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Stock Price Volatility of Listed Non-Banking Financial Companies on BSE during the COVID-19 Pandemic: An Empirical Study

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Abstract
This study inspected the reaction of stock/share prices of Non-Banking Financial Companies (NBFC) listed on the Bombay Stock Exchange (BSE) to COVID-19 by means of an event study method. The research sample is the closing price of the Stock Prices of selected NBFC companies that are listed on BSE and during the 30-day time prior the COVID-19 happening, 1(one) day for the period of the COVID-19 happening (January 30, 2020) and 30 days later. Empirical results prove that unusual returns respond negatively to COVID-19, S&P BSE SENSEX INDEX volatility fluctuates widely during the COVID-19 event. The practical repercussion of the study's outcomes for financiers is that the COVID-19 happeninginitiated volatility in stock price, which upsets abnormal yields. Consequently, to facecircumstances of uncertainty alsoenlarged volatility in the prospect, numerous lines of risk management are required in handling a stock assortment. In addition, it tooopens upprospects for risk-takers to profit in adisorganized market atmosphere. This research is constructed on the experimental literature presently being established to explore the occurrence of NBFC's stock price volatility affecting abnormal return behavior for the period of COVID-19 on the BSE. The realisticresults also authenticate the well-organized market hypothesis theory associated to the study of actions and the concept of financial performanceassociated to ambiguity. After analysis of stock prices of sampled NBFC for the study period that is 30 days prior and post covid-19 pandemic it is found that there is mixed trend in growth in post covid-19 period.

Keyword: Stock Price Volatility, NBFC, Returns, Risk Management, Event Study Method

1. Introduction

There was news regarding the downfall by huge numbers on various stock exchanges around the world. According to report issued by IMF, the economy at global level has shown a radical decline besides many economies in the world experienced a negative growth in their economy. The announcement of positive cases of COVID-19 has created fear in the minds of people which is seen in the stock exchanges. Many stocks price has fallen down and shown high volatility. Banking and financial sectors is not an exception to it. Banking and financial sectors are the backbone for economic development since it provides finance which is life blood for the industries, business houses and all economic activities.

Non-Banking Financial Companies are those companies which are registered with RBI as financial institutions and dealing with advancing of funds to the housing, infrastructure, leasing, commercial loan and many other types of loan assistance for various purposes also faced downfall during COVID-19 pandemic. NBFC (Non-Banking Financial Companies) are not permissible to have admittance to public deposits except few NBFC which are allowed by RBI to go for public deposits, therefore these NBFC's are facing huge problem with source of finance. During COVID-19 since there was lockdown NBFC's are facing problem of cash inflow which they are getting as EMI's paid by their customers.
COVID-19 has affected a lot on the performances of NBFC's due to mismatch between inflow and outflow of funds. In many studies it is examined to understand the impact of COVID-19 on the stock market, stock price volatility and effect of exogenous factor on the volatility of stock prices. Many earlier research studies have verified the effect of the COVID-19 happening on stock price instability, but inconsistent empirical confirmation is still established. Furthermost of the research study outcomes confirm that the stock market actionsweakeningin line for cases of COVID-19 transmission.

The US stock market modified due to the upsurge in affirmative cases of COVID-19 (Alfaro et al., 2020). By means of the occurrence study process, numerousoutcomesverify that during COVID-19, the worldwide stock market proficient a weakening. In one of the study it also establishes poor stock market routine in sixty-fournations due to presenceinfestedthrough COVID-19.
Under the study the researcher has considered Non-Banking Financial Companies. Non- Banking Financial Companies are those who are not banks but perform many functions like a bank. NBFCs are such companies who are dealing with

financial services and many other services but they didn't have a Banking license which is pre-requisite for running any type of bank either public or private or even co-operative. There are different categories of NBFCs in India like Housing Finance Companies, Investment and credit company, Micro finance company, Infrastructure finance company, NBFC-Factors, mortgage guarantee company etc. These NBFCs are assisting the financial market for the availability of finance to those people who don't have access from the banking companies. Banking companies have to follow strict norms as far as granting and advancing of loan is concerned. Borrowers have to submit various documents required for the finance which sometimes they don't have and therefore NBFCs becomes very important who provides them.

In the present study researchers have been considering such NBFCs which are dealing with Housing Finance and listed on Bombay Stock Exchange. Research has confirmed whether enough data is available while selecting samples of these NBFC-housing finance companies. Covid-19 is disastrous for the world at large whether it is concerned with human life or economy. Since there was no medicine available for the covid- 19 pandemic the only solution was to lockdown everything and it affected globally. Almost all economies at large have faced acute problems related to their government expenditure and income with income during the 2 year lockdown period. Present study deals with volatility in the stock prices of the selected NBFCs during the pre and post Covid-19 period. During the lockdown period people have started to trade in the stock exchange because of easy accessibility to trade on exchange through online portal facilities given by brokers.

Volatility refers to changes/ fluctuations during a period. Volatility shows the amount of responses in stock gets from the investors and further it can be explored to understand the behaviour of particular stocks with references to defined investors. Before going to select portfolios by manager/Mutual fund and others they study about the volatility or stocks in different events and further it helps them to understand the degree of volatility in particular events and accordingly frame their policies to make investment. The housing finance sector is an indispensable sector for the growth and development of the country. The housing finance sector creates value addition for the other related sectors like infrastructure. Volatility in the stock of housing finance companies affects their market capitalisation. From the various studies done on the similar topic it says that there is little effect on the housing sector. Researcher in order to find out the effect of Covid-19 on the volatility of stocks of housing finance companies. Volatility determines the prices of stocks and whenever any event happens that affects the degree of variability in volatility and therefore when predicting the prices of stock corporates/ analyst always considers the events effect particular to on volatility. Covid-19 was a situation in which there is control on economic activities almost for 2 years and therefore due to such unpredicted situations how stock prices responses become an area of study for the researcher in this arena.

2. Review of Literature

Pragmatic research on by what method COVID-19 contaminates the stock market has latelyaugmentedominously in numerousnations. Many research studies authorize that COVID-19 made the stock market actions to deteriorate abruptly. Khatatbeh et al. (2020) empirically established the throughresponse of eleven (11) stock market catalogs of countries plague-riddenthrough COVID-19. The research outcomes proved that meanwhile the COVID-19 case was pronounced to the public, stock yields have become adverse and have increased intensely post COVID-19 spreads tremendously. Alzyadati and Asfoura (2001) acknowledged the reply of the Saudi Arabian stock exchange to the COVID-19 occurrence. It isdecided that stock valueactionsdeclinedradically after the progress of positive cases infested with COVID-19 amplifiedfor the duration of the contagion. It is found that the adverseyieldperceived during the period prior and post the lock-down.

Topcu and Gulal (2020) studied the reaction of emerging market stock bourses to COVID-19 during thedated 10thMarch, 2020 – 30th April, 2020. The findingsdisplay that COVID-19 has infestedstock markets, which slowlywaned and initiated to deteriorating in mid-2020. The test effects showed the real estate and property, financial sectors and construction, proficient a weakening in unusual yields, whereas the utilities, infrastructure and transportation sectors with Abnormal Returnhave a tendency to to be constant, and other sectors experienced an upsurge in Abnormal Return.

Evidence from the accumulative abnormal yield value, the finance segments are most affected along with thattrade, services, and investment, while other sectors presented negative emotion. Generally, COVID-19 has initiated stock prices to drop severely. Ryandono et al. (2021)evidenced the undesirableinfluence on Indonesian Islamic shares.Instability is anindicator of determining the peril of facing ambiguity that financiersdeliberate when purchasing economic assets. Risk deliberations are the main factor in making investment selection decisions. Mazur et al. (2020) established that extreme irregular volatility is inversely linked to stock returns. It is alsosubstantiated that stock price instabilityamplified after being infestedthrough COVID-19.

3. Objectives of the study

a) To Study Stock price volatility of Non-Banking Financial Companies throughout the COVID-19 pandemic.
b) To analyze abnormal return of Non-Banking Financial Companies throughout the COVID-19 pandemic.

4. Hypotheses

Ho: There is no significant difference in AAR (Average Abnormal Return) during Pre and Post Covid-19 Period.
Ha: There is significant difference in AAR (Average Abnormal Return) during Pre and Post Covid-19 Period.

5. Methodology

To accomplish the specified research aims, the incident study is employed to regulate the Average Abnormal Return (AAR) prior and post the COVID-19 pandemic. An event study is an experiential analysis that scrutinizes the influence of a significant facilitatorincidence or dependent event on the worth of a security.

Event studies can disclosesignificantfactsapproximately how a stock is expected to respond to anassumed event. This study is employedsince the techniqueis able toexamine market responses to definite events by observing vagaries in stock price over and done with the measurement of unusual returns and the volume of stock exchange activity.

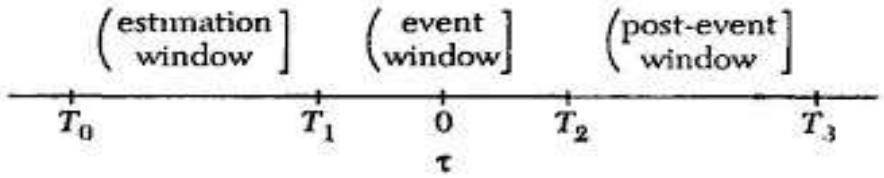
The stages of its use are as follows:
1) decide the sample of companies that have received the announcement;
2) decide Zero Day as the day of the declaration;
3) decide the time period to be scrutinized;
4) calculation of yield is performed each day;
5) the calculation of unusualyields is also done each day;
6) calculate the normalunusualyield in all samples;
7) add the unusualyields of each company to the calculation of unusual yields that have been gathered since the initial period;
8) scrutinize and argue the results (Elton et al., 2007).

5.1: Terminology related with Event Study

- Event Day: Announcement of any event which is denoted by "t0"
- Event Window: Event window is a period in which abnormal return is calculated considering some trading days of pre and post of the event day of sample companies (t-30 and t+30).
- Event/Window Estimation: Window estimation is a time period during which estimated return are computed (t-100).

5.2: Event window and samples

- The first case of COVID-19 was found on January 30, 2020. This was one of the variables that were selected as the period event. The event window used in this study is 61 days, of which 30 days before the COVID-19 first case, 30 days after that date and 1 event date on the January 30,2020.
- The observation period $T_0 - T_1$ is the estimation window, $T_1 - T_2$ is the event window, and $T_2 - T_3$ is the post-event period.



5.3: Population and sample

The population in this research is the day-to-day closing price of NBFC shares andS&P BSE Catalog. The sample of this research is the closing price of the S&P BSE Sensex and companies that are listed as NBFC-Finance category on BSE in the duration of 30 days prior the COVID-19 incident, 1 day through the COVID-19 happening (January 30, 2020) and 30 days post that. NBFC companiesdesignated as the research sample established on the succeedingconditions:

1) There are 12 categories of NBFC companies which are allowed by RBI to function in India. On BSE NBFC companies are listed out of which those NBFC which are coming under the category of NBFC-Finance are considered. There are 151establishments that meet these criteria.
2) Out of 151 companies listed under NBFC-Finance some companies are not having daily trading data available on the exchange so that only those companies having enough data availability for daily stock prices are chosen.
3) Only Eight (08) companies are selected as per convenience as sample for the study.

Table 1: Name of the Sample Listed NBFC Companies

S. No.	Name of the Sample Listed NBFC Companies

1	Edelweiss BSE: 532922 ISIN: INE532F01054
2	Coral India Fin BSE: 531556 ISIN: INE558D01021
3	Ashika Credit BSE: 590122 ISIN: INE094B01013
4	Bajaj Finance BSE: 500034 ISIN: INE296A01024
5	Bajaj Holdings BSE: 500490 ISIN: INE118A01012
6	Bengal & Assam BSE: 533095 ISIN: INE083K01017
7	Capital Trade BSE: 538476 ISIN: INE172D01021
8	Comfort BSE: 531216 ISIN: INE819A01031

5.4: Analysis models and variables

Researcher has tested the hypothesis in this study uses a quantitative methodwiththe event study technique. The stages of the research conceded out in progress from data gathering and data dispensation, calculation and investigation of unusual returns and S&P BSE Sensex Index volatility. The research results can provide both hypothetical and appliedrepercussions. The succeeding is a procedure for calculating stock price instability and unusual returns.

$$\overline{E}_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt}$$

with $\overline{E}_{it}$ as the expectation of stock returns at the time t, $\hat{\alpha}_i$. and $\hat{\beta}_i$ as market models during the estimation period, and R_{mt} as a market return at time t so that the value of abnormal returns can be calculated as the difference in actual and expected returns.

$$\mathrm{AR}_{it} = R_{it} - \overline{E}_{it}$$

The cumulative value of the abnormal return from the time of the event (p) to a certain time (q) can be calculated as follows:

$$\mathrm{CAR}_i(p,q) = \sum_{t=p}^{q} \mathrm{AR}_{it}$$

After the three calculations above, based on Panayides and Gong (2002), next is the calculation of the average abnormal return of the sample with an arithmetic average of n shares and the cumulative value of the average abnormal return of the sample, as follows:

$$\overline{\mathrm{AR}}_t = \frac{1}{n}\sum_{i=1}^{n} \mathrm{AR}_{it}$$

$$\mathrm{CAR}(p,q) = \sum_{t=p}^{q} \overline{\mathrm{AR}}_t$$

(Source: Erie FEBRIAN, Ardi GUNARDI Mokhamad ANWAR,Aldrin HERWANY)

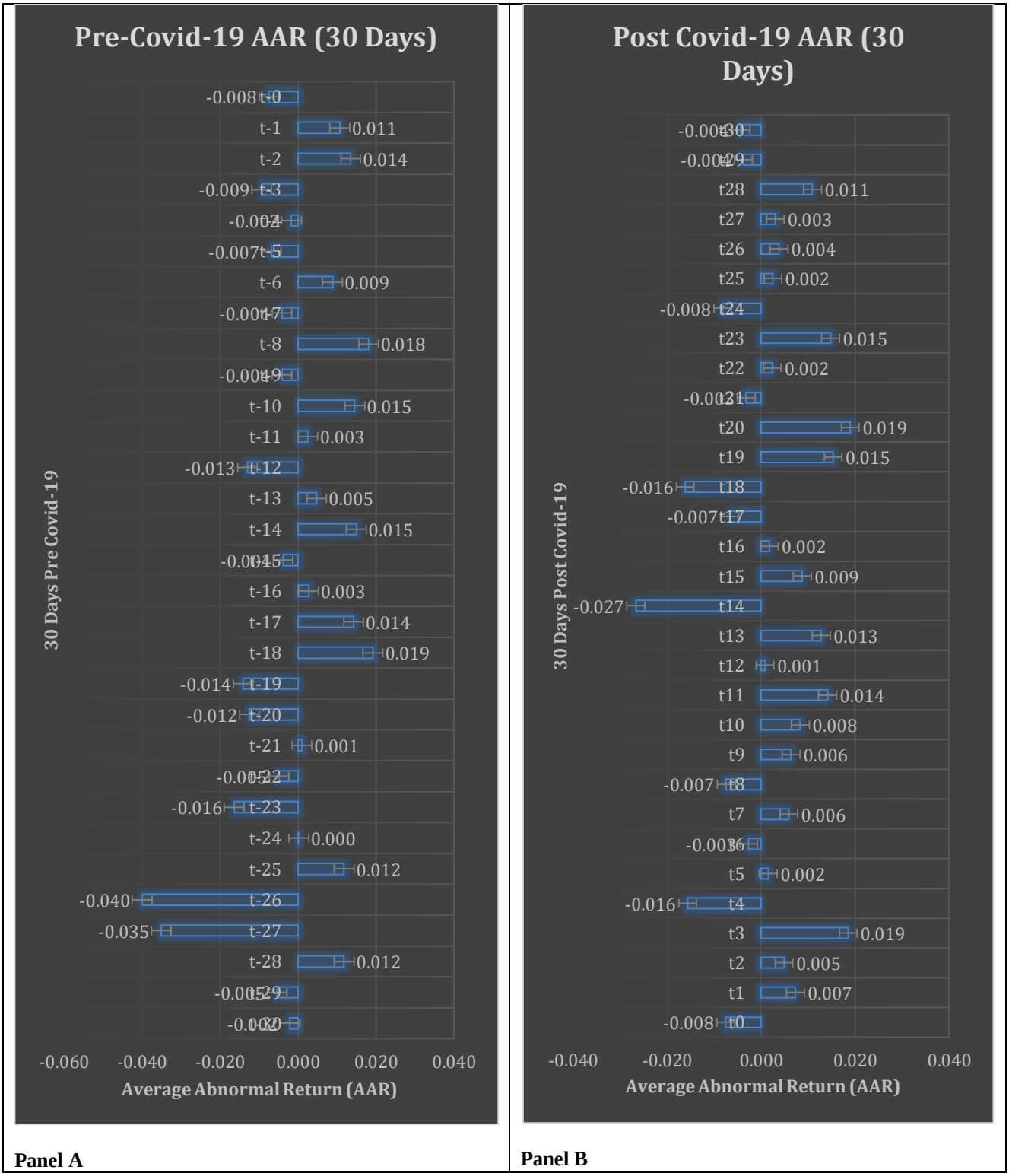
6. Discussion

1. Figure 1 displays NormalIrregularYieldduring 30 days Pre and Post Covid-19 Pandemic. Panel A shows Pre Covid-19 AAR for 30 days prior to event date whereas Panel B is about Post Covid-19 AAR for next 30 days from the event date.

From Panel A it's clear that 2 days (t-1, t-2) prior to event date there was positive AAR whereas on 3rd, 4th and 5th day (t-3,t-4,t-5) there was negative AAR. Out of 30 days prior to event date 15 days AAR shows positive AAR and 15 days negative AAR. The highest and lowest positive AAR was on t-18 and t-24 respectively whereas highest and lowest negative AAR was on t-26 and t-4 respectively.

From Panel B it was seen that out of post 30 days to event date positive AAR was for 20 days and negative AAR for 10 days. The highest and lowest positive AAR in post Covid-19 during 30 days was on t3, t20 and t12 respectively whereas highest and lowest negative AAR during post Covid-19 was on t14 and t21 respectively. Overall it can be said that there is not much impact of Covid-19 was seen on AAR of sampled NBFC's under the study.

Figure 1: Average Abnormal Return during 30 days Pre and Post Covid-19 Pandemic

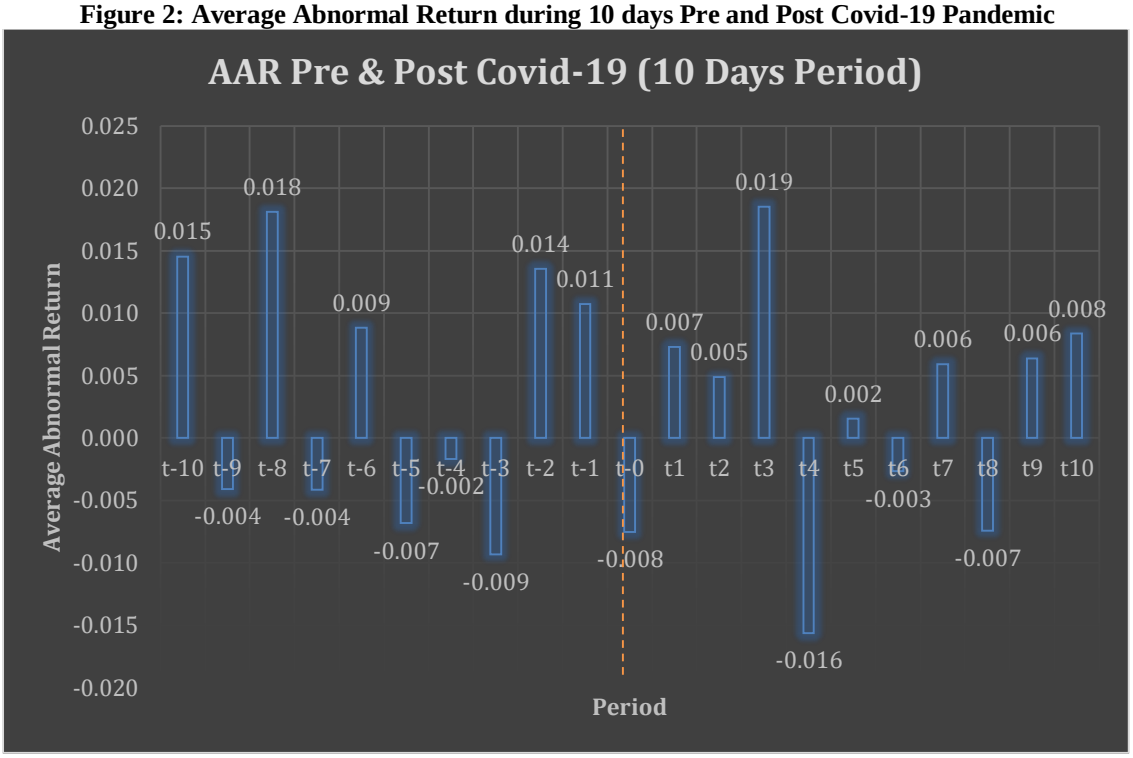


Panel A **Panel B**

(Source: Authors Calculation from secondary data collected from moneycontrol.com)

2. Figure 2 elaborating about AAR during 10 days before and after Covid-19 Pandemic. Prior Covid-19 AAR was positive for 50% of 10 days whereas Post Covid-19 AAR was positive for 70% of 10 days.

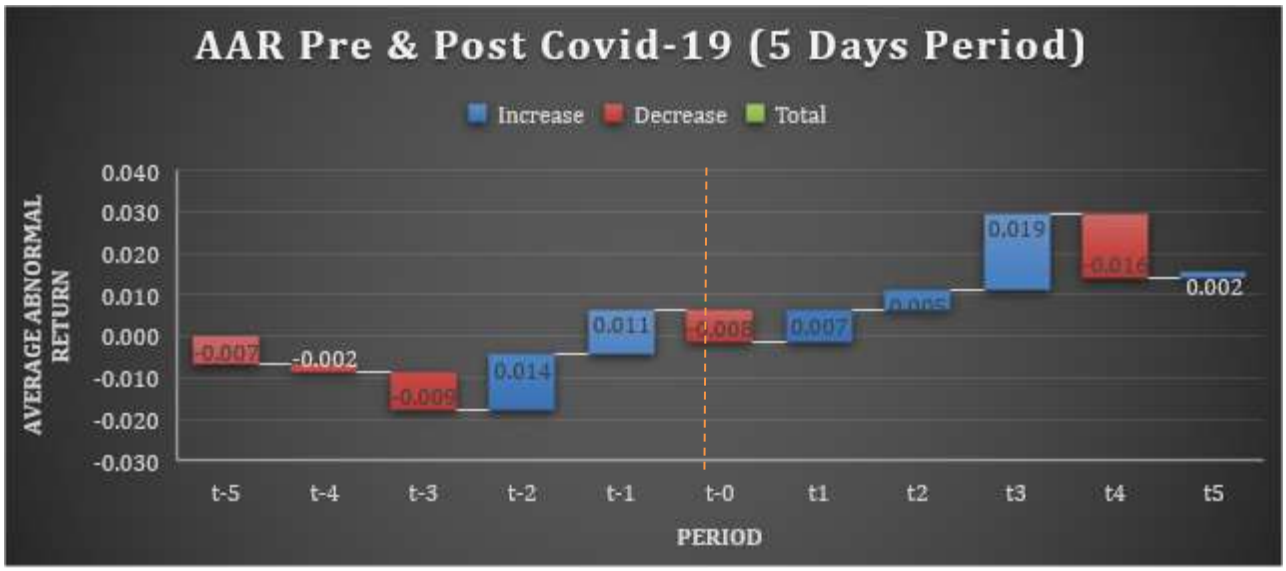
Figure 2: Average Abnormal Return during 10 days Pre and Post Covid-19 Pandemic



(Source: Authors Calculation from secondary data collected from moneycontrol.com)

3. Figure 3 illustrates about AAR during 5 days before and after Covid-19 Pandemic. This one is understood that there is surge in AAR during post Covid-19 Pandemic.4 out of 5 days AAR was positive whereas in pre Covid-19 there was increase in AAR for 2 out of 5days.

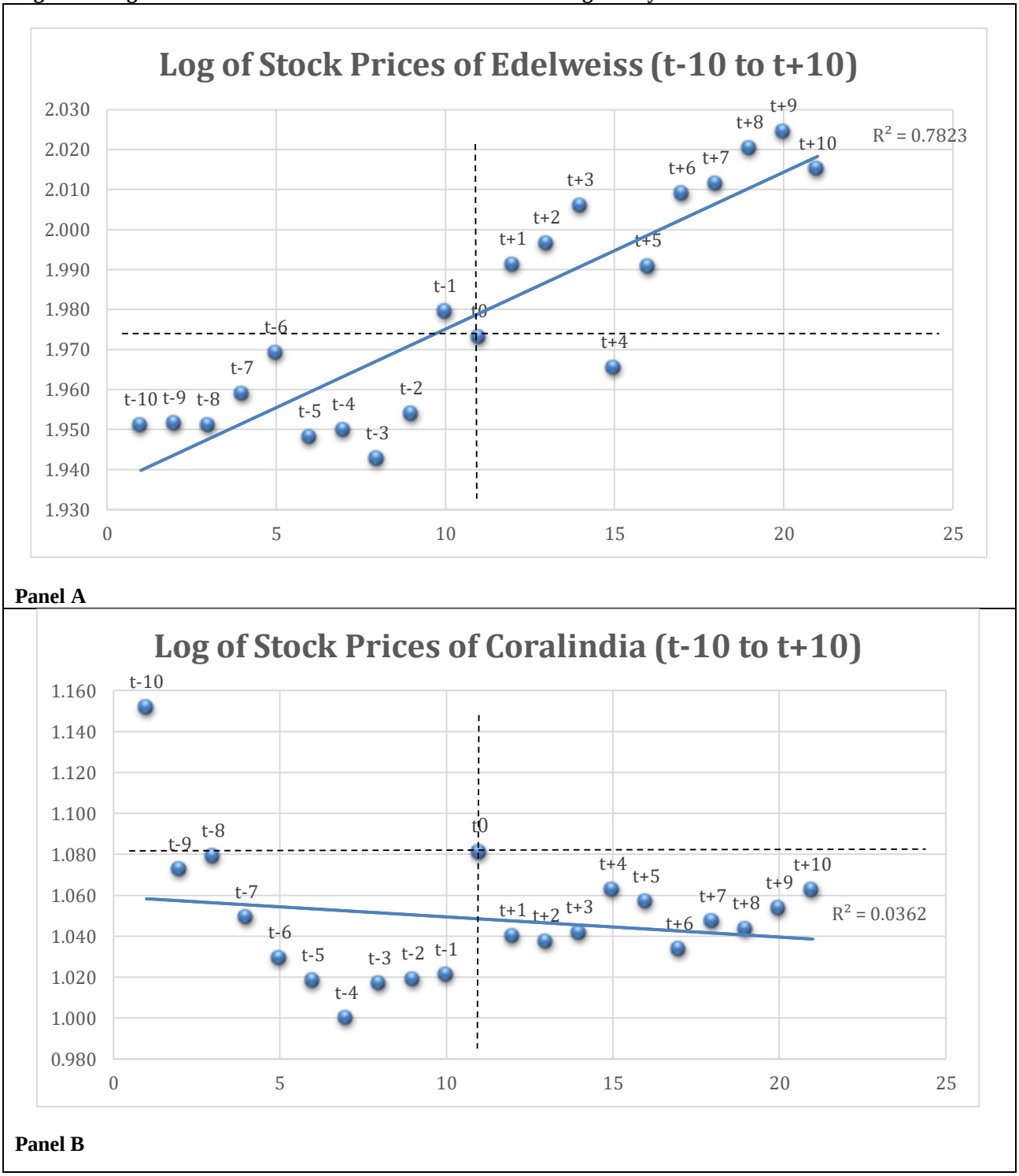
Figure 3: Average Abnormal Return during 5 days Pre and Post Covid-19 Pandemic



(Source: Authors Calculation from secondary data collected from moneycontrol.com)

4. Figure 4 illustrates the log of stock prices of Edelweiss and Coral India during 10 days before and after Covid-19 Contagion. Panel A displays that after Covid-19 Pandemic stock prices of Edelweiss company have not shown any negative stock prices instead it is increasing as per it's trending growth from past 10 days. Panel B was about stock prices of Coralindia company. It is understood that stock prices in after Covid-19 period is decreasing in trend.

Figure 4: Log of Stock Prices of Edelweiss and Coralindiaduring 10 days Pre and Post Covid-19 Pandemic



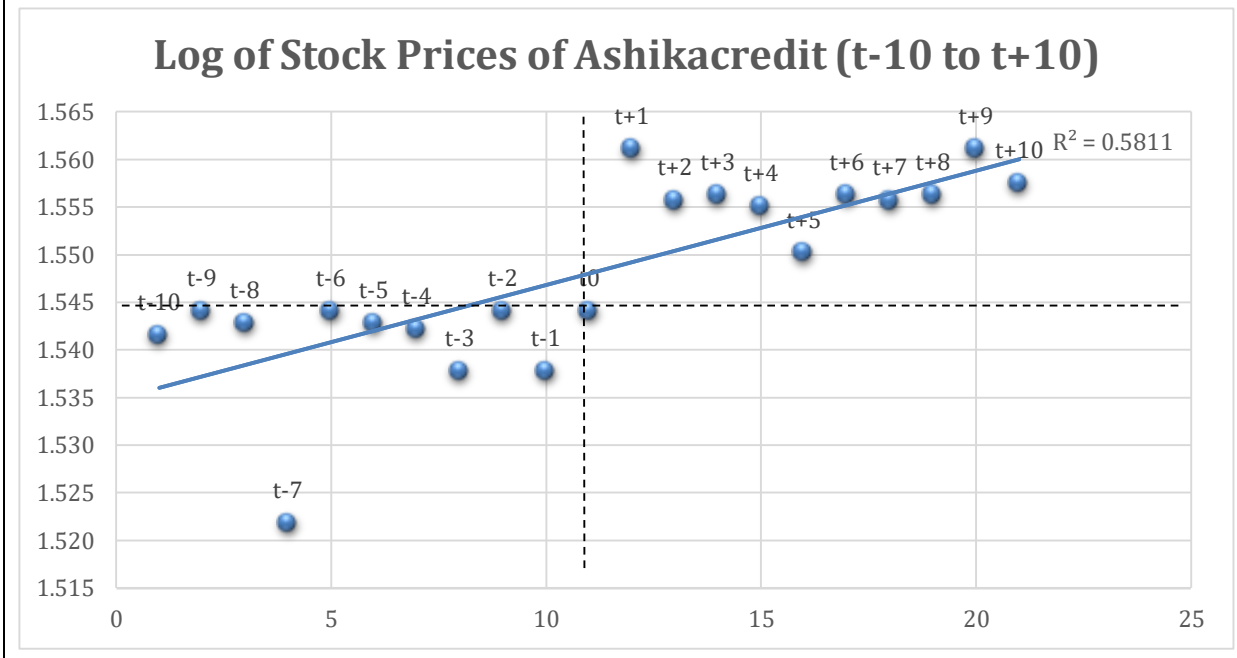
Panel A

Panel B

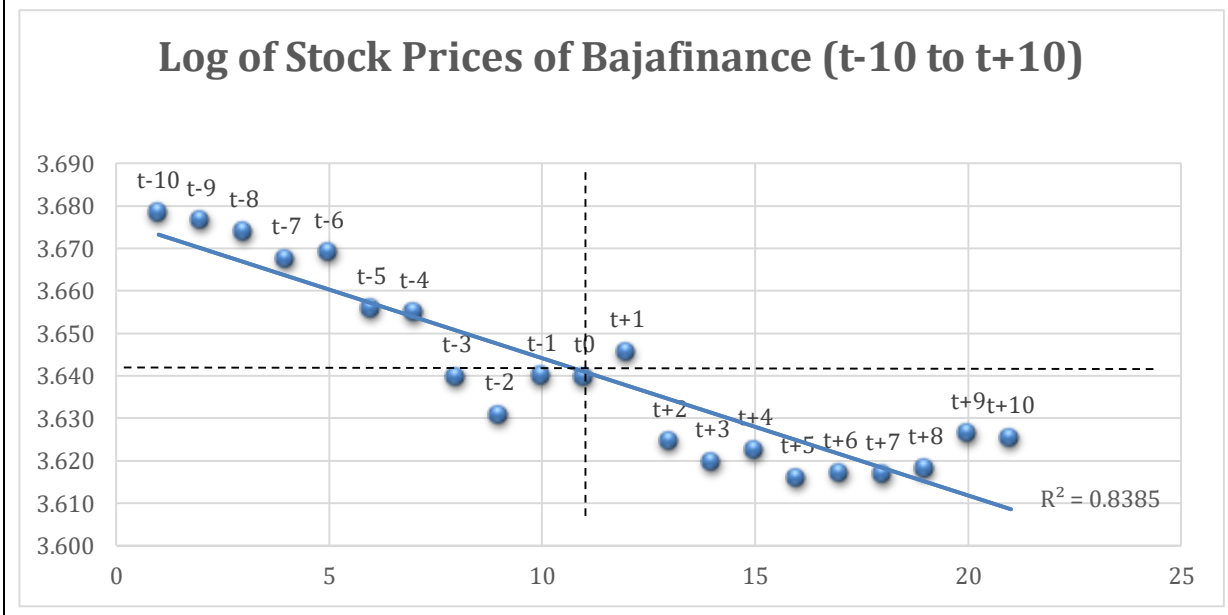
(Source: Authors Calculation from secondary data collected from moneycontrol.com)

5. Figure 5 gives analysis of stock prices of Ashikacredit and Bajaj Finance companyduring 10 days pre and post Covid-19 Pandemic. Panel A gives stock prices of Ashikacredit company. Stock prices after Covid-19 period was increasing as linked to prio Covid-19 period. Panel B is about stock prices of Bajaj Finance; it shows decreasing trend during post Covid-19 period.

Figure 5: Log of Stock Prices of Ashika credit and Bajajfinanceduring 10 days Pre and Post Covid-19 Pandemic



Panel A

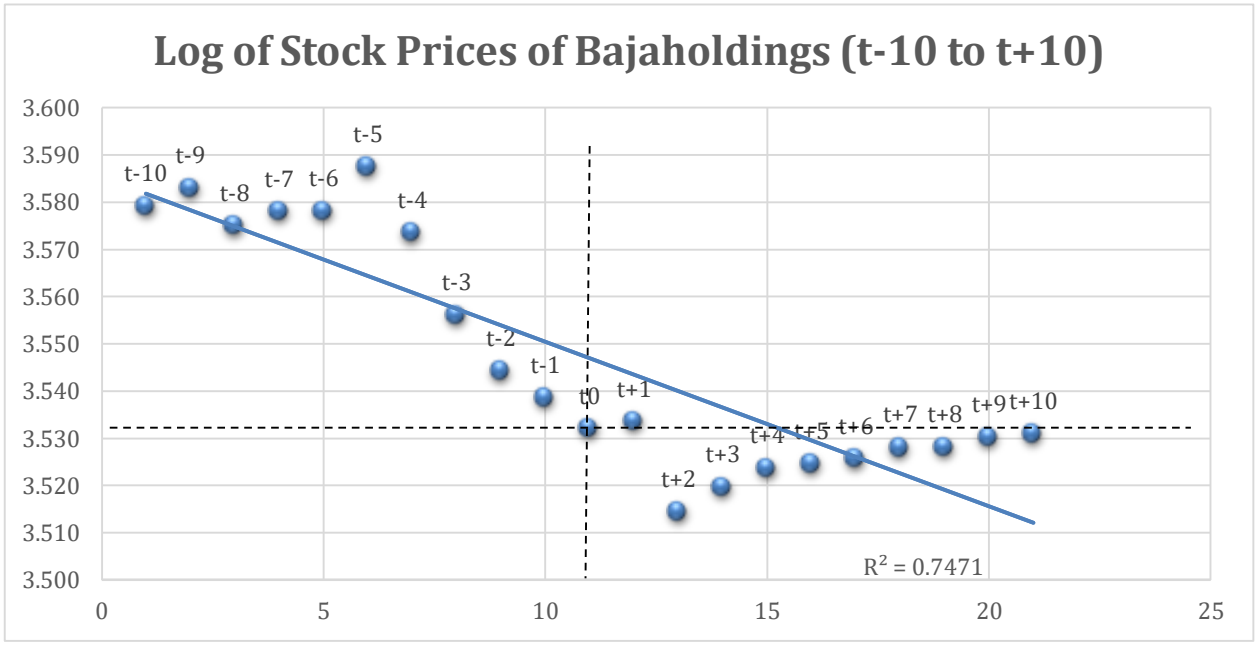


Panel B

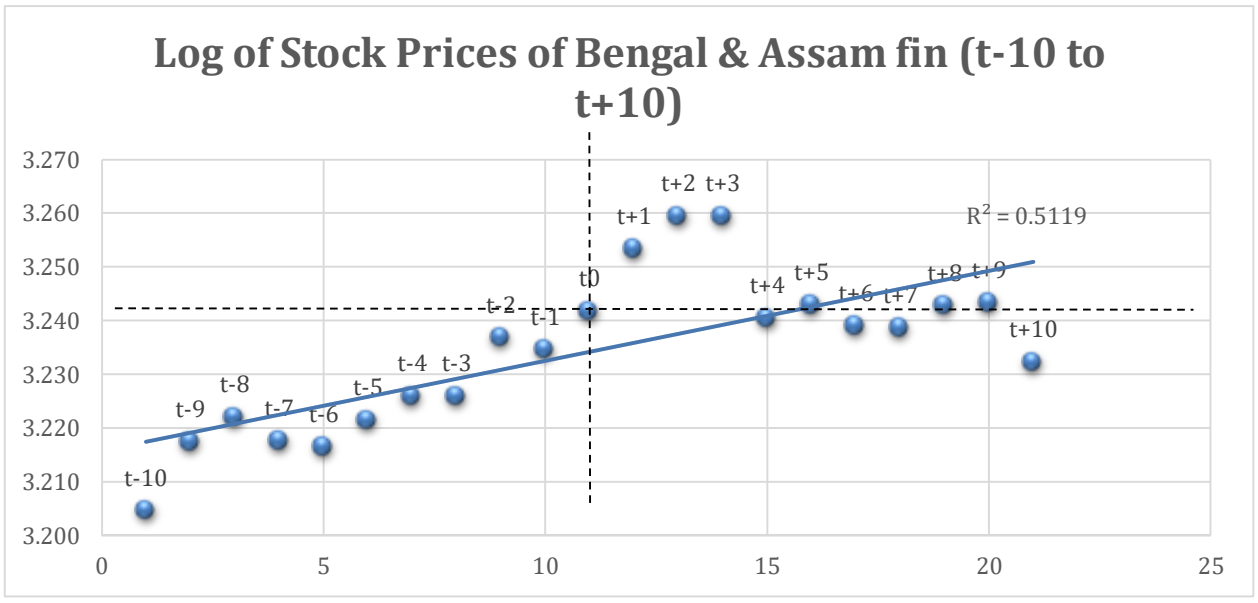
(Source: Authors Calculation from secondary data collected from moneycontrol.com)

6. Figure 6 gives analysis of stock prices of Bajajholdings and Bengal & Assam Finance company during 10 days Prio and Post Covid-19 Pandemic. Panel A gives stock prices of Bajajholding company. Stock prices post Covid-19 period was decreasing as equated to before Covid-19 period. Panel B is about stock prices of Bengal & Assam Finance Company mixed trend of growth during post Covid-19 perio

Figure 6: Log of Stock Prices of Bajajholdings and Bengal&Assamduring 10 days Pre and Post Covid-19 Pandemic



Panel A

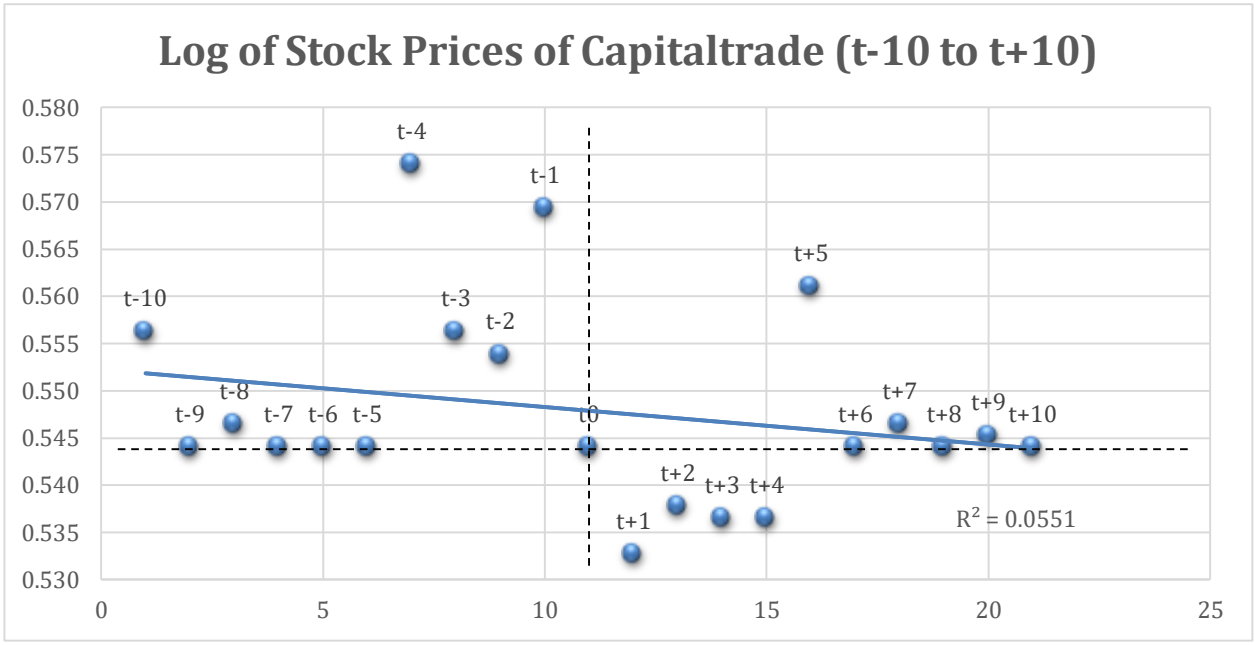


Panel B

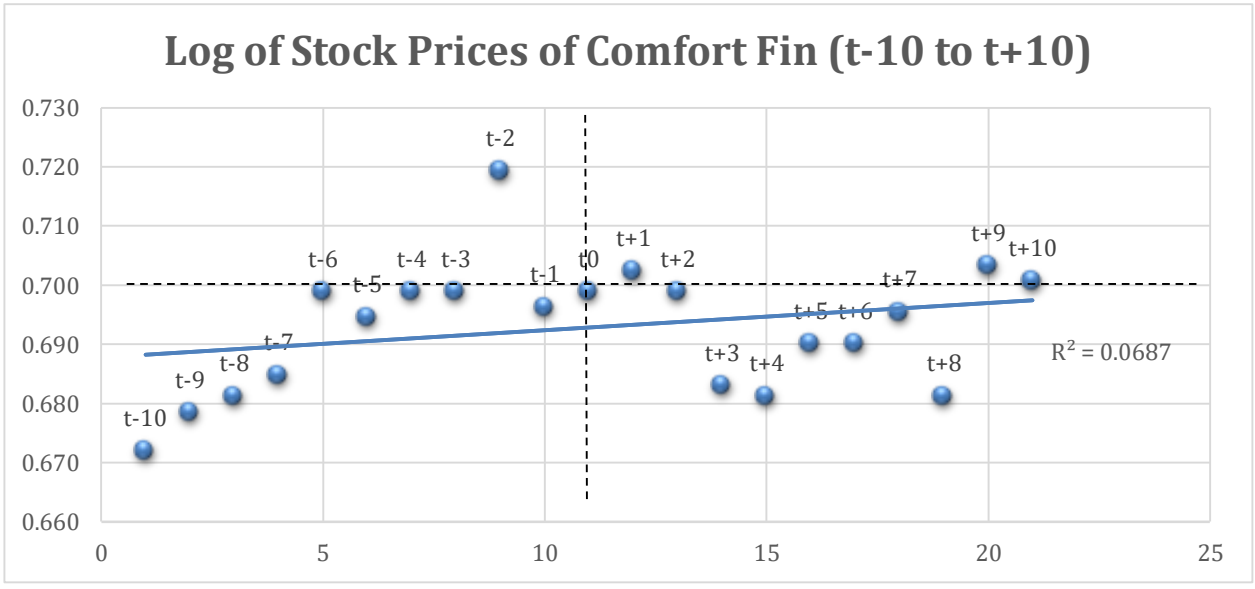
(Source: Authors Calculation from secondary data collected from moneycontrol.com)

7. Figure 7 gives analysis of stock prices of Capitaltrade and Comfort company during 10 days Pre and after Covid-19 Pandemic. Panel A gives stock prices of Capitaltrade company. Stock prices post Covid-19 period was a mixed trend of growth in stock prices all through post Covid-19 period. Panel B is about stock prices of Comfort Finance; it also shows mixed trend of growth in stock prices during post Covid-19 period.

Figure 7: Log of Stock Prices of Capitaltrade and Comfort during 10 days Pre and Post Covid-19 Pandemic



Panel A



Panel B

(Source: Authors Calculation from secondary data collected from moneycontrol.com)

7. Results

The Bombay stock exchange's response to the COVID-19 happening is specifiedthroughnoteworthy abnormal yields throughout the event period. The consequences of determining the average unusualyield are précised in Table 1. The regular Average Abnormal Return stock return value can be affirmative or adverse. The Average Abnormal Returnfor the duration of the event period displays 59.02% or 36 trading days, which are affirmative, and 40.98% or 25 trading days, which are adverse.

Table 2 displays that unusualyield testing before and after COVID-19 has been revealed that there is no significantly reduction in Accumulative Abnormal Returns (AAR) of selected NBFC companies. The acceptance of null hypothesis is justified by the action taken by the RBI to make NBFC sector shock-proof during COVID-19 and lockdown ill-effect. RBI has taken various corrective measures to provide NBFC sector companies for availability of finance by opening separate windows. The COVID-19 pandemiccomplete the BSE Market corrected fairlyintensely.

COVID-19 has led to adverse economic growth and many companies have proficient declining revenues and profits, so many financiers take the decision to sell owing to high ambiguity in the prospect. There was problem with inflow of funds due to non-payment of EMI's by NBFC's client during COVID-19 but RBI has taken timely action by making source of finance available to them. Based on the outcomes of Table 2, the AAR variable has a p-value of 0.3361, which is not less than 0.05, hence null hypothesis cannot be rejected and therefore it indicates that there is no significant difference in the Average Abnormal return on Pre and Post Covid-19 pandemic.

Stock Prices of Edelweiss and Ashikacredit NBFC has showing Positive during post covid-19 period whereas Coral India and Bajaj Finance showed negative trend in stock prices post covid-19 pandemic. Rest of the sampled companies has shown mixed trend in stock prices during post covid-19 pandemic.

Table 2: Calculation of the daily AAR of shares for the duration of the observation period

Before the Event			**Event**			**After the Event**		
Date	**Days to**	**AAR**	**Date**	**Days to**	**AAR**	**Date**	**Days to**	**AAR**
18/12/2019	t-30	-.00430	30/01/2020	t-0	-.00752	31/01/2020	t+1	0.01071
19/12/2019	t-29	-0.00377				01/02/2020	t+2	0.01353
20/12/2019	t-28	0.01092				03/02/2020	t+3	-0.00934
23/12/2019	t-27	0.00303				04/02/2020	t+4	-0.00169
24/12/2019	t-26	0.00380				05/02/2020	t+5	-0.00684
26/12/2019	t-25	0.00250				06/02/2020	t+6	0.00884
27/12/2019	t-24	-0.00815				07/02/2020	t+7	-0.00415
30/12/2019	t-23	0.01480				10/02/2020	t+8	0.01809
31/12/2019	t-22	0.00239				11/02/2020	t+9	-0.00410
01/01/2020	t-21	-0.00315				12/02/2020	t+10	0.01455
02/01/2020	t-20	0.01899				13/02/2020	t+11	0.00252
03/01/2020	t-19	0.01535				14/02/2020	t+12	-0.01299
06/01/2020	t-18	-0.01615				17/02/2020	t+13	0.00472
07/01/2020	t-17	-0.00663				18/02/2020	t+14	0.01496
08/01/2020	t-16	0.00177				19/02/2020	t+15	-0.00383
09/01/2020	t-15	0.00874				20/02/2020	t+16	0.00271
10/01/2020	t-14	-0.02664				24/02/2020	t+17	0.01423
13/01/2020	t-13	0.01278				25/02/2020	t+18	0.01920
14/01/2020	t-12	0.00083				26/02/2020	t+19	-0.01411
15/01/2020	t-11	0.01417				27/02/2020	t+20	-0.01250
16/01/2020	t-10	0.00834				28/02/2020	t+21	0.00101
17/01/2020	t-9	0.00639				02/03/2020	t+22	-0.00486
20/01/2020	t-8	-0.00743				03/03/2020	t+23	-0.01641
21/01/2020	t-7	0.00590				04/03/2020	t+24	0.00018
22/01/2020	t-6	-0.00267				05/03/2020	t+25	0.01181
23/01/2020	t-5	0.00155				06/03/2020	t+26	-0.04002
24/01/2020	t-4	-0.01563				09/03/2020	t+27	-0.03513
27/01/2020	t-3	0.01854				11/03/2020	t+28	0.01181
28/01/2020	t-2	0.00488				12/03/2020	t+29	-0.00538
29/01/2020	t-1	0.00730				13/03/2020	t+30	-0.00206

Table 3: Hypothesis testing results using the t-test

t-Test: Paired Two Sample for Means

	Before the Event	*After the Event*
Mean	0.002281841	-0.000818704
Variance	0.00011232	0.000202669
Observations	30	30
Pearson Correlation	0.044528304	
Hypothesized Mean Difference	0	
df	29	
t Stat	0.977951818	
P(T<=t) one-tail	0.168093171	
t Critical one-tail	1.699127027	
P(T<=t) two-tail	0.336186343	
t Critical two-tail	2.045229642	

9.Conclusion:

The COVID-19 occurrence in India turned out to have an influence on several segments in the Bombay Stock Exchange (BSE). The influence is shown by the advent of mixed sentiment from the segments that occurred during the day of occasions up to the thirty days subsequent the event. The economicsegments have shown to have unusual returns that declinesand on some occasion increases as well during the 30-day period before and after. To regulate the overall impact, a collective calculation of the AAR of the sample was accomplished, which displayed that the COVID-19 pandemic has had an influence on NBFC's stocks on the BSE. The outcomes of this event study, then, were established by advance testing, which reinforced the associationamid the COVID-19 contagion and the considerablyundesirable market returns specified by the unusualyieldssubsequent the event. Stock prices of sampled NBFC is a mixture of positive and negative trend during post covid-19 period.

Researchers have done extensive study on the topic. Under the study researcher has selected NBFC- housing finance companies and taken data related to stock prices during the study period that is pre and post Covid-19. Researchers have implemented the Event Study Method for the purpose of analysing the volatility of stock prices of NBFC- housing finance companies. After making analysis from the data of sampled companies it is found that there is a mixture of positive and negative trends during post Covid-19.

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