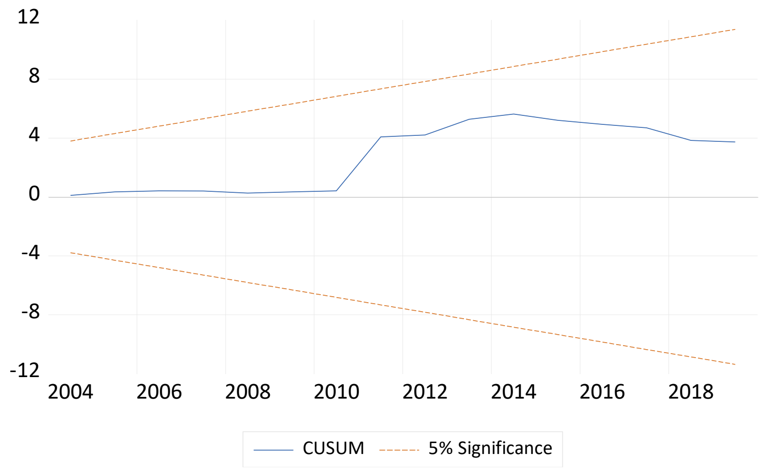
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19233795	27397586	0.702025	0.4934
NNP(-1)	-4437.368	2800.043	-1.584750	0.1339
NSE_NIFTY(-1)	27060.00	15323.33	1.765934	0.0977
NNP(-2)	536.0723	2679.227	0.200085	0.8441
NSE_NIFTY(-2)	24045.79	19458.63	1.235740	0.2356

R-squared	0.369177	Mean dependent var	24373889
Adjusted R-squared	0.200957	S.D. dependent var	69587299
S.E. of regression	62203534	Akaike info criterion	38.94204
Sum squared resid	5.80E+16	Schwarz criterion	39.19097
Log likelihood	-384.4204	Hannan-Quinn criter.	38.99063
F-statistic	2.194611	Durbin-Watson stat	1.984595
Prob(F-statistic)	0.118991		

Interpretation – The test result shows that there is no heteroscedasticity in the model

Table 7 (d)

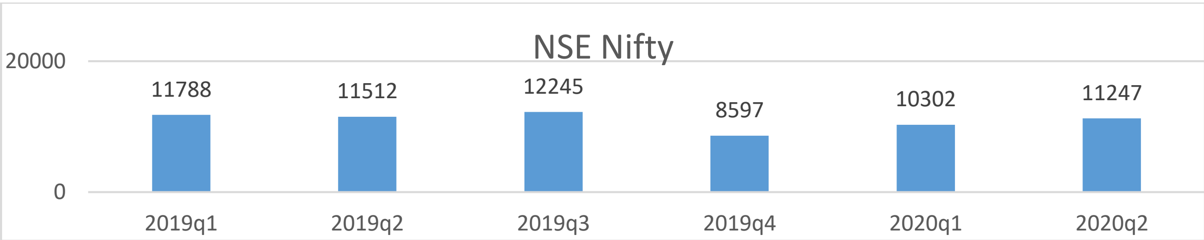
CUSUM TEST



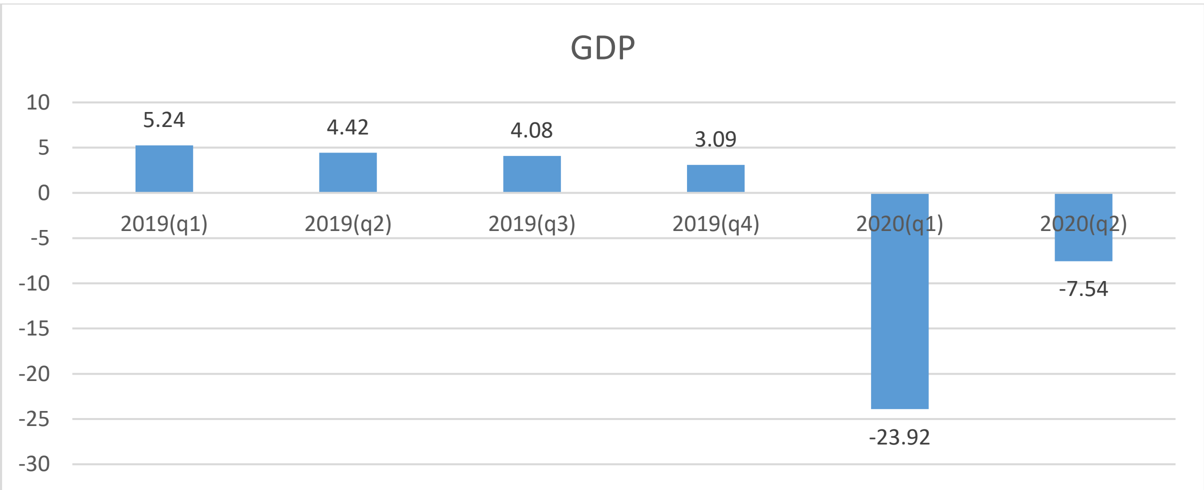
Interpretation – The test result confirms the stability in the model

4. Behaviour of NSE Nifty and Gross domestic product(GDP) during the Coronavirus pandemic

NSE Nifty fell maximum during 2019(q3) to 2019(q4) but restored its growth from 2020(q1) and growing



The growth rate of GDP keeps on decreasing from 2019(q1) to 2020(q1) and improvement in the GDP growth rate was found in the 2020(q2) in comparison of 2020(q) though it is still showing negative growth. The maximum negative growth of GDP was seen in 2020(q1) due to the lockdown.



CONCLUSIONS

This study examined the causal relationship between NSE NIFTY and NNP both for short and long run in the context of India. The analytical analysis was performed on yearly data for the period from 1998 to 2020. The test results of ADF shows that the variables are non-stationary at their levels and become stationary at their first difference. The output of Granger causality test reflects that there is a unidirectional relationship runs from NSE Nifty to NNP. This Study also applied Johansen cointegration test to examine the long-run relationship present between the variables and found the presence of long-run relationship between the NSE Nifty and NNP.Vector error correction model was applied to check the way disequilibrium is adjusted in the long-run. The yearly results of vector error correction model indicate that once the NSE Nifty and NNP departs away from the long-run equilibrium, then NSE Nifty do all correction to re-establish the long-run equilibrium by adjusting disequilibrium about 17% yearly. Test results of the study confirms NSE Nifty as the leading indicator of NNP. Output of the tests confirms that the NSE Nifty has been playing a key role in finding the NNP fluctuations and NSE Nifty encourages NNP by embracing suitable restructuring of resources.

The empirical analysis during the period from 2019 to 2020 shows that and NSE Nifty is rising whereas GDP is falling during the first quarter of 2020. Nifty is climbing and the reason behind this may be due to the forward-looking attitude of investors and expectation of a better future. The optimistic behaviour of investors could be based on the number of announcements done the government to recuperate the GDP.

Information about the direction of causal relationship between NSE Nifty and NNP would support investors in predicting the future movements of the NSE Nifty and allocate their assets accordingly. This study is helpful for government, Reserve bank of India and Securities and Exchange Board of India to make policies for the betterment of the country.

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