

Testing The Weak-Form Market Efficiency and Impact of Nation Wide Lockdown on Fmcg & Consumer Durables Companies Indices

Dr. Jutimala Bora¹, Shiv Kumar Sharma²

¹Associate Professor, Department of Commerce, Dibrugarh University, Dibrugarh, Assam, India. Email: jutimalabora@gmail.com

²Assistant Professor, Don Bosco College, Golaghat Assam, India

ARTICLE INFO	ABSTRACT
Received: 18 Dec 2024	Share market efficiency is used by investors for investment decision where they try to gain from the market and gain abnormal return. The study carried out to check the efficiency of National Stock Exchange of India for over fourteen years of index data of nifty50 were analysed for the study. Run test, Augmented Dickey-Fuller (ADF) test and Phillips Perron (PP) test along with Auto Correlation Function is used in the Study. Event Study Methodology was also used in the Study. The Study reveals that National Stock Exchange is inefficient in weak form implying that abnormal return is possible by historical data. FMCG and Consumer Durables historical index data was used to find out the abnormal return during post and pre nationwide lockdown imposed by the central government for the safety of the people. It is reflected in the study that on event date it has significant impact on the both indices.
Revised: 10 Feb 2025	
Accepted: 28 Feb 2025	
Keywords: Consumer Durables, Event Study, FMCG, Lockdown, Unit Root.	

INTRODUCTION

The Indian financial market is expanding in terms of trading volume day by day. The individual investors of the country are also seen to take active part in trading and investing decision as compared to previous time period. The main reason for this boost is involvement of some tech companies for allowing opening of demat, trading account through applications and web based instruction. Which has given boost to small investors to pool up the surplus funds in the financial market. The Indian share market has also outperformed many global market in terms of overall returned, which in turn has generated inquisitiveness among investors and they have started investing. The financial market is composed of two kinds of market, Primary market where new issue or ipo is launched by companies the raise the fresh capital and secondly the secondary market where existing shares are traded. In terms of efficiency the market is divided in three categories: efficient market, semi-strong form and weak-form market efficiency. In efficient market the future share price cannot be predicted. In semi and weak form efficiency the share price can be predicted by analysing the historical share price movements. The investors and can enter the market at bearish trend and exit at bullish trend by booking a handsome profit. The share market involves certain risk some of the risk are systematic while others are unsystematic. Systematic risk is those risk which affects the economy. Unsystematic risk is those risk which affects the individual firm. It is diversifiable in nature whereas unsystematic risk can be diversified by diversifying the portfolio. Nation wise lockdown declaration by the central government is systematic risk as it mends for the entire economy. The lockdown was started on 25th March 2020 it halted the entire nation except the emergency service for twenty-one days.

LITERATURE REVIEW

(Divya.V & Sophia.S. 2017)¹ studies the impact of demonetization on the share price of the IT software companies for three months duration. Event study methodology and time-series analysis technique were used to study the market behaviour and movement for stock market index and share prices. The researcher finds that demonetization

a major event because the whole economy is disrupted. The study reveals that the market was volatile in the starting days of demonetization. Then after it started growing, the growth did not extend to all the companies under study.

(Sharma.P & Sain.M. 2017)² studies the Impact of GST on Indian stock exchanges. The researcher studies the selected stock. The researcher reflects the stock price before and after the event. The study finds that microfinance, lone finance, and ascent finance have negative returns after the GST implementation, demonetization, and waving of agricultural loans. Researchers suggested that GST implementation is a half-hearted attempt by the central government of India to rationalize the indirect tax structure.

(Raja. M & Sudhahar. J. C. 2010)³ studied the Indian stock market efficiency in respect of bonus announcements by IT companies. The test run by the researchers showed that the security prices have a positive reaction to the announcement of bonus issues by the companies. They concluded that the Indian IT sector is efficient but not perfectly efficient to the announcement of a bonus issue of shares.

(Darmayanti.N 2015)⁴ studied to find if there is any direct effect of return on equity, earning per share, and systematic risk on the stock price. The study suggested that Return on Equity ROE and earnings per share EPS are having a dominant influence on the stock price. A systematic risk of t-test shows there is significantly nil effect on the company's stock price of food and beverage as the result of a systematic risk significance of 0.757. Values of r partial profitability for Systematic Risk is -0.046 which reflects there is a negative relationship between Systematic Risk of the selected stock price by 4.6 %.

2.1 Objectives of the Study

- To find the semi-strong market efficiency
- To check the efficiency of market during the Nation Wise Lockdown.
- To study the movement of the share price.

2.2 Hypothesis of the Study

H₀₁: The index Variable is random

H₀₂: The series does not contain unit root

H₀₃: NIFTY 50 follow random walk

H₀₄: Market is efficient.

DATA AND METHODOLOGY

3.1 Area of the Study:

The FMCG sector indexed companies is studied the table shows the list of companies which is used to fulfil the objective of the study. A total of 15 companies are used to form the index by NSE. For Studying the market efficiency index data is taken from 19 December,2007 to 19 Dec. 21. A total of 14 years is used in the study for analysing the semi strong form of market efficiency. The data were collected from the website of NSE.

Table No -1: List of Companies of FMCG and Consumer Durables sector index

	FMCG Index		Consumer Durables	
Sl. No	Company Name	Symbol	Company Name	Symbol
1	Britannia Industries Ltd.	BRITANNIA	Amber Enterprises India Ltd.	AMBER
2	Colgate Palmolive (India) Ltd.	COLPAL	Bata India Ltd.	BATAINDIA
3	Dabur India Ltd.	DABUR	Blue Star Ltd.	BLUESTARCO
4	Emami Ltd.	EMAMILTD	Crompton Greaves Consumer Electricals Ltd.	CROMPTON

	FMCG Index		Consumer Durables	
Sl. No	Company Name	Symbol	Company Name	Symbol
5	Godrej Consumer Products Ltd.	GODREJCP	Dixon Technologies (India) Ltd.	DIXON
6	Hindustan Unilever Ltd.	HINDUNILVR	Havells India Ltd.	HAVELLS
7	ITC Ltd.	ITC	Kajaria Ceramics Ltd.	KAJARIACER
8	Marico Ltd.	MARICO	Orient Electric Ltd.	ORIENTELEC
9	Nestle India Ltd.	NESTLEIND	Rajesh Exports Ltd.	RAJESHEXPO
10	Procter & Gamble Hygiene & Health Care Ltd.	PGHH	Relaxo Footwears Ltd.	RELAXO
11	Radico Khaitan Ltd	RADICO	TTK Prestige Ltd.	TTKPRESTIG
12	Tata Consumer Products Ltd.	TATACONSUM	Titan Company Ltd.	TITAN
13	United Breweries Ltd.	UBL	V-Guard Industries Ltd.	VGUARD
14	United Spirits Ltd.	MCDOWELL-N	Voltas Ltd.	VOLTAS
15	Varun Beverages Ltd.	VBL	Whirlpool of India Ltd.	WHIRLPOOL

Source: www.1.nseindia.com ⁵

3.2 Tools of the Study:

Descriptive and inferential statistics is used in the study. The descriptive statistics is used to describe the characteristics of the data. Event Analysis Methodology is also used for the study. To study the semi- strong market efficiency, the following test is used.

Run Test is used to test the randomness of the time series data. The null hypothesis of the test is that the observed series is a random variable. When the Z value is more than + 1.96 at a 5 percent level of significance, it rejects the null hypothesis. The test is non-parametric and independent of the normality and constant variance of given data.

Unit Root Test is employed to determine whether a time series variable is non-stationary and to assess the stationarity of time series data. The Phillips Perron (PP) test and the Augmented Dickey-Fuller (ADF) test are the most often utilized unit root tests for determining stationarity. The null hypothesis in both tests is that there is a unit root. The series contains a unit root if it is nonstationary and its initial difference is stationary.

Autocorrelation Function (ACF) is used to determine the correlation of time series data with itself. It measures the amount of linear relationship between observations in a time series data that are separated by time lag.

Event Study Methodology

In studying significant events like budgetary announcements, election, pandemics, interest rate fluctuations of banks, a market crash event study methodology is widely used. For the study 160 days estimation window is used along with (+20,-20) days of pre and post event. The event which is under study is Nationwide lock down. To carrying out event study methodology, the following is applicable

Daily Return is calculated using logarithm method

$$R_t = \log P_t / (P_{t-1})$$

Where,

R_t = Market return of the period t

P_t = Closing price of Index at day t

P_{t-1} = Closing price of index at day t-1

Log = Natural Log

Daily expected return is estimated using Market Model for each index as follows

$$E(R_{it}) = \alpha + \beta (r_m)$$

Where,

$E(R_{it})$ = Expected return on index i on day t

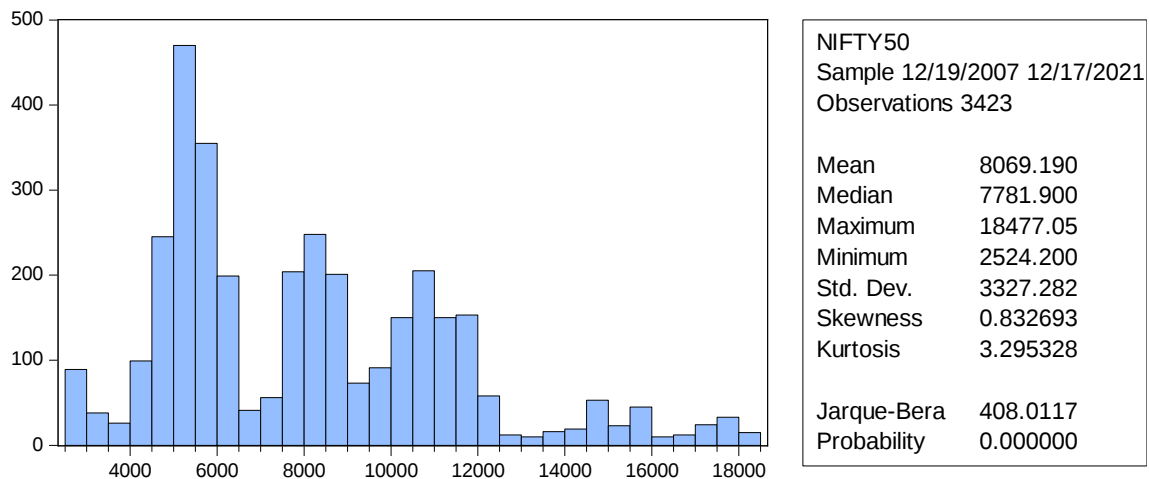
α = Alpha Value

β = Beta Value

r_m = return on the market on day t

RESULTS AND DISCUSSION

Table-2: Descriptive Statistics



Source: Author's Calculation

Table -3: Run Test

Runs Test	
	Close
Test Value ^a	7781.90
Cases < Test Value	1711
Cases >= Test Value	1712
Total Cases	3423
Number of Runs	30
Z	-57.523
Asymp. Sig. (2-tailed)	.000
a. Median	

Source: Author's Calculation

Table-2 shows the descriptive statistics with time period of the data along with the sample mean, median, maximum, minimum, Standard deviation, skewness, kurtosis, Jarque-Bera statistics, probability, and observation value. Table -3 reflects the p-value of NSE which is less than 0.05 as well as Z values are more than +1.96. So **H₀₁: The Variable is random** null hypothesis is rejected at 5 percent level of significance. NSE do not follow random walk during this period, thus implying that NSE is weak form inefficient.

Unit Root Test

Augmented Dickey-Fuller (ADF) Test

Level

Null Hypothesis: CLOSE has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic - based on SIC, maxlag=10)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.103435	0.9976
Test critical values:	1% level	-3.432091	
	5% level	-2.862195	
	10% level	-2.567162	
*MacKinnon (1996) one-sided p-values.			

First Difference

Null Hypothesis: D(CLOSE) has a unit root			
Exogenous: Constant			
Lag Length: 6 (Automatic - based on SIC, maxlag=10)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-20.31490	0.0000
Test critical values:	1% level	-3.432221	
	5% level	-2.862252	
	10% level	-2.567193	
*MacKinnon (1996) one-sided p-values.			

ADF test for data stationarity in both first difference and level form. The p-value indicates that the series is non-stationary at level form for both the BSE and NSE, but it is stationery in the first difference. This indicates that the unit root is present in the time series data. Thus, it may be said that neither the BSE nor the NSE follow a random walk. During this time, the markets are thought to be weak and inefficient.

Phillips Perron (PP) Test

Level

Null Hypothesis: CLOSE has a unit root			
Exogenous: Constant			
Bandwidth: 10 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	Prob.*

Phillips-Perron test statistic		1.019239	0.9969
Test critical values:	1% level	-3.432091	
	5% level	-2.862195	
	10% level	-2.567162	
*MacKinnon (1996) one-sided p-values.			

First Difference

Null Hypothesis: D(CLOSE) has a unit root			
Exogenous: Constant			
Bandwidth: 9 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-56.69345	0.0001
Test critical values:	1% level	-3.432109	
	5% level	-2.862203	
	10% level	-2.567167	
*MacKinnon (1996) one-sided p-values.			

Phillip Perron test rejects the null hypothesis. **Ho2:** *The series does not contain unit root.* The market data of NSE is non-stationary in level form whereas at first difference level it is stationary. This it implies NSE do not follow random walk and can be said as weak form inefficient.

Table- 4: Auto Correlation Function (ACF)

Autocorrelations					
Lag	Autocorrelation	Std. Error ^a	Box-Ljung Statistic		
			Value	df	Sig. ^b
1	.991	.017	3398.277	1	.000
2	.990	.017	6786.247	2	.000
3	.988	.017	10164.503	3	.000
4	.987	.017	13532.923	4	.000
5	.986	.017	16893.367	5	.000
6	.983	.017	20241.200	6	.000
7	.982	.017	23579.772	7	.000
8	.980	.017	26908.180	8	.000
9	.979	.017	30226.575	9	.000
10	.977	.017	33536.381	10	.000
11	.976	.017	36836.233	11	.000
12	.974	.017	40126.322	12	.000

13	.972	.017	43405.716	13	.000
14	.971	.017	46675.328	14	.000
15	.969	.017	49935.170	15	.000
16	.967	.017	53184.902	16	.000
a. The underlying process assumed is independence (white noise).					
b. Based on the asymptotic chi-square approximation.					

Source: Author's Calculation

Table 4, shows the ACF which reflects a high degree of dependence on previous series data when lag is low. However, as the lag is increased the dependence is decreased. Autocorrelation values are ranging between .991 and .967. For a market to be efficient in weak form the autocorrelation should be around Zero. For the studied period no correlation is found to be Zero thus implying that the market is inefficient in weak form.

Table No-5: AR of FMCG and Consumer Durables with t-statistics during Pre and Post Event Period

Days	AR-FMCG	t-Statistics	AR - Consumer Durables	t-Statistics	Days	AR - FMCG	t-Statistics	AR - - Consumer Durables	t-Statistics
-20	0.0032	0.5891	-0.0191	-1.9248	1	0.0183	3.3383*	-0.0104	-1.0476
-19	0.0010	0.1769	0.0048	0.4867	2	0.0010	0.1798	-0.0081	-0.8160
-18	0.0032	0.5768	0.0107	1.0784	3	0.0330	6.0336*	0.0082	0.8329
-17	0.0050	0.9129	0.0190	1.9156	4	0.0277	5.0531*	0.0226	2.2786*
-16	-0.0017	-0.3098	0.0112	1.1302	5	-0.0075	-1.3775	0.0244	2.4672*
-15	-0.0027	-0.4931	-0.0252	-2.5417*	6	0.0213	3.8909*	0.0686	6.9210*
-14	-0.0025	-0.4640	-0.0264	-2.6695*	7	0.0197	3.6068*	-0.0915	-9.2337*
-13	0.0087	1.5921	-0.0102	-1.0329	8	0.0043	0.7852	-0.0004	-0.0374
-12	-0.0020	-0.3737	-0.0470	-4.7470*	9	-0.0257	-4.6887*	-0.0174	-1.7617
-11	0.0057	1.0463	0.0471	4.7547*	10	-0.0071	-1.2908	0.0154	1.5547
-10	0.0011	0.1926	-0.0589	-5.9482*	11	0.0444	8.1063*	-0.0005	-0.0486
-9	-0.0090	-1.6489	0.0469	4.7359*	12	-0.0116	-2.1139*	-0.0395	-3.9885*
-8	-0.0221	-4.0390*	-0.0729	-7.3609*	13	-0.0311	-5.6749*	-0.0048	-0.4894
-7	-0.0028	-0.5107	0.0082	0.8258*	14	-0.0201	-3.6800*	-0.0016	-0.1601
-6	0.0259	4.7335*	0.0383	3.8650*	15	0.0171	3.1204*	0.0032	0.3281
-5	0.0113	2.0728*	-0.0807	-8.1481*	16	0.0086	1.5710	-0.0026	-0.2651
-4	0.0101	1.8454*	0.0143	1.4424	17	-0.0229	-4.1764*	0.0071	0.7161
-3	0.0386	7.0546*	0.0031	0.3120	18	0.0076	1.3821	0.0032	0.3220
-2	-0.0104	-1.9021*	0.1404	14.1783*	19	0.0034	0.6175	-0.0129	-1.2975
-1	0.0148	2.7114*	-0.0094	-0.9447	20	-0.0161	-2.9336*	-0.0233	-2.3485*

0	-0.0227	-4.1455*	-0.0733	-7.4045*					
* Significant at 5% level.									

Source: Author Calculation.

Table No-5: showing the event day generated an AR of -0.0227 percent which is significant at a 5 percent level. The ARs of FMCG Index before the pandemic declaration period from -20 days to -1 day is positive for 12 days out of 20 days and is negative for the other 8 days. The AAR is significant at 5 percent level on -1 day, -2, -3, -4, -5, -6, -8th day having a positive return on 5 occasion out of 6 occasions. On the event day of starting of lockdown AR of the selected company indices consisting of negative return -0.0227 at 5 percent level of significance. Post event have AR 12 days of positive return out of 20 days.

The ARs of Consumer Durables index before the pandemic declaration period from -20 days to -1 day is positive for 11 days out of 20 days and is negative for the other 9 days. The AAR is significant at 5 percent level on -2, -5, -6, -7, -8, -9, -10, -11, -12, -14, -15th day having a positive return on 5 occasion out of 11 occasions. On the event day of starting of lockdown AR of the index consisting of negative return -0.0733 at 5 percent level of significance. Post event have AR 12 days of positive return out of 20 days.

CONCLUSION

The market efficiency reflects if an investor can earn abnormal return by analysing the historical market data. The study concludes that from NSE, investors can earn abnormal return as the market is inefficient. The Augmented Dickey-Fuller (ADF) Test Phillip perron test results show that market doesn't follow random walk. The event of nationwide lockdown has significant impact on the event date on the index of FMCG and Consumer Durables. It reflects that investors were able to earn abnormal returns.

REFERENCES

- [1] Divya V, Sharon Sophia (2017) Impact of Demonetization on Stock Market Return. Amity Journal of Finance 2 (2), 14-34.
- [2] Priyanshu Sharma, Dr Manoj Sain (2017) A Review of Goods and Services Tax (GST): Impact on Indian Stock exchanges and various stock Sectors. International Journal of Scientific Research and Management (IJSRM), 5(11), 7418-7422.
- [3] Raja. M, Sudhahar.J. C (2010) An empirical test of Indian stock market efficiency in respect of bonus announcement. Asia Pacific Journal of Finance and Banking Research, 4(4), 1-14.
- [4] Novi Darmayanti (2015) The Effect of Systematic Risk Model of Fundamental and Stock Company Study Food and Beverage Firm Listing in Indonesia Stock Exchange (BEI) Year 2008 – 2012. Research Journal of Finance and Accounting, 6(9), 113-127.
- [5] NSE - National Stock Exchange of India Ltd. (n.d.). Retrieved December 19, 2021, from https://www1.nseindia.com/products/content/equities/indices/sectoral_indices.htm