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Anamolies in Indian Stock Market

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Abstract:
The efficient-market hypothesis (EMH) is unique and necessary economic and money hypotheses that are tested over the past century. Because of many abnormal phenomena and conflicting proof, otherwise referred to as anomalies against EMH, some intellectuals have questioned whether or not EMH is valid, and has substantial proof of anomalies, so several theories are developed to clarify some anomalies. This review is helpful to Intellectuals for developing up-to-date treatments of monetary theory that EMH, anomalies, and behavioral Finance underlie. The review is additionally useful to investors for creatingselections of investment merchandise and methods that suit their risk preferences and behavioural traits foreseen from behavioural models. Finally, when EMH, anomalies and behavioural Finance square measure wont to justify the impacts of capitalist behaviour on stock value movements, it's priceless to policy manufacturers, once reviewing their policies, to avoid excessive fluctuations available markets.

Key Words:
capitalist behavior , conflicting proof,excessive fluctuations , anomalies,Calendar impact

Introduction

About Anamolies

A market anomaly is a price action that contradicts the expected behaviour of the stock market. Some financial anomalies appear only once and disappear, but others appear consistently throughout historical chart analysis. Traders and investors can use these unusual market behaviours to find opportunities throughout the stock market. We take a look at some of the most common anomalies, how behavioural finance theory explains their reoccurrence and the ways traders can take advantage of the unusual market.

1. Calendar Effects
2. Holiday Effects
3. Budget Effects

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EFFICIENT MARKET THEORY

In an efficient market, price of each share is independent of the previous price. Prices are influenced by the equilibrium of demand and supply.Efficient Market Hypothesis (EMH) is based on the fundamentals that markets are efficient and prices make an independent movement in these markets.This hypothesis is also called 'Random Walk Hypothesis'. According to this hypothesis, prices get affected by the demand and supply position.Prices reflect equilibrium position of the demand and supply and these show a wide fluctuation, only on account of disequilibrium in the demand and supply position.

Forms Of Market Efficiency

1. Weak form of Efficient Market Theory
2. Semi-Strong form of Efficient Theory
3. Strong form of Efficient Theory

- **Weak form of Efficient Market Theory**

The week form of market holds that present stock market prices reflect all known information with respect to past stock prices, trends, and volumes. This form of theory is just the opposite of the technical analysis because according to it, the sequence of prices occurring historically does not have any value for predicting the future stocks prices. The technical analysts rely completely on charts and past behavior of prices of stocks.Researchers have studied that the evidence which supports the efficient market behavior is based on the random walk behavior of security prices but there is evidence which contradicts the random walk hypothesis. This does not mean that it contradicts the efficient market hypothesis also.

Two types of tests have been commonly employed to empirically verify the weak-form efficient market hypothesis:

1. Run Tests
2. Serial Correlation Tests

- **Semi-Strong form of Efficient Market Theory**

The semi strong form of the EMH centers on how rapidly and efficiently market prices adjust to new publicly available information. In this state, the market reflects even those forms of information which may be concerning the announcement of a firm's most recent earnings forecast and adjustments which will have taken place in the prices of security.The investor in the semi-strong form of the market will find it impossible to earn a return on the portfolio which is based on the publicly available information in excess of the return which may be said to be commensurate with the portfolio risk.Many empirical studies have been made on the semi-strong form of the efficient market hypothesis to study the reaction of security prices to various types of information around the announcement time of the information.

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- **Strong Form of Efficient Market Theory**

  This market hypothesis holds that all available information, public or private, is reflected in the stock prices. The strong form is concerned with whether or not certain individuals or groups of individuals possess inside information which can be used to make above average profits. If the strong form of the efficient capital market hypothesis holds, then and day is as good as any other day to buy any stock. This the most extreme form of the EMH. Most of the research work has indicated that the efficient market hypothesis in the strongest form does not hold good.

LITERATURE REVIEW

The hypothesis seeks to clarify however market potency are often delineate and tested inside 3 categories: the weak-form potency, semi-strong potency, and strong-form potency. However, Fama describes AN economical security market as a market wherever costs absolutely replicate all on the market data. Moreover, Fama argues that costs in AN economical market ought to follow a stochastic process and therefore creating it not possible to predict future security costs exploitation solely historical security value knowledge.

The term 'Anomaly' are some things that doesn't follow a regular pattern or in alternative words, deviates from what's expected. Similarly, existence of anomalies has been evidenced within the money markets yet. Although several analysis are done keeping stress on the western exchange indices, this paper tries to check not solely the presence of market anomalies in context to the Indian stock exchanges, however conjointly study the anomalies in terms of the Foreign Stock Exchanges. Anomalies are often delineate as 75odern75eing valuebehaviour within the market. The day-of-the-week impact is one type of a seasonal anomaly and it's one in every of the foremost heavily investigated topics. Early studies, like Cross (1973) and French (1980), have shown that there exists a negative Mon impact, which means basically that mean returns on Mondays square measure negative. The existence of this impact contradicts to the EMH, suggesting that there ought to be no evident pattern of come back within the market. Moreover, this might provide investors an opening to earn positive risk-adjusted returns (RAR). More 75odern studies, like Steeley (2001) and Kohers et al. (2004) suggests that the stock markets square measure a lot of economical these days, inflicting the day-of-the-week impact to slowly disappear.

Market anomalies, delineate as surprising value behaviour within the equity market are AN extensively studied field over the past forty years. Probably, investors might benefit of such mispricing so as to earn abnormal returns. Significantly, the group action prices and time variable exchange risk premiums got to be taken under consideration which can offset the potential gains from such a commerce strategy. Hence, a market that seems to be inefficient may very well be economical if one takes the group action prices and time-varying stock risk premiums under consideration. In capital markets, as well as the exchange, anomalies are often delineate as a deviation from the prediction in step with the economical Market Hypothesis.

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Calendar impact is on the majorly proverbial anomalies within the money markets. The January impact is one in every of the anomalies, whereverin the stocks that typically performed weak within the finish of the year (Previous), typically tend to rebound in January (Nicholas Molar, 2007). However, if we tend to take into account the case of the Indian exchange, the argument in favor of January impact are discarded and also the overall findings states that Gregorian calendar month & Gregorian calendar month months are often a lot of necessary to the investors rather than January once it involves the Indian stock exchanges (Kiran Mehta, Ramesh Chander, 2009)

Day of the week impact is another anomaly that's known, that states that stocks tend to try to to higher on weekday than that on Mon. The existence of the day of the week impact was found from 1950's to 1970's for traditional & Poor's Index. In addition, in later studies, the day of the week impact was tested for various markets and periods. These studies were sorted in step with markets. Presence of day of the week impact is certainly there within the Indian stock markets but here, in contrast to that of western stock markets, BSE & NSE incorporates a positive come back on Mon whereas weekday returns square measure negative. (Mahendra rule, Damini Kumar, 2006).

OBJECTIVE

The main objective of doing this paper is to find out whether there is an ARCH, GARCH, E-GARCH effect on Indian Stock Indices. The Indian Stock Indices which I have taken in this project are:

1. Nifty 500
2. Nifty 50
3. BSE- SENSEX

10 years data of these three stock indices and perform the tests on them to know that whether the stock indices are being affected by the following effects.

Research Objectives

Also, have found out the effects of Anamolies in these Stock Indices by taking the average returns of last 10 Years on the following Events:

1. New Year
2. Republic Day
3. Independence Day
4. On the Day of Budget

RESULTS ON NIFTY 500

Holiday and Festival Effects

NEW YEAR ANNUAL RETURNS

Date	Month	Daily	Annually
26	12	0.05%	13.22%
27	**12**	**0.43%**	**108.02%**
28	**12**	**0.61%**	**151.89%**
29	**12**	**0.42%**	**105.92%**
30	12	0.14%	35.25%

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31	12	0.30%	73.79%
1	1	0.30%	74.81%
2	1	0.05%	13.24%
3	1	0.14%	35.80%
4	1	0.12%	31.08%
5	**1**	**0.49%**	**122.24%**

REPUBLIC DAY ANNUAL RETURNS

20	1	-0.25%	-63.31%
21	1	-0.20%	-50.48%
22	1	0.08%	19.68%
23	1	0.29%	72.76%
24	**1**	**-0.59%**	**- 148.31%**
25	1	0.19%	47.86%
26	1	#DIV/0!	#DIV/0!
27	**1**	**-0.63%**	**- 158.64%**
28	1	-0.31%	-76.42%
29	1	0.11%	26.46%
30	**1**	**-0.54%**	**- 135.59%**
31	1	0.19%	47.27%

INDEPENDENCE DAY ANNUAL RETURNS

11	8	-0.10%	-24.35%
12	8	0.32%	79.13%
13	8	0.03%	6.41%
14	**8**	**0.74%**	**184.07%**
15	8	#DIV/0!	#DIV/0!
16	**8**	**-0.48%**	**- 120.37%**
17	8	0.25%	61.70%
18	**8**	**0.42%**	**105.19%**
19	8	-0.06%	-15.64%
20	**8**	**-0.47%**	**- 116.79%**
26	9	0.16%	40.70%

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BUDGET EFFECTS ANNUAL RETURNS

Budget Effects Average 10 Years			
Date	**Month**	**Daily**	**Annually**
21	1	-0.20%	-50.48%
22	1	0.08%	19.68%
23	1	0.29%	72.76%
24	**1**	**-0.59%**	**-148.31%**
25	1	0.19%	47.86%
26	1	#DIV/0!	#DIV/0!
27	**1**	**-0.63%**	**-158.64%**
28	1	-0.31%	-76.42%
29	1	0.11%	26.46%
30	**1**	**-0.54%**	**-135.59%**
31	1	0.19%	47.27%
1	**2**	**1.04%**	**260.20%**
2	2	-0.05%	-11.79%
2	2	-0.05%	-11.79%
3	**2**	**-0.72%**	**-181.20%**

ARCH EFFECT ON NIFTY 500

Hypothesis Question

H0: There is no Significant effect of ARCH, GARCH and E-GARCH

H1: There is ARCH effect of ARCH, GARCH and E-GARCH

Null Hypothesis: LOG_RETURNS has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-17.31063	0.0000
Test critical values:	1% level	-3.432814	
	5% level	-2.862514	
	10% level	-2.567334	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_RETURNS)
Method: Least Squares
Date: 05/08/22 Time: 15:12
Sample (adjusted): 5/07/2012 4/22/2022
Included observations: 2460 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_RETURNS(-1)	-0.872989	0.050431	-17.31063	0.0000
D(LOG_RETURNS(-1))	-0.084502	0.046659	-1.811043	0.0703
D(LOG_RETURNS(-2))	-0.083466	0.043265	-1.929193	0.0538
D(LOG_RETURNS(-3))	-0.066220	0.038819	-1.705858	0.0882
D(LOG_RETURNS(-4))	-0.078688	0.033901	-2.321141	0.0204
D(LOG_RETURNS(-5))	0.001608	0.027913	0.057616	0.9541
D(LOG_RETURNS(-6))	-0.083336	0.020135	-4.138857	0.0000
C	0.000462	0.000213	2.167706	0.0303

R-squared	0.496196	Mean dependent var	3.41E-06
Adjusted R-squared	0.494757	S.D. dependent var	0.014769
S.E. of regression	0.010498	Akaike info criterion	-6.272076
Sum squared resid	0.270214	Schwarz criterion	-6.253189
Log likelihood	7722.654	Hannan-Quinn criter.	-6.265213
F-statistic	344.9953	Durbin-Watson stat	1.995655
Prob(F-statistic)	0.000000		

Since the P-Value is less than 0.05, Therefore there is no root in the data. Hence the data is Stationarity.

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Heteroskedasticity Test: ARCH

F-statistic	54.32444	Prob. F(1,2464)	0.0000
Obs*R-squared	53.19572	Prob. Chi-Square(1)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/08/22 Time: 15:17
Sample (adjusted): 4/26/2012 4/22/2022
Included observations: 2466 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.57E-05	1.02E-05	9.428166	0.0000
RESID^2(-1)	0.146872	0.019927	7.370512	0.0000

R-squared	0.021572	Mean dependent var	0.000112
Adjusted R-squared	0.021175	S.D. dependent var	0.000497
S.E. of regression	0.000492	Akaike info criterion	-12.39646
Sum squared resid	0.000596	Schwarz criterion	-12.39175
Log likelihood	15286.84	Hannan-Quinn criter.	-12.39475
F-statistic	54.32444	Durbin-Watson stat	2.079475
Prob(F-statistic)	0.000000		

Since the P-Value is less than 0.05, Hence there is an ARCH effect in the data.

GARCH EFFECT ON NIFTY 500

Dependent Variable: LOG_RETURNS
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 05/08/22 Time: 15:25
Sample (adjusted): 4/25/2012 4/22/2022
Included observations: 2467 after adjustments
Convergence achieved after 26 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000759	0.000174	4.353341	0.0000
		Variance Equation		
C	3.79E-06	6.74E-07	5.613309	0.0000
RESID(-1)^2	0.098543	0.008717	11.30434	0.0000
GARCH(-1)	0.864988	0.013531	63.92812	0.0000

R-squared	-0.000524	Mean dependent var	0.000517
Adjusted R-squared	-0.000524	S.D. dependent var	0.010592
S.E. of regression	0.010595	Akaike info criterion	-6.526295
Sum squared resid	0.276796	Schwarz criterion	-6.516873
Log likelihood	8054.185	Hannan-Quinn criter.	-6.522872
Durbin-Watson stat	1.939394		

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1. P-value of RESID(-1)^2 i.e. ARCH should be less than 0.05.
2. P- value of GARCH(-1) should be less than 0.05.
3. The coefficient if ARCH and GARCH should be positive.
4. Coefficient of sum of ARCH and GARCH should be greater than than 0 but less than 1.

Since all the conditions are fulfilled, Hence, we can say that there is a presence of ARCH-GARCH Effect.

E-GARCH EFFECT ON NIFTY 500

Dependent Variable: LOG_RETURNS
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 05/08/22 Time: 15:30
Sample (adjusted): 4/25/2012 4/22/2022
Included observations: 2467 after adjustments
Convergence achieved after 38 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(2) + C(3)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(4)*RESID(-1)/@SQRT(GARCH(-1)) + C(5)*LOG(GARCH(-1))

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000408	0.000166	2.464260	0.0137
		Variance Equation		
C(2)	-0.458762	0.046660	-9.832085	0.0000
C(3)	0.138232	0.016816	8.220291	0.0000
C(4)	-0.113152	0.007257	-15.59146	0.0000
C(5)	0.962271	0.004267	225.5077	0.0000

R-squared	-0.000105	Mean dependent var	0.000517
Adjusted R-squared	-0.000105	S.D. dependent var	0.010592
S.E. of regression	0.010592	Akaike info criterion	-6.564441
Sum squared resid	0.276680	Schwarz criterion	-6.552664
Log likelihood	8102.237	Hannan-Quinn criter.	-6.560162
Durbin-Watson stat	1.940207		

In E-GARCH the most important term is C(4) which is also known as Leverage Term.

1. The Coefficient of C(4) must be negative.
2. The P-value should be smaller than 0.05.

Since all the conditions are fulfilled, Hence, we can say that there is a presence of E-GARCH Effect which means that the negative news influences more than the positive news.
Hence we will reject the NULL HYPOTHESIS and accept the ALTERNATIVE HYPOTHESIS.

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RESULTS ON NIFTY 50

Holiday and Festival Effects

NEW YEAR ANNUAL RETURNS

Date	Month	Daily	Annually
26	12	0.09%	22.44%
27	**12**	**0.44%**	**109.07%**
28	**12**	**0.55%**	**137.80%**
29	12	0.38%	94.59%
30	12	0.09%	22.82%
31	12	0.17%	42.97%
1	1	-0.12%	-29.22%
2	1	0.26%	66.13%
3	1	0.04%	9.10%
4	1	0.18%	45.26%
5	1	0.40%	99.09%
6	**1**	**-1.09%**	**- 271.28%**

REPUBLIC DAY ANNUAL RETURNS

21	1	-0.09%	-22.33%
22	1	0.06%	14.27%
23	1	0.34%	85.00%
24	1	-0.40%	-99.21%
25	1	0.23%	57.73%
26	1	#DIV/0!	#DIV/0!
27	**1**	**-0.68%**	**- 170.00%**
28	1	-0.38%	-95.25%
29	1	0.19%	47.09%
30	**1**	**-0.56%**	**- 138.86%**
31	1	0.19%	47.06%

INDEPENDENCE DAY ANNUAL RETURNS

10	8	-0.33%	-82.65%
11	8	-0.07%	-18.21%
12	8	0.35%	88.69%
13	8	0.11%	28.31%
14	**8**	**0.67%**	**167.65%**

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15	8	#DIV/0!	#DIV/0!
16	**8**	**-0.55%**	**-138.08%**
17	8	0.16%	39.47%
18	8	0.29%	73.57%
19	8	-0.15%	-37.02%
20	**8**	**-0.45%**	**-113.33%**
26	9	0.06%	15.87%
27	**9**	**-0.55%**	**-137.53%**
28	9	0.20%	48.80%

<u>BUDGET EFFECTS ANNUAL RETURNS</u>

Date	Month	Daily	Annually
21	1	-0.09%	-22.33%
22	1	0.06%	14.27%
23	1	0.34%	85.00%
24	1	-0.40%	-99.21%
25	1	0.23%	57.73%
26	1	#DIV/0!	#DIV/0!
27	**1**	**-0.68%**	**-170.00%**
28	1	-0.38%	-95.25%
29	1	0.19%	47.09%
30	**1**	**-0.56%**	**-138.86%**
31	1	0.19%	47.06%
1	**2**	**1.08%**	**270.33%**
2	2	0.01%	2.77%
2	2	0.01%	2.77%

<u>ARCH EFFECT ON NIFTY 50</u>

H0: There is no Significant effect of ARCH, GARCH and E-GARCH

H1: There is ARCH effect of ARCH, GARCH and E-GARCH

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Null Hypothesis: LOG_RETURNS has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-17.57270	0.0000
Test critical values:	1% level	-3.432814	
	5% level	-2.862514	
	10% level	-2.567334	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_RETURNS)
Method: Least Squares
Date: 05/08/22 Time: 15:37
Sample (adjusted): 5/07/2012 4/22/2022
Included observations: 2460 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_RETURNS(-1)	-0.923787	0.052569	-17.57270	0.0000
D(LOG_RETURNS(-1))	-0.064974	0.048533	-1.338758	0.1808
D(LOG_RETURNS(-2))	-0.076335	0.044886	-1.700623	0.0891
D(LOG_RETURNS(-3))	-0.065890	0.040083	-1.643824	0.1003
D(LOG_RETURNS(-4))	-0.081686	0.034781	-2.348552	0.0189
D(LOG_RETURNS(-5))	0.005626	0.028370	0.198302	0.8428
D(LOG_RETURNS(-6))	-0.079505	0.020146	-3.946377	0.0001
C	0.000457	0.000219	2.089789	0.0367

R-squared	0.512977	Mean dependent var	2.85E-06
Adjusted R-squared	0.511586	S.D. dependent var	0.015404
S.E. of regression	0.010765	Akaike info criterion	-6.221729
Sum squared resid	0.284167	Schwarz criterion	-6.202842
Log likelihood	7660.727	Hannan-Quinn criter.	-6.214866
F-statistic	368.9522	Durbin-Watson stat	1.993966
Prob(F-statistic)	0.000000		

Since the P-Value is less than 0.05, Therefore there is no root in the data. Hence the data is Stationarity.

Heteroskedasticity Test: ARCH

F-statistic	80.52176	Prob. F(1,2464)	0.0000
Obs*R-squared	78.03693	Prob. Chi-Square(1)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/08/22 Time: 15:40
Sample (adjusted): 4/26/2012 4/22/2022
Included observations: 2466 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.70E-05	1.06E-05	9.111828	0.0000
RESID^2(-1)	0.177890	0.019824	8.973392	0.0000

R-squared	0.031645	Mean dependent var	0.000118
Adjusted R-squared	0.031252	S.D. dependent var	0.000524
S.E. of regression	0.000516	Akaike info criterion	-12.30076
Sum squared resid	0.000656	Schwarz criterion	-12.29604
Log likelihood	15168.83	Hannan-Quinn criter.	-12.29904
F-statistic	80.52176	Durbin-Watson stat	2.108279
Prob(F-statistic)	0.000000		

Since the P-Value is less than 0.05, Hence there is an ARCH effect in the data.

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GARCH EFFECT ON NIFTY 50

Dependent Variable: LOG_RETURNS
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 05/08/22 Time: 15:45
Sample (adjusted): 4/25/2012 4/22/2022
Included observations: 2467 after adjustments
Convergence achieved after 22 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000751	0.000169	4.446249	0.0000
Variance Equation				
C	2.46E-06	5.39E-07	4.562879	0.0000
RESID(-1)^2	0.093507	0.008190	11.41724	0.0000
GARCH(-1)	0.885080	0.011364	77.88230	0.0000

R-squared	-0.000610	Mean dependent var	0.000482
Adjusted R-squared	-0.000610	S.D. dependent var	0.010863
S.E. of regression	0.010866	Akaike info criterion	-6.515006
Sum squared resid	0.291178	Schwarz criterion	-6.505584
Log likelihood	8040.260	Hannan-Quinn criter.	-6.511583
Durbin-Watson stat	2.005405		

1. P-value of RESID(-1)^2 i.e. ARCH should be less than 0.05.
2. P- value of GARCH(-1) should be less than 0.05.
3. The coefficient if ARCH and GARCH should be positive.
4. Coefficient of sum of ARCH and GARCH should be greater than than 0 but less than 1.

Since all the conditions are fulfilled, Hence, we can say that there is a presence Of GARCH Effect.

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E-GARCH EFFECT ON NIFTY 50

Dependent Variable: LOG_RETURNS
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 05/08/22 Time: 15:54
Sample (adjusted): 4/25/2012 4/22/2022
Included observations: 2467 after adjustments
Convergence achieved after 40 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(2) + C(3)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(4)*RESID(-1)/@SQRT(GARCH(-1)) + C(5)*LOG(GARCH(-1))

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000372	0.000164	2.267390	0.0234
Variance Equation				
C(2)	-0.356169	0.038770	-9.186625	0.0000
C(3)	0.131376	0.016149	8.135305	0.0000
C(4)	-0.116017	0.007499	-15.47063	0.0000
C(5)	0.972637	0.003553	273.7209	0.0000

R-squared	-0.000103	Mean dependent var	0.000482
Adjusted R-squared	-0.000103	S.D. dependent var	0.010863
S.E. of regression	0.010864	Akaike info criterion	-6.557735
Sum squared resid	0.291030	Schwarz criterion	-6.545959
Log likelihood	8093.967	Hannan-Quinn criter.	-6.553457
Durbin-Watson stat	2.006422		

In E-GARCH the most important term is C(4) which is also known as Leverage Term.

1. The Coefficient of C(4) must be negative.
2. The P-value should be smaller than 0.05.

Since all the conditions are fulfilled, Hence, we can say that there is a presence of E-GARCH Effect which means that the negative news influences more than the positive news.
Hence we will reject the NULL HYPOTHESIS and accept the ALTERNATIVE HYPOTHESIS.

RESULTS ON BSE-SENSEX

Holiday and Festival Effects

NEW YEAR ANNUAL RETURNS

Date	Month	Daily	Annually
26	12	0.04%	8.99%
27	**12**	**0.47%**	**117.94%**
28	**12**	**0.51%**	**127.24%**
29	12	0.39%	97.20%
30	12	0.08%	18.93%
31	12	0.13%	32.38%

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1	1	0.13%	31.60%
2	1	0.07%	17.90%
3	1	0.05%	12.04%
4	1	0.11%	28.01%
5	1	0.38%	94.88%
6	**1**	**-1.15%**	**-287.64%**

REPUBLIC DAY ANNUAL RETURNS

20	1	-0.21%	-53.33%
21	1	-0.07%	-17.21%
22	1	0.07%	18.20%
23	1	0.33%	82.74%
24	1	-0.36%	-89.42%
25	1	0.15%	38.47%
26	1	#DIV/0!	#DIV/0!
27	**1**	**-0.64%**	**-159.48%**
28	1	-0.38%	-93.99%
29	1	0.13%	33.37%
30	**1**	**-0.55%**	**-137.65%**
31	1	0.21%	51.26%

INDEPENDENCE DAY ANNUAL RETURNS

10	8	-0.32%	-78.83%
11	8	-0.04%	-11.16%
12	**8**	**0.42%**	**103.92%**
13	8	0.11%	26.53%
14	**8**	**0.62%**	**154.21%**
15	8	#DIV/0!	#DIV/0!
16	**8**	**-0.55%**	**-138.66%**
17	8	0.14%	34.55%
18	8	0.24%	60.37%
19	8	-0.15%	-37.72%
20	**8**	**-0.40%**	**-100.17%**

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BUDGET EFFECTS ANNUAL RETURNS

Date	Month	Daily	Annually
21	1	-0.07%	-17.21%
22	1	0.07%	18.20%
23	1	0.33%	82.74%
24	1	-0.36%	-89.42%
25	1	0.15%	38.47%
26	1	#DIV/0!	#DIV/0!
27	**1**	**-0.64%**	**-159.48%**
28	1	-0.38%	-93.99%
29	1	0.13%	33.37%
30	**1**	**-0.55%**	**-137.65%**
31	1	0.21%	51.26%
1	**2**	**0.66%**	**165.04%**
2	2	0.03%	7.36%
2	2	0.03%	7.36%
3	**2**	**-0.46%**	**-114.44%**
4	2	0.37%	93.20%
5	2	0.14%	34.56%

ARCH EFFECT ON BSE-SENSEX

H0: There is no Significant effect of ARCH, GARCH and E-GARCH

H1: There is ARCH effect of ARCH, GARCH and E-GARCH

Null Hypothesis: LOG_RETURNS has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-17.64986	0.0000
Test critical values:	1% level	-3.432806	
	5% level	-2.862511	
	10% level	-2.567332	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_RETURNS)
Method: Least Squares
Date: 05/08/22 Time: 15:59
Sample (adjusted): 5/04/2012 4/22/2022
Included observations: 2468 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_RETURNS(-1)	-0.930377	0.052713	-17.64986	0.0000
D(LOG_RETURNS(-1))	-0.056229	0.048670	-1.155294	0.2481
D(LOG_RETURNS(-2))	-0.072149	0.044983	-1.603911	0.1089
D(LOG_RETURNS(-3))	-0.066822	0.040156	-1.664089	0.0962
D(LOG_RETURNS(-4))	-0.079193	0.034790	-2.276329	0.0229
D(LOG_RETURNS(-5))	0.006349	0.028340	0.224037	0.8227
D(LOG_RETURNS(-6))	-0.074863	0.020141	-3.716974	0.0002
C	0.000453	0.000217	2.083989	0.0373

R-squared	0.509890	Mean dependent var	-1.49E-06
Adjusted R-squared	0.508495	S.D. dependent var	0.015301
S.E. of regression	0.010727	Akaike info criterion	-6.228855
Sum squared resid	0.283073	Schwarz criterion	-6.210019
Log likelihood	7694.408	Hannan-Quinn criter.	-6.222012
F-statistic	365.6112	Durbin-Watson stat	1.995698
Prob(F-statistic)	0.000000		

Since the P-Value is less than 0.05, Therefore there is no root in the data. Hence the data is Stationarity.

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Heteroskedasticity Test: ARCH

F-statistic	84.52296	Prob. F(1,2472)	0.0000
Obs*R-squared	81.79461	Prob. Chi-Square(1)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/08/22 Time: 16:04
Sample (adjusted): 4/26/2012 4/22/2022
Included observations: 2474 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.55E-05	1.09E-05	8.767476	0.0000
RESID^2(-1)	0.181828	0.019778	9.193637	0.0000

R-squared	0.033062	Mean dependent var	0.000117
Adjusted R-squared	0.032671	S.D. dependent var	0.000538
S.E. of regression	0.000530	Akaike info criterion	-12.24804
Sum squared resid	0.000693	Schwarz criterion	-12.24334
Log likelihood	15152.82	Hannan-Quinn criter.	-12.24633
F-statistic	84.52296	Durbin-Watson stat	2.113748
Prob(F-statistic)	0.000000		

Since the P-Value is less than 0.05, Hence there is an ARCH effect in the data.

GARCH EFFECT ON BSE-SENSEX

Dependent Variable: LOG_RETURNS
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 05/08/22 Time: 16:07
Sample (adjusted): 4/25/2012 4/22/2022
Included observations: 2475 after adjustments
Convergence achieved after 24 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000759	0.000167	4.554481	0.0000
		Variance Equation		
C	2.40E-06	5.10E-07	4.707136	0.0000
RESID(-1)^2	0.088513	0.007873	11.24275	0.0000
GARCH(-1)	0.889571	0.011153	79.75883	0.0000

R-squared	-0.000642	Mean dependent var	0.000485
Adjusted R-squared	-0.000642	S.D. dependent var	0.010805
S.E. of regression	0.010808	Akaike info criterion	-6.543625
Sum squared resid	0.289004	Schwarz criterion	-6.534229
Log likelihood	8101.736	Hannan-Quinn criter.	-6.540212
Durbin-Watson stat	1.999065		

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1. P-value of RESID(-1)^2 i.e. ARCH should be less than 0.05.
2. P- value of GARCH(-1) should be less than 0.05.
3. The coefficient if ARCH and GARCH should be positive.
4. Coefficient of sum of ARCH and GARCH should be greater than than 0 but less than 1.

Since all the conditions are fulfilled, Hence, we can say that there is a presence Of GARCH Effect.

E-GARCH EFFECT ON NIFTY 500

Dependent Variable: LOG_RETURNS
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 05/08/22 Time: 16:10
Sample (adjusted): 4/25/2012 4/22/2022
Included observations: 2475 after adjustments
Convergence achieved after 43 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(2) + C(3)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(4)*RESID(-1)/@SQRT(GARCH(-1)) + C(5)*LOG(GARCH(-1))

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000428	0.000163	2.629082	0.0086
Variance Equation				
C(2)	-0.349281	0.037562	-9.298680	0.0000
C(3)	0.127038	0.014871	8.542745	0.0000
C(4)	-0.114650	0.007170	-15.99059	0.0000
C(5)	0.973130	0.003468	280.5824	0.0000

R-squared	-0.000028	Mean dependent var	0.000485
Adjusted R-squared	-0.000028	S.D. dependent var	0.010805
S.E. of regression	0.010805	Akaike info criterion	-6.585667
Sum squared resid	0.288827	Schwarz criterion	-6.573921
Log likelihood	8154.763	Hannan-Quinn criter.	-6.581401
Durbin-Watson stat	2.000292		

In E-GARCH the most important term is C(4) which is also known as Leverage Term.

1. The Coefficient of C(4) must be negative.
2. The P-value should be smaller than 0.05.

Since all the conditions are fulfilled, Hence, we can say that there is a presence of E-GARCH Effect which means that the negative news influences more than the positive news.
Hence we will reject the NULL HYPOTHESIS and accept the ALTERNATIVE HYPOTHESIS.

IMPLICATIONS AND CONCLUSIONS

The study mainly tests the existence of the market anomalies in the Indian market by comparing averages of the mean of the index values of BSE- SENSEX, NIFTY 500 and

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NIFTY-50from the year APRIL 24, 2012 to APRIL 23, 2022. The holiday effect was proved in Indian stock market. Also, there is a presence of some other effects like Budget effect which means increase in the volume and price of shares in Budget sessions. Also Republic Day effects, Independence Day effects and New Year effects and political changes effect exists in Indian market. However Indian market needs to be evaluated in depth to prove such effects as proven in foreign markets. Such studies will add value to the potential investors in making right investment decisions and ensure accelerated growth in the security market.

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