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Impact of Reliance Industry Stock Price on NIFTY 50 - Granger Causality Test

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ABSTRACT

It is well known for the Indian Equity Market NIFTY 50 is the National Stock Exchange of India's benchmark broad based stock market Index. Full form of NIFTY 50 is "National Stock Exchange Fifty". Generally it represents the weighted average of fifty Indian Company Stocks; but right now it is fiftyone stocks and is one of the main stock indices in India.

The study is an attempt to find the impact of Reliance Industries Limited(Reliance) stock price (one of the 51 stocks enlisted under NIFTY 50) on NIFTY 50. We have collected data mostly from i.) NSE and ii.) Yahoo finance. Annual Data(Daily) for the period of 2008-2018 have been utilized. The data comprises of Open, High, low, Close and Volume Traded. For this empirical study Closing values are considered. This study employs Testing of parameters, Hypothesis, and Granger Causality Test an econometric tool to analyse the cause effect relationship. It will be helpful for rational investors to understand the moving trend of NIFTY 50 with respect to Reliance stock price movement and also to understand the current position of Reliance in Indian Stock Market. We used EViews for detailed analysis.

1. Introduction

This paper is designed to study the investment behaviour of the common investors with reference to equity investment and future trading in commodity market in India. Investors at different age, risk, class, etc are often confronted with situation within and beyond their control. In most of the cases they arise at their investment decision based on either i.) rule of the thumb method or ii.) tips offered by their friends or relative or iii) depending on trend of the data given newspaper or iv.) discussion done in media. Based on rational analysis (statistical and econometrical) this thesis seeks to arrive at some policy implications that would guide them during the period of uncertainties. There is also an attempt to predict share price, and movement of Nifty or Sensex prediction for future trading in Commodity market. A good stock should have depth, breadth, and resilience. It becomes possible when large number of listed companies have a broad investors base with huge investible fund. It has been proved that judicious investment in equity market and commodity market requires not only an integrated mindset but also meticulous estimation about correct trimming for buy, sell, or hold and similarly for future trading in Commodity market as it has some hedging effect. Ability to i.)Continue value investment over a long period of time, ii.)Observe price movements of stocks on a daily basis iii.) Transact on the basis of information or research in not only quite expensive but requires high investment skill for common investors. Similarly changes in commodity price can have significant effects to producers and consumers revenues and credit exposure. As a result good proportion of common investors goes for mutual fund investment. But judicious and long term value investment in equity stock always give maximum return in comparison to other possible investment avenues viz debt securities, government securities with assured return, real estate or bullion market. Those who deal with share and commodity- individual or institutional, Indian or foreign, seeks to invest with maximum possible return combined with minimum possible risk. They require buying at the bottom most point (of index) or price(for commodities) selling at topmost point (of index) or price (for commodity) or at least as near as possible to those points or price.

Stocks are often classified based on the type of company it is, the company's value, or in some cases the level of return that is expected from the company. Below is a list of classifications which are generally known to us Growth Stocks, Value Stocks, Large Cap Stocks, Mid Cap Stocks, and Small Cap Stocks. Stocks are usually classified according to their characteristics. Some are classified according to their growth potential in the long run and the others as per their current valuations. Similarly, stocks can also be classified according to their market capitalization. S&P CNX NIFTY has NIFTY (50), Junior NIFTY (50), CNX IT (20), Bank NIFTY (12), NIFTY Midcap50, CNX Realty (10) and CNX Infra (25). The sectoral distribution of NSE are Financial services or banks, Energy, Information Technology, Metals, Automobile, FMCG, Construction, Media & Entertainment, Pharma, Industrial Manufacturing, Cement, Fertilizers & Pesticides, Textiles, Power and Telecom.

Nifty is considered as an index depending on how market players analyze it with reference to their expectations. Reliance Industries Limited (RIL) is an Indian conglomerate holding company headquartered in Mumbai, Maharashtra, India. Reliance owns businesses across India engaged in energy, petrochemicals, textiles, natural resources, retail, and telecommunications. Reliance is one of the most profitable companies in India, the largest publicly traded company in India by market capitalization, and the second largest company in India as measured by revenue after the government-controlled Indian Oil Corporation. On 18 October 2007, Reliance Industries became the first Indian company to

breach $100 billion market capitalization. The company is ranked 203rd on the *Fortune Global 500* list of the world's biggest corporations as of 2017. It is ranked 8th among the Top 250 Global Energy Companies by Platts as of 2016. Reliance continues to be India's largest exporter, accounting for 8% of India's total merchandise exports with a value of Rs 147,755 crore and access to markets in 108 countries.[10] Reliance is responsible for almost 5% of the government of India's total revenues from customs and excise duty. It is also the highest income tax payer in the private sector in India.

This paper is focused on Impact of Reliance Stock price on NIFTY 50. Broadly we are going to discuss the impact of this industry on NIFTY 50 for the last ten years, and the different position of Reliance stock price at different time frame. We have also tried to analyze the turning point of growth of Reliance and finally analyse the current position of this Industry in the stock market.

Rational investors in Indian Stock Market will come to know the advantages and disadvantages of investment on Reliance Stock from the analysis and conclusion.

2. Literature Review

There exists vast literature in this subject and most of the works are empirical in nature. However, keeping in view of the inherent limitation of empirical research we propose to take up a very humble attempt of a study that includes, fundamental analysis, charting techniques, statistical analysis, econometric analysis and case study methods. Suchismita Bose and Dipankar Kundu(2004) have studied "The Impact of FII Regulations in India: A Time-Series Interaction Analysis of Equity Flows". They examined the impact of FII policy reforms on FII portfolio flows to the Indian Stock Markets. These result strongly suggests that liberalization policy has better impact to increase the mean level of FII's inflows whereas restrictive measures do not show any significant negative impact on the net inflows. Adam L Alter and Daniel M Oppenheimer (2006) have studied psychological impact on short time share price movements. Their result imply that simple, cognitive approaches to modelling human behaviour sometimes out perform more typical complex alternatives. When people attempt to understand complicated information they tend to simplify the task by relying on mental shortcuts on heuristics, suggesting that fluency effects extends to their domain of language processing. Hiroshi Takahashi and Takao Terno (2003) worked on Agent based approach to analyse how investors and investment system that are based on behavioural finance affect asset prices. Their result indicates that the non – fundamentality affect the traded price and obtained the excess returns in real market also. Alexander A Shersdtov and Peter Stone (2004) have made a comparative study based on three automated stock trading agents. The three approaches, presented take inspiration from reinforcement learning myopic trading, using regression based price prediction and market making. Their research initiative designed to provide a realistic test bed for stock trading strategies.

3. Objective

The objective of the study is to find the effect of Reliance stock price on NIFTY 50 and the current position of the Reliance Industries limited in the Indian stock market with respect to the past history.

This is an in depth study and is based on econometric modelling - Granger Causality Test. It was found that the time series data is stationary after performing the root test (ADF Test) of first difference. We used EViews for the analysis. The empirical results with analysis are shown in the entire study.

4. Methodology

The study is empirical in nature and is limited to Indian Stock Market represented by NSE. The time frame chosen for study is between September '2008 to August '2018. the sampling elements of the study were NIFTY 50 and Reliance Scrip.

Purposive sampling was used to complete the study and the data was collected from secondary sources through official website of NSE and Yahoo Finance.

Firstly the entire data set is taken into consideration(02.09.2008 to 31.08.2018 named as T1) for the analysis.

Secondly the data set is segregated into different time frames for complex analysis to reach the desired results. The segregated data is named as hereunder:-

T2 - (02.09.2008 to 31.03.2014), T3 - (02.09.2008 to 22.02.2017), T4 - (01/04/2014 to 31.08.2018), T5 - (01.04.2014 to 22.02.2017), T6 - (02.01.2017 to 31.08.2018), T7 - (23.02.2017 to 31.08.2018) .

The above time series data will help us to know the position Reliance Scrip with respect to past history. The tools used for data analysis :-

a. Unit root Test for stationary state of data and conversion of non stationary data to stationary state with first difference. b. Hypothesis formulation. c. Granger Causality Test.

EViews is used for data analysis. The above analysis is done based on 2469 data points for the period of 02.09.2008 to 31.08.2018.

4.1. Analysis of Data and Discussion:

TABLE 1
NIFTY 50 and Reliance

Date	NIFTY 50	RELIANCE
02-09-2008	4504	553.188
04-09-2008	4447.75	538.062
05-09-2008	4352.3	520.225
08-09-2008	4482.3	533.3
09-09-2008	4468.7	535.638
10-09-2008	4400.25	520.662
11-09-2008	4290.3	499.35

12-09-2008	4228.45	483.163
15-09-2008	4072.9	471.737
16-09-2008	4074.9	482.013
17-09-2008	4008.25	469.163
18-09-2008	4038.15	484.562
19-09-2008	4245.25	513.775
22-09-2008	4223.05	509.775
23-09-2008	4126.9	501.612
24-09-2008	4161.25	511.525

continued..... till 31.08.2018.(T1)

Different time series data as stated earlier T2 - (02.09.2008 to 31.03.2014), T3 - (02.09.2008 to 22.02.2017), T4 - (01/04/2014 to 31.08.2018), T5 - (01.04.2014 to 22.02.2017), T6 - (02.01.2017 to 31.08.2018), T7 - (23.02.2017 to 31.08.2018) are taken into account for data analysis.

4.1.1. Unit Root Test: At first let us define non - stationary. Considering the simplest stochastic trend model as :-

$$y_t = y_{t-1} + u_t$$

or, $$\Delta y_t = u_t$$

Generalising the concept to consider the case where the series contains more than one "unit root". We need to apply the first difference operator, Δ, more than once to induce stationary.

If a non stationary series, y_t be differenced 'd' times before it becomes stationary then it is said to be integrated of order 'd'.
We write $y_t \sim I(d)$.
So if $y_t \sim I(d)$ then $\Delta^d y_t \sim I(0)$.
An I(0) series is a stationary series. An I(1) series contains one unit root.

$$\text{e.g. } y_t = y_{t-1} + u_t$$

The early and pioneering work on testing for a unit root in time series was done by Dickey and Fuller (Dickey and Fuller 1979, Fuller 1976).

The basic objective of the test is to test the null hypothesis that $\phi = 1$ in:

$$y_t = \phi y_{t-1} + u_t$$

against the one sided alternative $\phi < 1$. So we have :-

H_0 : series contains a root

vs H_A : series is stationary.

And we usually use the regression :

$$\Delta y_t = \psi y_{t-1} + u_t$$

so that test of $\phi = 1$is equivalent to test of $\psi = 0$(since $\phi - 1 = \psi$).
Dickey fuller tests are also known as τ tests : τ, τ_μ, τ_τ.
By computing the Dickey Fuller Test we can write :-

$$\Delta y_t = u_t$$

where $\Delta y_t = y_t - y_{t-1}$, and the alternatives may be expressed as :

$$y_t = \psi y_{t-1} + \mu + \lambda t + u_t$$

where $\mu = \lambda = 0$ in case i), and $\lambda = 0$ in case ii.) and $\psi = \phi - 1$.

In each case , the tests are based on the t - ratio on y_{t-1} term in the estimated regression of Δy_t on y_{t-1} , plus a constant in case ii.) and a constant and a trend in case iii.) and none.

The test statistic is defined by ;

$$\text{test statistic} = \hat{\psi} / SE\hat{}(\hat{\psi})$$

The test statistic does nit follow the usual t - distribution under the null, since the null is one of the non - stationary, but rather follows a non - standard distribution. Critical values are derived from Monte - Carlo experiments in for e.g. , Fuller (1976).

Relevant examples of the distribution are shown in table below :-

Critical Values for the DF Test

Significance Level	*10 %*	*5 %*	*1 %*
C.V for constant but no trend	*-2.57*	*-2.86*	*-3.43*
C.V for constant and trend	*-3.12*	*-3.41*	*-3.96*

Critical values for DF and ADF tests(Fuller, 1976, P373)

The null hypothesis of a unit root is rejected in favor of the stationary alternative in each case if the test statistic is more negative than the critical value.

The test above are only valid if u_t is white noise. In particular, u_t, will be autocorrelated if there was autocorrelation in the dependent variable of the regression (Δy_t) which we have not modelled. The solution is to "augment" the test using p lags of the dependent variable. The alternative model in caase (i) is now written as:

$$\Delta y_t = \psi y_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta y_{t-i} + u_t$$

The same critical values from the DF tables are used as before. A problem arises now in determining the optimal number of lags of the dependent variable.

There are 2 possible ways :

a.) By using the frequency of the data to decide.

b.) By using information criteria.

Phillips - Perron Test:- Phillips and Perron have developed a more complicated theory of unit root non - stationarity. The tests are similar to ADF tests, but they incorporate an automatic correction to the DF procedure to allow auto correlated residuals.

The tests usually gives the same conclusions as the ADF tests and the calculation of test statistic is complex.

Decision Rule:-

If t* > ADF, PP critical value, the decision: not reject null hypothesis, unit root exists, the value series is non - stationary.

If t* > ADF, PP critical value, the decision: reject null hypothesis, unit root does not exists, the value series is stationary.

If ADF, PP value (in absolute terms) < t* critical value (in absolute terms), the decision: not reject null hypothesis, unit root exists, the value series is non - stationary.

If ADF, PP value (in absolute terms) > t* critical value (in absolute terms), the decision: reject null hypothesis, unit root does not exist, the value series is stationary.

TABLE 2

ADF Test for NIFTY 50 at its Level (T1)

Null Hypothesis: NIFTY_50 has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.290238	0.9778
Test critical values:	1% level	-3.432807	
	5% level	-2.862511	
	10% level	-2.567332	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NIFTY_50)
Method: Least Squares
Date: 10/29/18 Time: 17:22
Sample (adjusted): 3 2469
Included observations: 2467 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIFTY_50(-1)	0.000195	0.000671	0.290238	0.7717
D(NIFTY_50(-1))	0.081896	0.020093	4.075862	0.0000
C	1.373401	4.754920	0.288838	0.7727

R-squared	0.006784	Mean dependent var	2.931800
Adjusted R-squared	0.005978	S.D. dependent var	69.30765
S.E. of regression	69.10018	Akaike info criterion	11.31021
Sum squared resid	11765194	Schwarz criterion	11.31727
Log likelihood	-13948.14	Hannan-Quinn criter.	11.31277
F-statistic	8.415064	Durbin-Watson stat	1.994901
Prob(F-statistic)	0.000228		

From the above analysis ADF test in its level it is found that NIFTY 50 has unit root present. So the data is not stationary. We have to convert the data into stationary state. It can be done by taking first difference. In the following table DNIFTY_50 is the first difference unit root test.

TABLE 3

ADF Test for NIFTY 50 at its Level with First Difference(T1)

Null Hypothesis: DNIFTY_50 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-45.73161	0.0001
Test critical values:	1% level	-3.432807	
	5% level	-2.862511	
	10% level	-2.567332	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DNIFTY_50)
Method: Least Squares
Date: 10/29/18 Time: 17:31
Sample (adjusted): 3 2469
Included observations: 2467 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DNIFTY_50(-1)	-0.917853	0.020070	-45.73161	0.0000
C	2.692958	1.392181	1.934344	0.0532

R-squared	0.459000	Mean dependent var	0.024301
Adjusted R-squared	0.458781	S.D. dependent var	93.91003
S.E. of regression	69.08735	Akaike info criterion	11.30943
Sum squared resid	11765596	Schwarz criterion	11.31414
Log likelihood	-13948.18	Hannan-Quinn criter.	11.31114
F-statistic	2091.380	Durbin-Watson stat	1.994930
Prob(F-statistic)	0.000000		

So from the above analysis it is found that there is no unit root present in the first difference.

First difference of NIFTY 50 is stored in DNIFTY_50 where DNIFTY_50 = d(NIFTY_50) in EViews. Similarly DRELIANCE = d(RELIANCE). Lag is chosen automatically by the software.

TABLE 4
ADF Test for RELIANCE at its Level (T1)

Null Hypothesis: RELIANCE has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.537998	0.9994
Test critical values:	1% level	-3.432808	
	5% level	-2.862512	
	10% level	-2.567332	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RELIANCE)
Method: Least Squares
Date: 10/29/18 Time: 17:34
Sample (adjusted): 4 2469
Included observations: 2466 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RELIANCE(-1)	0.002296	0.001493	1.537998	0.1242
D(RELIANCE(-1))	-0.159708	0.020250	-7.886792	0.0000
D(RELIANCE(-2))	-0.055978	0.020240	-2.765741	0.0057
C	-0.839013	0.816234	-1.027907	0.3041

R-squared	0.025690	Mean dependent var	0.292549
Adjusted R-squared	0.024502	S.D. dependent var	12.64679
S.E. of regression	12.49089	Akaike info criterion	7.889498
Sum squared resid	384127.2	Schwarz criterion	7.898922
Log likelihood	-9723.751	Hannan-Quinn criter.	7.892922
F-statistic	21.63851	Durbin-Watson stat	1.997349
Prob(F-statistic)	0.000000		

ADF test in its level analyses that RELIANCE has unit root present. So the data is not stationary. We have to convert the data into stationary state. It can be done by taking first difference. In the following table DRELIANCE is the first difference unit root test.

TABLE 5

ADF Test for RELIANCE at its Level with First Difference(T1)

Null Hypothesis: DRELIANCE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-57.55186	0.0001
Test critical values:	1% level	-3.432807	
	5% level	-2.862511	
	10% level	-2.567332	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DRELIANCE)
Method: Least Squares
Date: 10/29/18 Time: 17:35
Sample (adjusted): 3 2469
Included observations: 2467 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DRELIANCE(-1)	-1.147736	0.019943	-57.55186	0.0000
C	0.328392	0.252006	1.303111	0.1927

R-squared	0.573324	Mean dependent var	-0.007164
Adjusted R-squared	0.573151	S.D. dependent var	19.15326
S.E. of regression	12.51353	Akaike info criterion	7.892309
Sum squared resid	385990.7	Schwarz criterion	7.897020
Log likelihood	-9733.163	Hannan-Quinn criter.	7.894020
F-statistic	3312.217	Durbin-Watson stat	2.012732
Prob(F-statistic)	0.000000		

Here in the above analysis it is found that there is no unit root present in the first difference.

The same test are performed for all the time series data set T2, T3, T4, T5, T6 and T7 and the same result is found i.e. each segregated data set is having unit root present and the data is converted to first difference with no unit root present. So the entire analysis is done by considering the first difference data set for all the segregated data sets.

4.1.2. Granger Causality Test: The Granger causality test, first proposed by Granger , is commonly used to examine causality relationship between two time series variables. It is a statistical hypothesis test in order to determine if one variable affects the other. Technically speaking, x and y are two time-series variables. If “x causes y” by means of a set of statistics, it indicates that the current y can be explained by past values of x and that adding lagged values of x to the model can enhance the explanation. When it comes to the nexus between NIFTY 50 and Reliance stock price we get different results depending on the different time series data. The Granger causality test model reads as follows:

$$y_t = \alpha_0 + \sum_{j=1}^{p} \alpha_j \, y_{t-j} + \sum_{j=1}^{p} \beta_j \, x_{t-j} + \varepsilon_t$$

$$x_t = \alpha_0 + \sum_{j=1}^{p} \alpha_j \, x_{t-j} + \sum_{j=1}^{p} \beta_j \, y_{t-j} + \varepsilon_t$$

The null hypothesis in the first regression is that “x does not Granger cause y”. Similarly, the null

hypothesis in the second equation is that “y does not Granger cause x”.

Technically speaking, the null joint hypothesis is given below.

$H_0 = \beta_1 = \beta_2 = \beta_3 = \ldots\ldots\ldots = \beta_p = 0$

On the other hand, the alternative hypothesis is that at least one estimated parameter is not zero.

It can be given as follows:
H1 : At least one $\beta_j \neq 0$

From the above discussion performing the Granger test for the time series data sets (T1 to T7) we obtain the following results:-

TABLE 6
Granger Test for DNIFTY 50 and DRELIANCE(T1)

Pairwise Granger Causality Tests
Date: 10/29/18 Time: 17:40
Sample: 1 2469
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DRELIANCE does not Granger Cause DNIFTY_50	2466	0.91893	0.3991
DNIFTY_50 does not Granger Cause DRELIANCE		31.9316	2.E-14

From the above Granger Causality test performed, we accept the null hypothesis that DRELIANCE does not Granger Cause DNIFTY_50 as probability is greater than 5% and reject null hypothesis DNIFTY_50 does not granger cause DRELIANCE as probability value is less than 5%. Then we can conclude that in the dataset (02.09.2008 to 31.08.2018) NIFTY 50 price change effects the price change of Reliance Industries limited. But reverse is not true. Unidirectional - Nifty 50 granger cause Reliance.

TABLE 7
Granger Test for DNIFTY 50 and DRELIANCE(T2)

Pairwise Granger Causality Tests
Date: 10/29/18 Time: 18:05
Sample: 1 1379
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DRELIANCE does not Granger Cause DNIFTY_50	1376	0.76739	0.4644
DNIFTY_50 does not Granger Cause DRELIANCE		38.2264	7.E-17

Here from the above Granger Causality test we accept the null hypothesis DRELIANCE does not Granger Cause DNIFTY_50 as probability is greater than 5% and reject null hypothesis DNIFTY_50 does not granger cause DRELIANCE as probability value is less than 5%. Then we can conclude that in the dataset (02.09.2008 to 31.08.2018) NIFTY 50 price change effects the price change of Reliance Industries limited. But reverse is not true. Unidirectional Nifty 50 granger cause Reliance.

TABLE 8
Granger Test for DNIFTY 50 and DRELIANCE(T3)

Pairwise Granger Causality Tests
Date: 10/29/18 Time: 18:23
Sample: 1 2090
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DRELIANCE does not Granger Cause DNIFTY_50	2087	0.26463	0.7675
DNIFTY_50 does not Granger Cause DRELIANCE		42.5624	8.E-19

From the above Granger Causality test we accept the null hypothesis DRELIANCE does not Granger Cause DNIFTY_50 as probability is greater than 5% and reject null hypothesis DNIFTY_50 does not granger cause DRELIANCE as probability value is less than 5%. Then we can conclude that in the dataset (**2/9/2008-22/2/2017**) NIFTY 50 price change effects the price change of Reliance Industries limited. But reverse is not true. Unidirectional Nifty 50 granger cause Reliance.

TABLE 9
Granger Test for DNIFTY 50 and DRELIANCE(T4)

Pairwise Granger Causality Tests
Date: 10/29/18 Time: 18:39
Sample: 1 1090
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DRELIANCE does not Granger Cause DNIFTY_50	1087	1.37631	0.2529
DNIFTY_50 does not Granger Cause DRELIANCE		0.94333	0.3896

From the above Granger Causality test we accept the null hypothesis DRELIANCE does not Granger Cause DNIFTY_50 as probability is greater than 5% and also accept null hypothesis DNIFTY_50 does not granger cause DRELIANCE as probability value is greater than 5%. Then we can conclude that in the dataset (01.04.2014 to 31.08.2018) neither NIFTY 50 price change effects the price change of Reliance Industries limited nor Reliance Industry Limited price change effects the NIFTY50. So granger cause in not seen in the data set so they are independent. This may be the turning point of Reliance Industries growth. As if there is a change in NIFTY 50 there will be no change in Reliance stock price.

To understand whether this time frame is the turning point of growth of reliance industries or not we have take the following time frame and tested the significance.

TABLE 9
Granger Test for DNIFTY 50 and DRELIANCE(T5)

Pairwise Granger Causality Tests
Date: 10/29/18 Time: 19:28
Sample: 1 711
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DRELIANCE does not Granger Cause DNIFTY_50	708	0.65182	0.5214
DNIFTY_50 does not Granger Cause DRELIANCE		1.96865	0.1404

From the above Granger Causality test we accept the null hypothesis DRELIANCE does not Granger Cause DNIFTY_50 as probability is greater than 5% and also accept null hypothesis DNIFTY_50 does not granger cause DRELIANCE as probability value is greater than 5%. Then we can conclude that in the dataset (01/04/2014-22/02/2017) neither NIFTY 50 price change effects the price change of Reliance Industries limited nor Reliance Industry Limited price change effects the NIFTY50. So granger cause in not seen in the data set so they are independent. This is the turning point of Reliance Industries growth. As if there is a change in NIFTY 50 there will be no change in Reliance stock price. Similarly vice-versa.

TABLE 10
Granger Test for DNIFTY 50 and DRELIANCE(T6)

Pairwise Granger Causality Tests
Date: 10/29/18 Time: 18:54
Sample: 1 660
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DRELIANCE does not Granger Cause DNIFTY_50	657	3.17231	0.0426
DNIFTY_50 does not Granger Cause DRELIANCE		1.46186	0.2326

From the above Granger Causality test we reject the null hypothesis DRELIANCE does not Granger Cause DNIFTY_50 as probability is less than 5% and accept null hypothesis DNIFTY_50 does not granger cause DRELIANCE as probability value is greater than 5%. Then we can conclude that in the dataset (02/01/2017-31/08/2018) NIFTY 50 price

change effects does not affect the price change of Reliance Industries limited but Reliance Industry Limited price change effects the NIFTY50. So granger cause in seen in the data set where Reliance granger cause NIFTY 50. As of we have told between (1/4/2014-31/08/2018) is the turning point where neither of Reliance or NIFTY 50 granger cause each other but in this data set we can conclude that Reliance Industry came to a position where price change of Reliance stock price can affect the price change of NIFTY 50. So Reliance Industries Limited is in a good position from 2nd January, 2017 and investors can invest in this stock to get good return.

TABLE 11
Granger Test for DNIFTY 50 and DRELIANCE(T7)

Pairwise Granger Causality Tests
Date: 10/29/18 Time: 19:11
Sample: 1 660
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DRELIANCE does not Granger Cause DNIFTY_50	657	4.26257	0.0145
DNIFTY_50 does not Granger Cause DRELIANCE		2.86873	0.0575

From the above Granger Causality test we reject the null hypothesis DRELIANCE does not Granger Cause DNIFTY_50 as probability is less than 5%(probability is 1.45 %) and accept null hypothesis DNIFTY_50 does not granger cause DRELIANCE as probability value is greater than 5%. Then we can conclude that in the dataset (23/02/2017-31/08/2018) NIFTY 50 price change effects does not affect the price change of Reliance Industries limited but Reliance Industry Limited price change effects the NIFTY50 in a much more effective way as the probability level in this dataset is less than previous data set(probability level 4.26%). So granger cause in seen in the data set where Reliance granger cause NIFTY 50 and is unidirectional. As of we have told between (1/4/2014-31/08/2018) is the turning point where neither of Reliance or NIFTY 50 granger cause each other and in previous dataset/timeframe we have said Reliance Industries Limited is in a good position(from 2nd January, 2017 onwards) and investors can invest in this stock to get good return.

But in this data set we can conclude that Reliance Industry came to a position where the investors can invest in this stock for higher return.

5. Conclusion

From all the above analysis we have performed in the previous section starting from Unit Root Test to Granger Causality test for all the time series data sets defined (T1, T2, T3, T4, T5, T6 and T7), comprises the following conclusion:-

i.) All the segregated data sets have unit root so first difference have been taken for analysis which is stationary. ii.) T1, T2 and T3 data sets implies that NIFTY 50 Granger cause RELIANCE and is unidirectional. iii.) T4 data set represent no Granger Cause between NIFTY 50 and RELIANCE. They are independent of Granger Cause. It may be the turning point of RELIANCE as fluctuation on NIFTY 50 does not affect the price of Reliance stock. The period is in between April '2014 and August '2018. iv.) T5 data set shows same result as of T4 analysis, till February '2017 they are independent. v.) T6 data set represents different picture. From the analysis it is found that RELIANCE Granger Cause NIFTY 50(Unidirectional) so it's the turning point of Reliance Industry's growth which has started from January '2017 just after the change in Government and demonetization. vi.) To sustain with comment on change of government and demonetization, T7 data set analysis constitute the same result and is much more significant that Reliance Granger Cause NIFTY 50(23.02.2017 to 31.08.2018).

Finally we can conclude that though the turning point of growth of Reliance Industry started earlier in 2014-15 but actually it came into effect in the year 2017 just after demonetization and change in government. Currently Reliance Industry is in a very good position and rational investors can invest on Reliance stock for a good return on investment.

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