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Impact of White Collar Scams on Stock Market Behavior in India

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Abstract: ***The present study has made an attempt to examine the white collar scams effect on stock market performance with the help of three scams. The study has considered the three scams which have significantly influenced the equity markets. The returns performance has been measured with the Modigliani risk adjusted method result indicated that the 2G spectrum before effect is found to be stronger than the post. The ARCH family model has been applied and the result stated that the market volatility is having significant difference in pre and post scam period. This study is useful to the equity investors, retailers, regulators and academicians.***

Keywords: White Collar Scams, Stock Market, Return performance, Volatility.

I. INTRODUCTION

Stock prices change every day by market forces. It means that share prices change because of supply and demand. If more people want to buy a stock (demand) than sell it (supply), then the price moves up. Conversely, if more people wanted to sell a stock than buy it, there would be greater supply than demand, and the price would fall. There are many other factors which influence the stock market behavior in India. There are many reasons for the changes in the stock market. One of the reasons is scams. Scams majorly affect the stock market. These scams have just not led to the loss of millions of rupees but have also affected the economy in a major way. The scale of these economic crimes and the way in which these crimes have been committed are a serious concern to the Government as well as to the people. Approximately 73 lakh crores rupees have been lost due to the economic scams since 1992.Indian economy lost almost 6,600 rupees in the fiscal year of 2012 alone .These scams have affected all the sectors of the economy. White-collar crime or corporate transgression refers to financially motivated nonviolent crime committed by business and government professionals. Within criminology, it was first defined by sociologist Edwin Sutherland in 1939 as "a crime committed by a person of respectability and high social status in the course of his occupation". The importance of understanding the cultural roots and perceptions of criminal behavior motives, bribery, fraud, and corruption is paramount in today's corporative world.

II. OBJECTIVES OF THE STUDY

A. To measure the return performance before and after select scams of stock market.
B. To study the volatility of the stock market before and after select white collar scam effect.

III. SCOPE OF THE STUDY

A. The present study is focused on the Indian equity markets behavior with the effect of white collar scams. The study has considered the following white collar scams which took place from 2010 to 2018. The scams are:
B. 2g Spectrum scam-1-11-2010
C. Kanishkh Gold scam-10-12-2017
D. Punjab National Bank scam-14-02-2018

IV. RESEARCH METHODOLOGY

A. Hypothesis
1) Statement 1: This hypothesis focuses on the return performance measurement before and after select scams.
a) H01: There is no change of risk return performance of equity market before and after scam effect.
b) H02: There is change of risk return performance of equity market before and after scam effect.
2) Statement 2: This hypothesis focuses on the volatility of the stock market before and after select white collar scam effect.
a) H11: There is no change of volatility of equity markets with the effect of scams.
b) H12: There is change of volatility of equity markets with the effect of scams.

B. Source of Data

The present study is considering the secondary data from NSE.

C. Sample Size

The sample size of the project is confined to 3 different scams have been selected on which the actual research is made.

V. REVIEW OF LITERATURE

A. Sze-Ling voon, Chin-Hong Puah, Harry Entebang (February 2008) examines the depth of investigation of the effect of announcement of corporate crime focusing on stock market performance among public enterprise in Malaysia and the reason and behavior of why and how crimes are committed. The findings imply that the data when the announcement of the ethical behavior of the members of the company or the individual associated with the company is made public by the media whether or not the person is guilty. Therefore before any announcement on corporate crime is made, Securities Commission usually will conduct query to the suspected company. As a result, some investors might have sold out their shares once they know about the news from press release. Therefore, the author concluded that the action taken by Securities Commission provide a signal to investors to take up further decision on their stocks.

B. Chin-Hong Puah and Samuel Wei-Siew Liew (June 2011) examines that White-collar crime continues to hit the headlines across Malaysia and it remains a serious issue influencing organizations globally. The findings imply that the share price is found to react negatively to the announcement of white-collar crime on the day of the announcement. Foster (1986) identified three factors determining whether an announcement has information content, namely (i) the capital market's expectation as to the content and timing of the release; (ii) the implications of the release for the future distribution of security returns; and (iii) the credibility of the information source. The author concludes that share price reacts negatively following the announcement. Significant negative CAARs are found continuously in the subsequent 10 trading days, which equates to a period of two weeks.

VI. DATA ANALYSIS AND INTERPRETATION

A. Augmented Dickey Filler Test (ADF)

ADF is a unit root test which is done to know the stationarity of a time series data. Since the Probability Values of the data is less than 0.05 which indicates that the data is further applicable for statistical analysis.

1) Objective 1: To measure the return performance of select scams.

Modigliani-Millers approach:

The following three scams are considered:

a) Punjab National Bank scam

b) Kanishkh Gold scam

c) 2g Spectrum scam

Table 3.1: Showing the calculated MM approach for 3 years before Punjab National Bank scam.

[1] Punjab National Bank scam(3 years before scam)

RP	rf	D	MEAN D	STD D	S	BUSINESS RISK	RF	MM
0.382779	7.75	-7.36722	-6.56156	0.580455	-11.3042	0.121950264	6.608108	-4.57411
0.055622	7.75	-7.69438						
-0.22046	7.5	-7.72046						
-0.19163	7.5	-7.69163						
0.159273	7.5	-7.34073						
-0.03087	7.25	-7.28087						
0.088235	7.25	-7.16176						
-0.31148	7.25	-7.56148						
-0.00625	6.75	-6.75625						
0.075377	6.75	-6.67462						
-0.08308	6.75	-6.83308						
0.009314	6.75	-6.74069						
-0.18687	6.75	-6.93687						
-0.20321	6.75	-6.95321						
0.332932	6.75	-6.41707						

0.071255	6.5	-6.42875
0.216793	6.5	-6.28321
0.084729	6.5	-6.41527
0.183482	6.5	-6.31652
0.074364	6.5	-6.42564
-0.01705	6.5	-6.51705
-0.06571	6.25	-6.31571
-0.23868	6.25	-6.48868
-0.00426	6.25	-6.25426
0.308229	6.25	-5.94177
0.099739	6.25	-6.15026
0.184586	6.25	-6.06541
0.029147	6.25	-6.22085
0.165486	6.25	-6.08451
-0.0191	6.25	-6.2691
0.227644	6.25	-6.02236
-0.0777	6	-6.0777
0.002959	6	-5.99704
0.251801	6	-5.7482
-0.12932	6	-6.12932
0.154766	6	-5.84523
0.349372	6	-5.65063

Table 3.1.1: Showing the result of MM approach of 3 years before Punjab National Bank scam

RP	rf	D	MEAN D	STD D	S	BUSINESS RISK	RF	MM
0.382779	7.75	-7.36722	-6.56156	0.580455	-11.3042	0.121950264	6.608108	-4.57411

The above table indicates the returns performance of Punjab National Bank based on the adjusted risk as been studied before 3 years scam effect period i.e. from 16 Jan 2015 to 15 Jan 2018.The return performance of MM approach is observed to be negative i.e. -4.57411 which is below the risk free rate of return i.e. 6.6081.The business risk is observed to be in positive i.e. 0.1219 but the return performance is indicating negative. Hence the MM approach result states that before PNB scam effect period the market performance is observed to be inferior.

Table 3.1.2: Showing the calculated MM approach 3 years post Punjab National Bank scam

[2] Punjab National Bank(3 years after)

rp	rf	D	mean d	std d	business risk	mean rf	s	mm
0.303103	6	-5.6969	-6.26477	0.359345	0.050009	6.269231	-17.4339	-11.1146
-0.25751	6	-6.25751						
-0.18966	6	-6.18966						
0.287769	6	-5.71223						
0.000612	6	-5.99939						
-0.00795	6.25	-6.25795						
0.265964	6.25	-5.98404						
0.135454	6.5	-6.36455						
-0.36475	6.5	-6.86475						
-0.23245	6.5	-6.73245						
0.233264	6.5	-6.26674						
-0.00206	6.5	-6.50206						
-0.11379	6.5	-6.61379						

Table 3.1.3: Showing the result of MM approach of 3years post Punjab National Bank scam

RP	RF	D	Mean D	STD D	Business Risk	Mean RF	S	MM
0.303103	6	-5.6969	-6.26477	0.359345	0.050009	6.269231	-17.4339	-11.1146

The above table indicates the return performance of Punjab National Bank based on the adjusted risk as been studied after 1 year scam effect i.e. from 16 Jan 2018 to 15 Jan 2019.The return performance of MM approach is observed to be negative which is below the risk free rate of return i.e. 6.269.The business risk is observed to be 0.05 but the return performance is indicating negative. Hence the MM approach result states that the market performance is observed to be inferior post scam effect also but the returns are better when compared to the pre scam period.

Table 3.2: Showing the calculated MM approach 3years before Kanishkh Gold scam.

[3] Kanishkh Gold Scam(3 years before scam)

RP	RF	D	MEAN D	SD D	S	Business Risk	Mean RF	MM
0.300153	7.75	-7.44985	-6.58995	0.575743	-7.16569	0.142586	6.625	-0.3981
0.055622	7.75	-7.69438						
-0.22046	7.5	-7.72046						
-0.19163	7.5	-7.69163						
0.159273	7.5	-7.34073						
-0.03087	7.25	-7.28087						
0.088235	7.25	-7.16176						
-0.31148	7.25	-7.56148						
-0.00625	6.75	-6.75625						
0.075377	6.75	-6.67462						
-0.08308	6.75	-6.83308						
-0.00989	6.75	-6.75989						
-0.25582	6.75	-7.00582						
-0.20321	6.75	-6.95321						
0.332932	6.75	-6.41707						
0.071255	6.5	-6.42875						
0.216793	6.5	-6.28321						
0.084729	6.5	-6.41527						
0.183482	6.5	-6.31652						
0.074364	6.5	-6.42564						
-0.01705	6.5	-6.51705						
-0.06571	6.25	-6.31571						
-0.23868	6.25	-6.48868						
-0.04168	6.25	-6.29168						
0.307863	6.25	-5.94214						
0.099739	6.25	-6.15026						
0.184586	6.25	-6.06541						
0.029147	6.25	-6.22085						
0.165486	6.25	-6.08451						
-0.0191	6.25	-6.2691						
0.227644	6.25	-6.02236						
-0.0777	6	-6.0777						
0.002959	6	-5.99704						
0.251801	6	-5.7482						
-0.12932	6	-6.12932						
0.252453	6	-5.74755						

Table 3.2.1: Showing the result of MM approach 3 years post Kanishk Gold scam

RP	RF	D	MEAN D	SD D	S	BUSINESS RISK	MEAN RF	MM
0.300153	7.75	-7.44985	-6.58995	0.575743	-7.16569	0.142586	6.625	-0.3981

The above table indicates the returns performance of Kanishkh gold based on the adjusted risk as been studied before 3 years scam effect period i.e. from 31 Dec 2014 to 30 Dec 2017.The return performance of MM approach is observed to be negative i.e. -0.3981 which is below the risk free rate of return i.e. 6.625.The business risk is observed to be 0.14 but the return performance is indicating negative. Hence the MM approach result states that before Kanishkh gold scam effect period the market performance is observed to be inferior.

Table 3.2.2: Showing the calculated MM approach 3 years post Kanishk Gold scam

[4] Kanishkh Gold Scam(3 years after)

RP	RF	D	MEAN D	SD D	S	BUSINESS RISK	MEAN RF	MM
0.256383	7.75	-7.49362	-6.38553	0.471071	-6.8566	0.050924	6.395833	-0.40984
-0.25751	6	-6.25751						
-0.18966	6	-6.18966						
0.287769	6	-5.71223						
0.000612	6	-5.99939						
-0.00795	6.25	-6.25795						
0.265964	6.25	-5.98404						
0.135454	6.5	-6.36455						
-0.36475	6.5	-6.86475						
-0.23245	6.5	-6.73245						
0.233264	6.5	-6.26674						
-0.00346	6.5	-6.50346						

Table 3.2.3: Showing the result of MM approach 3 years post Kanishk Gold scam

RP	RF	D	MEAN D	SD D	S	BUSINESS RISK	MEAN RF	MM
0.256383	7.75	-7.49362	-6.38553	0.471071	-6.8566	0.050924	6.395833	-0.40984

The above table indicates the returns performance of Kanishkh gold based on the adjusted risk as been studied 1 year before scam effect period i.e. from 31-12-2017 to 30-12-2018.The return performance of MM approach is observed to be negative i.e. -0.40984 which is below the risk free rate of return i.e. 6.395.The business risk is observed to be in positive i.e. 0.05 but the returns performance indicating negative. Hence the MM approach result states that after Kanishkh gold scam effect period the market performance is observed to be inferior.

Table 3.3: Showing the calculated MM approach before 3 years 2G spectrum scam

[5] 2g spectrum scam(3 years before scam):

RP	RF	D	SD OF D	MEAN D	S=MEAN D/STD D	BUSINESS RISK	MEAN OF RF	MM
0.202	7.75	-7.547	1.812	-5.753	-3.174	0.11024	6.232	3.168
0.346	7.75	-7.403						
-0.719	7.75	-8.469						
0.107	7.75	-7.642						
-0.5006	7.75	-8.250						
0.444	7.75	-7.305						
-0.287	7.75	-8.037						
-0.868	8	-8.868						
0.346	8.5	-8.153						
0.043	9	-9.043						
-0.408	9	-9.500						
-1.403	8	-9.489						
-0.660	7.5	-8.160						
0.614	6.5	-5.885						
-0.422	5.5	-5.922						
-0.163	5.5	-5.663						
0.698	5	-4.301						
0.195	4.75	-4.554						
1.161	4.75	-3.588						
-0.176	4.75	-4.926						
0.380	4.75	-4.369						
-0.073	4.75	-4.823						
0.476	4.75	-4.272						
-0.530	4.75	-5.280						
0.525	4.75	-4.224						
0.146	4.75	-4.603						
-0.460	4.75	-5.210						
0.267	4.75	-4.482						
0.257	4.75	-4.492						
-0.205	5.13	-5.330						
-0.107	5.25	-5.357						
0.198	5.25	-5.051						
0.174	5.75	-5.575						
0.041	5.75	-5.708						
0.555	6	-5.444						
-0.025	6	-6.025						
0.824	6.25	-5.425						

Table 3.3.1: Showing result of MM approach 3 years before 2G spectrum scam

RP	RF	D	SD OF D	MEAN D	S=MEAN D/STD D	BUSINESS RISK	MEAN OF RF	MM
0.202	7.75	-7.547	1.812	-5.753	-3.1741	0.11024	6.232	3.168

The above table indicates the returns performance of 2g spectrum based on the adjusted risk as been studied before 3 years scam effect period i.e. from 10 Nov 2007 to 9 Nov 2010.The return performance of MM approach is observed to be positive i.e. 3.168 which is below the risk free rate of return i.e. 6.2326.The business risk is observed to be positive (0.11024) which is less than the returns performance. Hence the MM approach result states that before 2g scam the market performance is observed to be superior.

Table 3.3.2: Showing the calculated MM approach 3years post 2G spectrum scam

[6] 2g spectrum(3 years after scam):

RP	RF	D
-0.51381	6.25	-6.76381
0.210312	6.25	-6.03969
-0.53257	6.5	-7.03257
-0.14849	6.5	-6.64849
0.416086	6.75	-6.33391
-0.07563	6.75	-6.82563
-0.14599	7.25	-7.39599
0.075337	7.5	-7.42466
-0.13686	8	-8.13686
-0.42492	8	-8.42492
-0.04291	8.25	-8.29291
0.405605	8.5	-8.0944
-0.26862	8.5	-8.76862
-0.28846	8.5	-8.78846
0.559811	8.5	-7.94019
0.104779	8.5	-8.39522
-0.01031	8.5	-8.51031
-0.07128	8	-8.07128
-0.35307	8	-8.35307
0.417546	8	-7.58245
-0.02916	8	-8.02916
0.013853	8	-7.98615
0.42929	8	-7.57071
-0.05935	8	-8.05935
0.276311	8	-7.72369
0.089041	8	-7.91096
-0.00303	7.75	-7.75303
-0.24445	7.75	-7.99445
0.049091	7.5	-7.45091
0.173206	7.5	-7.32679
-0.01196	7.25	-7.26196
-0.04476	7.25	-7.29476
-0.13049	7.25	-7.38049
-0.28658	7.25	-7.53658
0.520198	7.5	-6.9798
0.321291	7.75	-7.42871
-0.36331	7.75	-8.11331

Table 3.3.3: Showing the result of MM approach 3 years post 2G spectrum scam

RP	RF	D	MEAN D	SD OF D	S	Business risk	mean of rf	MM
-0.51381	6.25	-6.76381	-7.66552	0.649468	-11.8028	0.042545	7.662162	-4.09806

The above table indicates the returns performance of 2g spectrum based on the adjusted risk as been studied after scam effect period i.e. from 10 nov 2010 to 8 nov 2013.The returns performance of MM approach is observed to be negative i.e. -4.098 which is below the risk free rate of return i.e. 7.66.The business risk is observed to be positive i.e. 0.042 but the returns performance indicating negative. Hence the MM approach result states that after 2g scam effect period the market performance is observed to be inferior when compared to the pre scam period and comparatively the returns are more in pre scam period than in post.

2) Objective 2: To study the volatility of the stock markets before and after select white collar scam effect.

B. Auto Regressive Conditional Heteroskedasticity (ARCH)

The following three scams are considered:

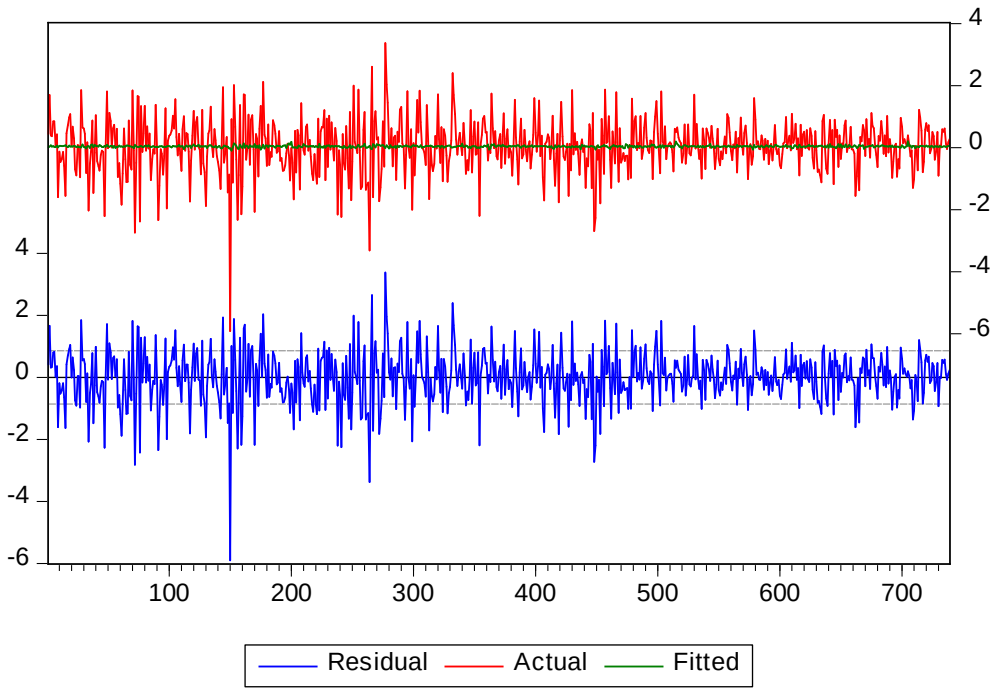
1) Punjab National Bank Scam
2) Kanishkh Gold Scam
3) 2g Spectrum scam

Table 3.4: Exhibiting the result of Heteroskedasticity test.
PNBNIFTY1 and PNBMSCI1
Null Hypothesis: Arch effect does not exist between PNBNIFTY1 with PNBMSCI1
Alternative Hypothesis: Arch effect exists between PNBNIFTY1 with PNBMSCI1

Heteroskedasticity Test: ARCH			
F-statistic	5.322275	Prob. F(1,736)	0.0014
Obs*R-squared	0.122335	Prob. Chi-Square(1)	0.0012

F statistic value is observed to be greater than the critical value (3.8601) and p value is observed to be less than 0.05 that means PNBNIFTY1 is having significant arch effect on PNBMSCI1.Hence it is concluded that Null hypothesis is rejected and Alternative hypothesis is accepted i.e. arch effect exists between PNBNIFTY1 and PNBMSCI1.

Chart 3.4: Showing Residual Graph to know if arch model is applicable
RESIDUAL GRAPH



Residual graph reflects the volatility influence between PNBNIFTY1 and PNBMSCI1.Here the trend line is found to be crossing the fitted line. Hence it is concluded that prolonged clusters is existing between PNBNIFTY1 and PNBMSCI1 and thereby confirming arch model will be applicable.

Table 3.4.1: Output of ARCH test

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Date: 02/22/19 Time: 23:01				
Sample (adjusted): 1 739				
Included observations: 739 after adjustments				
Convergence achieved after 12 iterations				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.036217	0.032476	1.115182	0.2648
PNBMSCI1	0.025270	0.022835	1.106646	0.02545
	Variance Equation			
C	0.698634	0.031963	21.85760	0.0000
RESID(-1)^2	0.046396	0.036370	1.275657	0.2021
R-squared	0.001992	Mean dependent var		0.035764
Adjusted R-squared	0.000637	S.D. dependent var		0.857096
S.E. of regression	0.856823	Akaike info criterion		2.533699
Sum squared resid	541.0656	Schwarz criterion		2.558626
Log likelihood	-932.2017	Hannan-Quinn criter.		2.543310
Durbin-Watson stat	1.889605			

The above table represents the volatility of PNBNIFTY1 during the period of 3years.Result signifies that coefficient value is observed to be positive (0.025270) i.e. 1 unit increase in the PNBNIFTY1 the corresponding value (0.025270) unit will rise in PNBMSCI1 stock price and the p value is observed to be less than 0.05 which indicates volatility exists between PNBNIFTY1 and PNBMSCI1.

1) PNBNIFTY2 and PNBMSCI2

a) Null Hypothesis: Arch effect does not exist between PNBNIFTY2 and PNBMSCI2.

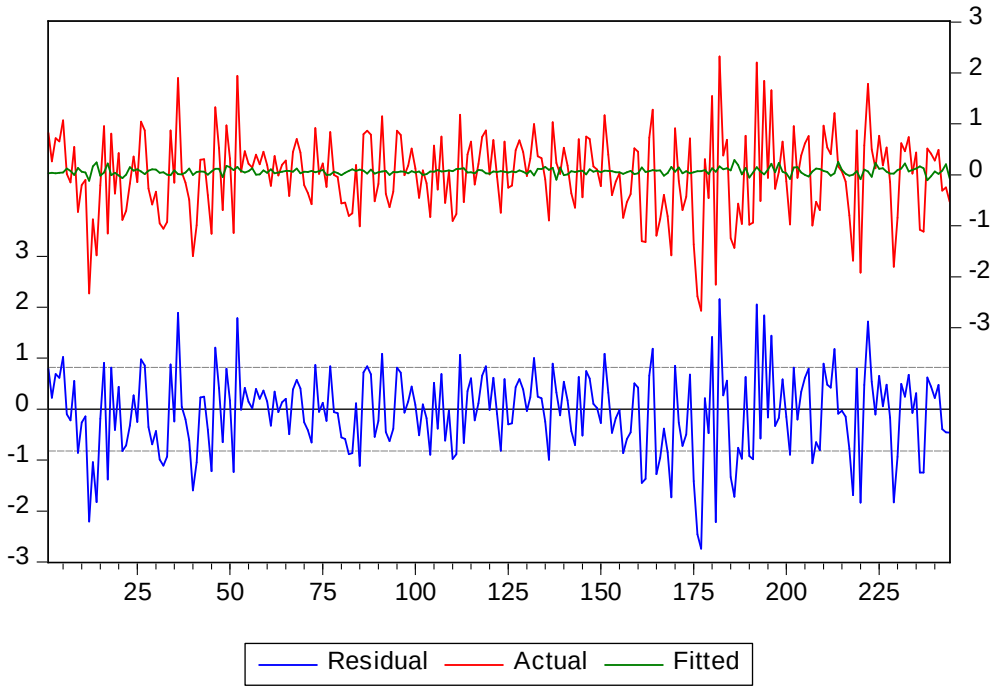
b) Alternative Hypothesis: Arch effect exists between PNBNIFTY2 and PNBMSCI2.

Table 3.5: Exhibiting the result of Heteroskedasticity test.

Heteroskedasticity Test: ARCH			
F-statistic	0.027845	Prob. F(1,241)	0.8676
Obs*R-squared	0.028073	Prob. Chi-Square(1)	0.8669

Heteroskedasticity test signifies the Arch effect between PNBNIFTY2 and PNBMSCI2. Result indicates that F statistic value observed to be lesser than the critical value (3.8601) and p value is observed to be more than 0.05 that means PNBNIFTY2 is not having significant arch effect on PNBMSCI2.Hence conclude that alternative hypothesis is rejected and null hypothesis is accepted i.e. arch effect does not exists between PNBNIFTY2 and PNBMSCI2.

Chart 3.5: Showing Residual Graph to know if arch model is applicable



Residual graph reflects the volatility influence on PNBNIFTY2 and PNBMSCI2.Here the trend line is not found to be crossing the fitted line. Hence it is concluded that prolonged clusters is not existing between the PNBNIFTY2 and PNBMSCI2 and thereby confirming arch model will not be applicable.

Table 3.5.1: Output of ARCH table.

Dependent Variable: PNBNIFTY2				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Date: 02/22/19 Time: 23:03				
Sample (adjusted): 1 244				
Included observations: 244 after adjustments				
Convergence achieved after 11 iterations				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.069087	0.047665	1.449425	0.1472
PNBMSCI2	-0.036853	0.024488	-1.504957	0.2023
	Variance Equation			
C	0.469858	0.059884	7.846094	0.0000
RESID(-1)^2	0.300835	0.113519	2.650082	0.0080
R-squared	-0.001694	Mean dependent var		0.004751
Adjusted R-squared	-0.005833	S.D. dependent var		0.817206
S.E. of regression	0.819586	Akaike info criterion		2.402197
Sum squared resid	162.5565	Schwarz criterion		2.459528
Log likelihood	-289.0681	Hannan-Quinn criter.		2.425287
Durbin-Watson stat	1.910099			

The above table represents the volatility of PNBNIFTY2 during the period of 3years.Result indicates that coefficient value is observed to be negative (-0.0368) i.e. 1 unit increase in the PNBNIFTY2 the corresponding value (-0,0368) will decrease in PNBMSCI2 stock price and the p value is observed to be greater than 0.05 which indicates volatility does not exists between PNBNIFTY2 and PNBMSCI2.

2) KGSNIFTY1 and KGSMSCI1

a) Null Hypothesis: Arch effect does not exists between KGSNIFTY1 ns KGSMSCI1

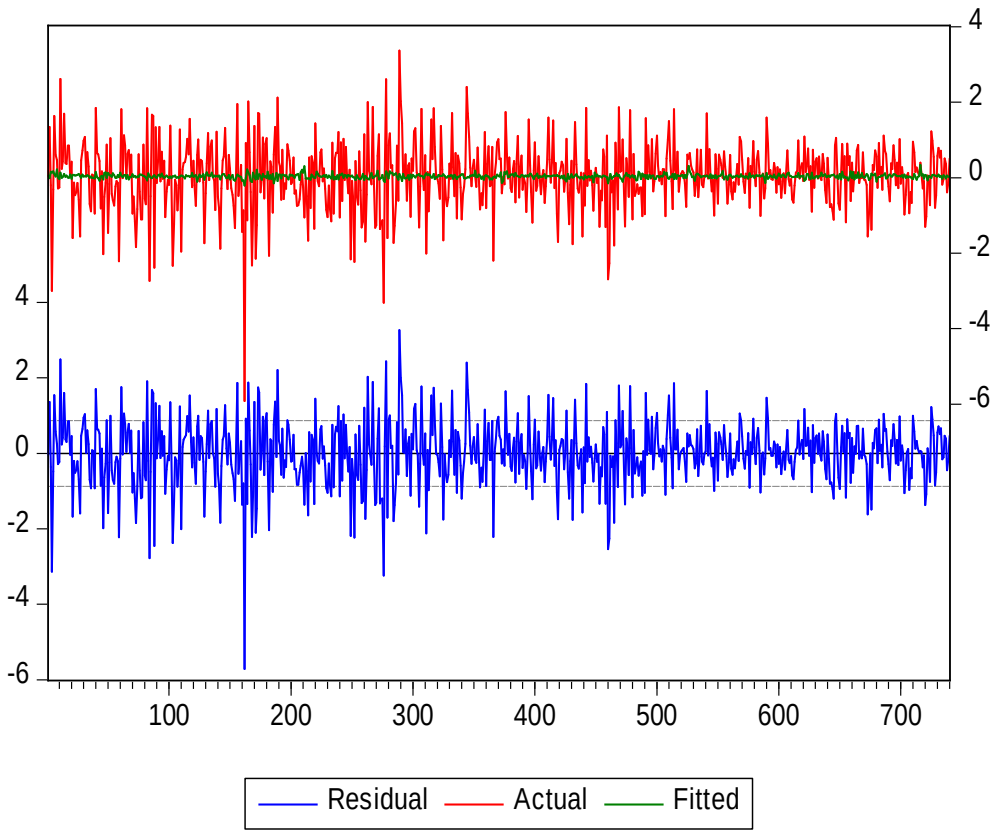
b) Alternative Hypothesis: Arch effect exists between KGSNIFTY1 and KGSMSCI1.

TABLE 3.6: Exhibiting the result of Heteroskedasticity test.

Heteroskedasticity Test: ARCH			
F-statistic	4.115760	Prob. F(1,737)	0.0001
Obs*R-squared	0.123412	Prob. Chi-Square(1)	0.0000

Heteroskedasticity test signifies the arch effect between KGSNIFTY1 and KGSMSCI1.Result indicates that F statistic value observed to be greater than the critical value (3.8508) and p value is observed to be less than 0.05 that means KGSNIFTY1 is having significant arch effect on KGSMSCI1.Hence concluded that null hypothesis is rejected and alternative hypothesis is accepted i.e arch effect exists between KGSNIFTY1 an KGSMSCI1.

CHART 3.6: Showing Residual Graph to know if arch model is applicable



Residual graph reflects the volatility influence of KGSNIFTY1 on KGSMSCI1.Here the trend line is found to be crossing the fitted line. Hence it is concluded that prolonged clusters is existing between KGSNIFTY1 and KGSMSCI1 and thereby confirming arch model will be applicable.

Table 3.6.1: Output of ARCH test.

Dependent Variable: KGSNIFTY1				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Date: 02/22/19 Time: 22:42				
Sample (adjusted): 1 740				
Included observations: 740 after adjustments				
Convergence achieved after 13 iterations				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.030493	0.032913	0.926465	0.3542
KGSMSCI1	0.045500	0.020065	2.267615	0.0234
	Variance Equation			
C	0.730448	0.034148	21.39067	0.0000
RESID(-1)^2	0.033391	0.032455	1.028858	0.3035
R-squared	0.004325	Mean dependent var		0.034146
Adjusted R-squared	0.002976	S.D. dependent var		0.871648
S.E. of regression	0.870350	Akaike info criterion		2.566542
Sum squared resid	559.0413	Schwarz criterion		2.591443
Log likelihood	-945.6205	Hannan-Quinn criter.		2.576143
Durbin-Watson stat	1.886377			

The above table represents the volatility of KGSNIFTY1 during the period of 3years.Result signifies that coefficient value is observed to be positive(0.045500) i.e. 1 unit increases the KGSNIFTY1 the corresponding value(0.045500) unit will rise in KGSMSCI1 stock price. And the p value is less than 0.05 which indicates volatility exists between KGSNIFTY1 and KGSMSCI.

3) KGSNIFTY2 and KGSMSCI2

a) Null Hypothesis: Arch effect does not exists between KGSNIFTY2 and KGSMSCI2

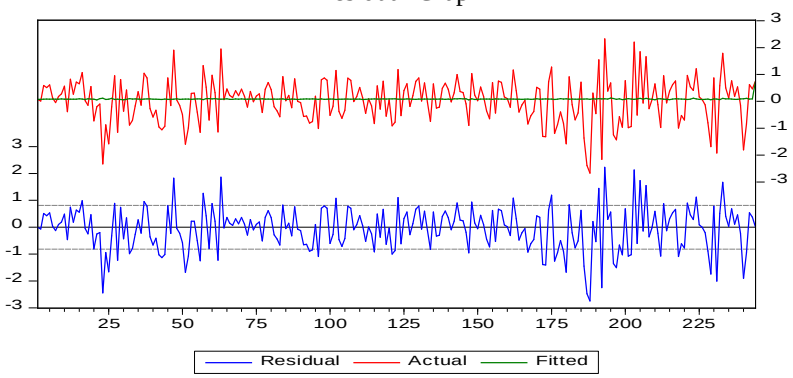
b) Alternative Hypothesis: Arch effect exists between KGSNIFTY2 and KGSMSCI2

Table 3.7: Exhibiting the Heteroscedasticity.

F-statistic	0.138440	Prob. F(1,241)	0.7102
Obs*R-squared	0.139509	Prob. Chi-Square(1)	0.7088

Heteroskedasticity test signifies the arch effect between KGSNIFTY2 and KGSMSCI2.Result indicates that F statistic value observed to be lesser than the critical value(3.8601) and p value is observed to be more than 0.05 that means KGSNIFTY2 is not having significant arch effect on KGSMSCI2.Hence concluded that alternative hypothesis is rejected and null hypothesis is accepted i.e. arch effect does not exists between KGSNIFTY2 and KGSMSCI2.

Chart 3.7: Showing Residual Graph to know if arch model is applicable



Residual graph reflects the volatility influence on KGSNIFTY2 and KGSMSCI2.Here the trend line is not found to be crossing the fitted line. Hence it is concluded that prolonged clusters is not existing between the KGSNIFTY2 and KGSMSCI2 and thereby confirming arch model will not be applicable.

Table 3.7.1: Output of Arch test.

Dependent Variable: KGSNIFTY2				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Date: 02/22/19 Time: 22:58				
Sample (adjusted): 1 244				
Included observations: 244 after adjustments				
Convergence achieved after 10 iterations				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.084933	0.048266	1.759686	0.0785
KGSMSCI2	-0.006428	0.022413	-0.286798	0.7743
	Variance Equation			
C	0.450471	0.051307	8.779859	0.0000
RESID(-1)^2	0.328947	0.115712	2.842815	0.0045
R-squared	-0.003567	Mean dependent var		0.019620
Adjusted R-squared	-0.007714	S.D. dependent var		0.811411
S.E. of regression	0.814535	Akaike info criterion		2.381685
Sum squared resid	160.5589	Schwarz criterion		2.439015
Log likelihood	-286.5655	Hannan-Quinn criter.		2.404774
Durbin-Watson stat	1.932120			

The above table represents the volatility of KGSNIFTY2 during the period of 3years.Result indicates that coefficient value is observed to be negative(-0.006428) i.e. 1 unit increase in the KGSNIFTY2 the corresponding value (-0.006428) will decrease in KGSMSCI2 stock price and the p value is observed to be greater than 0.05 which indicates volatility does not exists between KGSNIFTY2 and KGSMSCI2.

4) SPECTRUMNIFTY1 and SPECTRUMMSCI1

a) Null Hypothesis: Arch effect does not exists between SPECTRUMNIFTY1 and SPECTRUMMSCI

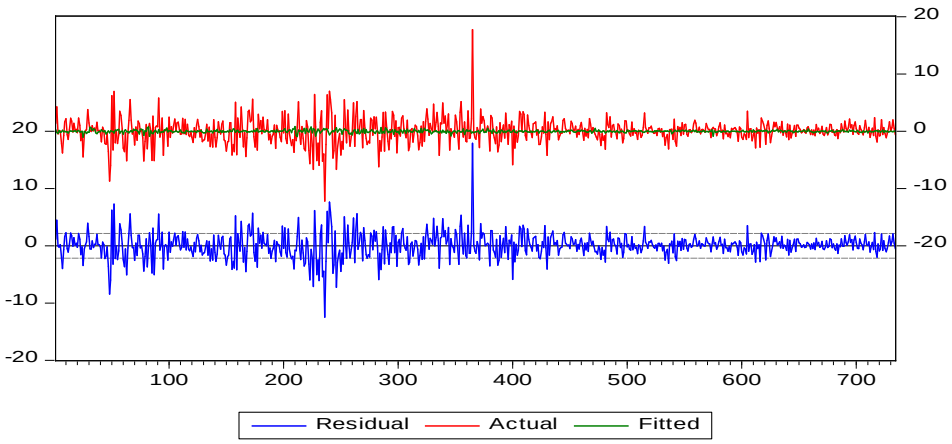
b) Alternative Hypothesis: Arch effect exists between SPECTRUMNIFTY1 and SPECTRUMSCI1.

Table 3.8: Exhibiting the Heteroscedasticity test.

Heteroskedasticity Test: ARCH			
F-statistic	1.341786	Prob. F(1,731)	0.2471
Obs*R-squared	1.342992	Prob. Chi-Square(1)	0.2465

Heteroskedasticity test signifies the arch effect between SPECTRUMNIFTY1 and SPECTRUMNIFTY1.Result indicates that F statistic value observed to be lesser than the critical value(3.8508) and p value is observed to be more than 0.05 that means SPECTRUMNIFTY1 is not having significant arch effect on SPECTRUMMSCI1.Hence concluded that alternative hypothesis is rejected and null hypothesis is accepted i.e. arch effect does not exists between SPECTRUMNIFTY1 and SPECTRUMMSCI1.

Chart 3.8: Showing Residual Graph to know if arch model is applicable



Residual graph reflects the volatility influence on SPECTRUMNIFTY1 and SPECTRUMMSCI1.Here the trend line is not found to be crossing the fitted line.Hence it is concluded that prolonged clusters is not existing between the SPECTRUMNIFTY1 and SPECTRUMMSCI1 and thereby confirming arch model will not be applicable.

Table 3.8.1: Output for ARCH test

Dependent Variable: SPECTRUMNIFTY1				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Date: 02/22/19 Time: 23:04				
Sample (adjusted): 1 734				
Included observations: 734 after adjustments				
Convergence achieved after 10 iterations				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.010928	0.067397	-0.162148	0.8712
SPECTRUMMSCI1	-0.061387	0.012540	-4.895336	0.20670
	Variance Equation			
C	2.620629	0.151290	17.32185	0.0000
RESID(-1)^2	0.600112	0.050662	11.84531	0.0000
R-squared	-0.016917	Mean dependent var		0.027804
Adjusted R-squared	-0.018306	S.D. dependent var		2.148847
S.E. of regression	2.168426	Akaike info criterion		4.272930
Sum squared resid	3441.916	Schwarz criterion		4.297990
Log likelihood	-1564.165	Hannan-Quinn criter.		4.282596
Durbin-Watson stat	1.850215			

The above table represents the volatility of SPECTRUMNIFTY1 during the period of 3years.Result indicates that coefficient value is observed to be negative(-0.061387) i.e. 1 unit increase in the SPECTRUMNIFTY1 the corresponding value (-0.061387) will decrease in SPECTRUMNIFTY1 stock price and the p value is observed to be greater than 0.05 which indicates volatility does not exists between SPECTRUMNIFTY1 and SPECTRUMMSCI1

5) SPECTRUMNIFTY2 and SPECTRUMMSCI2

a) Null Hypothesis: Arch effect does not exists between SPECTRUMNIFTY2 and SPECTRUMMSCI2

b) Alternative Hypothesis: Arch effect exists between SPECTRUMNIFTY2 and SPECTRUMMSCI2

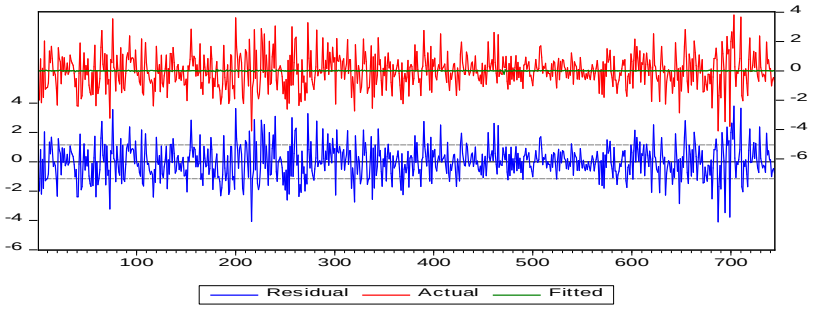
Table 3.9: Exhibiting the Heteroscedasticity test

F-statistic	0.500553	Prob. F(1,741)	0.00001
Obs*R-squared	0.000555	Prob. Chi-Square(1)	0.00000

Heteroskedasticity test signifies the arch effect between SPECTRUMNIFTY2 and SPECTRUMMSCI2.Result indicates that F statistic value observed to be greater than the critical value(3.8601) and p value is observed to be less than 0.05 that means SPECTRUMNIFTY2 is having significant arch effect on SPECTRUMMSCI2.Hence concluded that null hypothesis is rejected and alternative hypothesis is accepted i.e arch effect exists between SPECTRUMNIFTY2 an SPECTRUMMSCI2.

Chart 3.9: showing residual graph to know if arch model is applicable

Residual graph



Residual graph reflects the volatility influence of SPECTRUMNIFTY2 on SPECTRUMMSCI2.Here the trend line is found to be crossing the fitted line. Hence it is concluded that prolonged clusters is existing between SPECTRUMNIFTY2 and SPECTRUMMSCI2 and thereby confirming arch model will be applicable.

Table 3.9.1: Output of Arch test.

ARCH

Dependent Variable: SPECTRUMNIFTY2				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Date: 02/22/19 Time: 23:06				
Sample (adjusted): 1 744				
Included observations: 744 after adjustments				
Convergence achieved after 14 iterations				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.007695	0.042500	0.181062	0.8563
SPECTRUMMSCI2	0.688667	0.021047	0.411783	0.0105
	Variance Equation			
C	1.322059	0.273434	18.00336	0.0000
RESID(-1)^2	0.368114	0.338344	0.211604	0.0024
R-squared	0.000261	Mean dependent var		0.008135
Adjusted R-squared	-0.001087	S.D. dependent var		1.155436
S.E. of regression	1.156064	Akaike info criterion		3.135895
Sum squared resid	991.6704	Schwarz criterion		3.160691
Log likelihood	-1162.553	Hannan-Quinn criter.		3.145453
Durbin-Watson stat	1.859659			

The above table represents the volatility of SPECTRUMNIFTY2 during the period of 3years.Result signifies that coefficient value is observed to be positive(0.688667) i.e. 1 unit increases the SPECTRUMNIFTY2 the corresponding value(0.688667) unit will rise in SPECTRUMMSCI2 stock price. And the p value is less than 0.05 which indicates volatility exists between SPECTRUMNIFTY2and SPECTRUMMSCI2.

VII. FINDINGS AND CONCLUSION

A. *Findings*

1) The study has considered the three scams effect on the Indian stock market. The study has adopted the cumulative average abnormal returns to know the short term effect. The study result indicates that 2G spectrum scam (6.515) effect has been found higher on the market.

2) The study observed that the Kanishkh Gold scam (5.661) effect found the lower impact on the stock market.

3) The study applied the Modigliani risk adjusted method to know the returns performance of the stock market and compare with the before and after scam effect. The study result indicates that the 2G spectrum (3,168) before market performance is found to be superior than the after period scam effect (-4.098).

4) The study observed that the scam effect on the market volatility has been studied on the Indian market. The ARCH model has been applied and the result indicates that the kanishkh Gold scam volatility effect is found to be insignificant.

5) The Volatility of the stock market has been studied with the ARCH model on the market and compared before and after period. The study result indicates that the post 2G scam volatility impact is higher on the market compared with the pre-scam effect period of the stock market.

B. *Conclusion*

The present study has been focused on the scam effect on the stock market performance. The study has considered the three scams which have shown the significant impact on the equity markets. The study has considered PNB, 2G Spectrum scam, Kanishkh Gold scam and framed the structured in short run and long run period. The study result indicated that the scam effect has been observed in short run period. The ARCH model indicated that the volatility of the scam affected stocks are having the higher fluctuations in pre scam period than the post scam period. Hence there is a need to do further research in this are by considering the fundamental changes in pre and post scam period.

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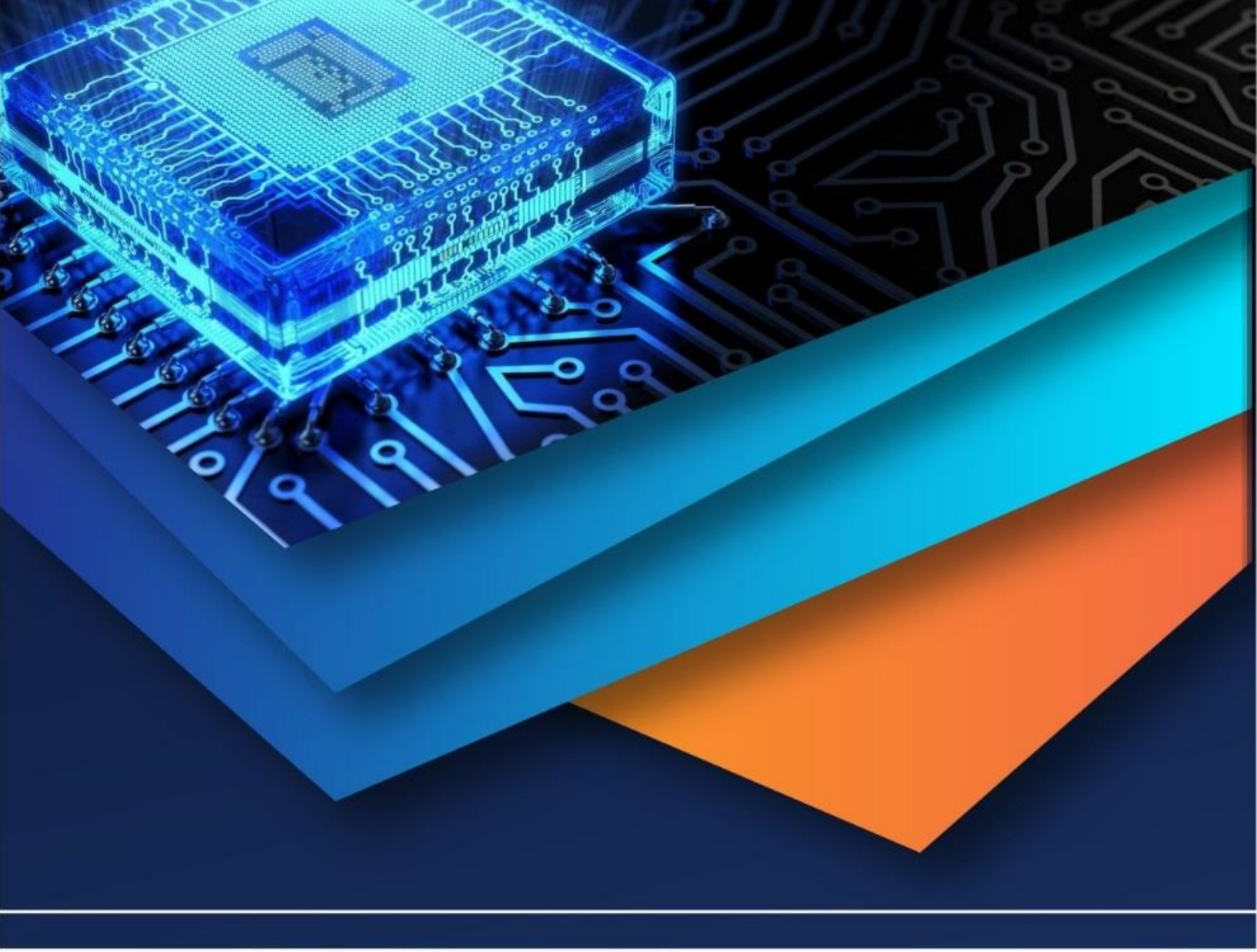
[2] Chin-Hong Puah and Samuel Wei-Siew Liew (June 2011), “White-Collar Crime and Stock Return: Empirical Study from Announcement”. google. Retrieved from google web site: https://mpra.ub.uni-muenchen.de/31748/1/White-collar_Crime_and_Stock_Return-Empirical_Study_from_Annoucement_Effect.pdf

INTERNAL SOURCES

1) www.nse.india

2) www.moneycontrol.com



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