Volatility Nature of Financial Time Series Applications During Covid-19 Era

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Abstract:

Covid-19 is a newly discovered infectious disease caused by Carona Virus. Pneumonia of unknown cause was first detected in Wuhan, China. It is the first country reported to World Health Organization popularly known as WHO about Carona Virus in China on 31st December 2019. From that day on words WHO is working 24/7 days to analyze the data, giving the advice to public, coordinate with the partners, helps the countries to prepare, Increase supplies and manage expert networks, …etc. Covid-19 is a name which was declared by Public Health Emergency of International Concern on 30th January 2020. On 11th February WHO announced its name as COVID-19. This period was very terrible period for Indian Stock Market and also the upshots of infectious disease are considerable and turned out to be directly affecting the world wide Stock Markets. In India we have three major stock markets i.e.; Bombay Stock Exchange, National Stock Exchange and Calcutta Stock Exchange popularly known as BSE, NSE and CSE. In stock market generally there is a direct relationship between Risk and Return, there are several reasons which are associated with different people i.e.; investors in the market. Volatility is a one of the statistical measures of the dispersion of returns for a given security in stock markets. The present paper used data for Indian Stock Market Indices of NSE i.e.; Nifty 50, Nifty Infra, and Nifty FMCG during the period of Covid-19. The study covers the period from 12 weeks of pre Covid-19 to 12 Weeks of post Covid-19. The study attempts to evaluate volatility in Indian Stock Market using the indices of Nifty 50, Nifty Infra and Nifty FMCG.

Key words: WHO, Nifty, Covid-19, FMCG, Infra, Volatility, NSE….etc

Introduction:

The Indian Stock Market is highly volatile and is affected by the lot of external factors and other markets in the world. In such a case, understanding the risk and return relationship of stocks with various sectors and markets becomes essential. With the Globalization, many after the Demonetization, recently we have Covid-19 Pandemic brings high rate of volatile and highly interdependent on each other in stock markets were takes place and also any change in global world affects the market and the economy as a whole. Example of global world effect of Covid-19 has been directly affected on Indian Stock Market; nearly 2,919 points were plunged out in one day.

Stock prices are altered every day by the market, the market is depends on supply and demand factors. Buyers and sellers root prices to change as they fix on how precious each stock is. Basically, share prices alteration because of supply and demand. If more people desire to buy a stock than sell it - the price moves upbeat conversely, if more people wish for to sell a stock, there would be more supply (sellers) than demand (buyers) - the price would start to go down. Unpredictability in the stock return is an integral part of stock market with the blinking bull and bear phases. In the bullish market, the share prices rise high and in the bearish market share prices cut down and these ups and downs decide the return and volatility of the stock market. Pricing of securities depends on volatility of each asset. An increase in stock market volatility brings a large stock price change of advances or declines.

Stock markets are also predictable to play a major role in disciplining company's managements. In India, Equity market development received highlighting since the very fast phase of liberalization in premise 'eighties. Additional prominence follow after the liberalization process got deepen and widen in 1991 as development of capital markets was made an integral part of the reorganization strategy. Today, Indian markets conform to international standards both in terms of structure and in terms of working efficiency.

Literature Review:

The impact of the COVID-19 is of decisive importance, chiefly since its first epidemic happen in China, which is the main center of foreign investment in Asia. Researchers accept as true that COVID-19 and SARS belong to the same family, but these two epidemics differ significantly. Many previous studies related to the economic effects of the infectious virus epidemic could be referred to as we discuss the impact of COVID-19.

According to "Juhi Ahuja" (2012) present a review of Indian Capital Market & its structure. In last decade or so, it has been experiential that there has been a pattern shift in Indian capital market. The application of many reforms & developments in Indian capital market has made the Indian capital market comparable with the international capital markets. Now, the market features a developed regulatory mechanism and a modern market Infrastructure with growing market capitalization, market liquidity, and mobilization of resources. The emergence of Private Corporate Debt market is also a good innovation replacing the banking mode of corporate Finance. However, the market has witnessed its worst time with the recent global financial crisis that originated from the US sub-prime mortgage market and spread over to the entire world as a contagion. The capital market of India delivered a sluggish performance.

Objectives of the Study:

1. To study the causes of volatility in Indian Stock Market using Nifty50.

2. To study the volatility of Nifty Infra in Indian Stock Market
3. To study the volatility of FMCG in Indian Stock Market

Impact of Covid-19:

The Indian economy has been experience considerable slowdown over the past few quarters. In the third quarter of the existing fiscal, the economy grew at a six-year low rate of 4.7%. Investment and utilization demand had been languishing and a number of spur measures have been taken to carry back the financial system on a growth path. There was a strong hope of healing in the last quarter of the current fiscal. However, the new corona virus epidemic has made the recovery extremely difficult in the near to medium term. The outbreak has presented bright challenges for the Indian economy now, causing severe disruptive impact on both demand and supply side elements which has the potential to derail India's growth story.

Impact on Financial Market - Greater uncertainty about the future course and consequence of Covid-19has also made the financial market tremendously explosive, leading to massive crashes and wealth erosion, which in turn is impacting consumption levels. One of the major slide in the domestic equity markets was seen on March 12th 2020, when following the trend of the global equity markets, both the BSE Sensex and NSE Nifty crashed by more than 8% in a single day. The BSE Sensex dropped over 2,919 points – its biggest one-day fall in supreme terms while the NSE Nifty dropped by 868 points. Estimated Rs 10 lakh crore of Market Cap was supposedly wiped off due to this single day fall. The fall has continued till date as investors resorted to persistent selling amid rising cases of coronavirus. On March 19th 2020, Indian equity markets again plunged to new low. Sensex closed 581 points lower at 28,288 and Nifty fell down by 205 points to end at 8,263. With equity markets likely to stay volatile in future as well, further wealth erosion of investors is expected.

Research Methodology:

Data Collection: The study is based on secondary data. The required data related to Indian Stock Market, National Stock Market (NSE) have been collected from various sources i.e. Bulletins of Reserve Bank of India, publications from Ministry of Commerce, SEBI Handbook of Statistics, Govt. of India. CNX Nifty data is down loaded from the websites of NSE. Daily closing index value are taken and averaged to get the index value for each week, which is considered as more representative figure of index for the entire week rather any one day closing figure of the index.

Volatility in Indian Stock Market:

Nifty50:

The following Table 1 shows Nifty 50 date wise description for 12 weeks of the sample. After describing date wise, descriptive statistics for Nifty 50 Indices was conducted each week wise during Pre Covid-19 and Post Covid-19. The change was taken among the difference between Pre Covid-19 indices and Post Covid-19 indices. The Highest indices were identified in 3 rd week with 12348.60 in pre Covid-19. Where as in Post Covid-19 the highest change was found in 12th week with 10058.06,

However, in the start of 2020, there was overall recovery which led to both NSE and BSE traded at their highest levels ever, hitting peaks of 12,362 and 42,273 respectively. At the beginning of the year, there were close to 30 companies that were expected to file IPO's. The market conditions were generally favorable as they witnessed record highs in mid-January, The COVID-19 pandemic has led to a major re-pricing and re-positioning in Capital Market.

Table 1
The Stock Market has a history of crash and recovery

year of scam	**Name of the Scam**	**Sensex plunged**	**Recovered (%)**	**Recovered (Years)**
1992	Harshad Mehta Scam	53 % in one year	127	1.5 years
1996	Asian Crisis	40 % in 4 years	115	1 year
2000	Tech Bubble	56 % in 1.5 years	138	2.5 years
2008	Real Estate – Lehman" crisis	61 % in a year	157	1.5 years
2020	Covid -19	30 % in Less Than 3 Months	No one knows when the economy will be back on track	Experts even compare this meltdown of economies with the "Great Depression" of the 20th Century.

COVID-19 is a black swan event: Throughout history, there have been highly implausible events that grab almost everyone by surprise and can potentially have a large impact on the status quo by troublemaking human activities and creating destruction; such kind of events is called black swans. Black swan is the incidence of a highly unforeseen event that also has a tremendous impact. The ground of finance frequently attempt to imprison outlier events and fails with equal regularity. Impact of novel coronavirus (Covid-19) on the stock market is one such event, which has all characteristics of black swan.The outlook in the stock markets across the world is murky. This is reflecting in the numerous crashes in the share markets in all parts of the world. Financial markets in India are witness quick volatility currently as a result of the fallout in global markets.

The following Table 1 clearly describes the week's description during pre Covid-19 and Post Covid-19 to study the volatility of Nifty50, Nifty Infra and Nifty FMCG Indices

Table 2

Week's description for Pre Covid-19 and Post Covid-19

Weeks	Pre Covid-19	Post Covid-19
1 week	30-12-2019 To 03-01-2020	23-03-2020 To 27-03-2020
2 week	06-01-2020 To 10-01-2020	30-03-2020 To 03-04-2020
3 week	13-01-2020 To 17-01-2020	07-04-2020 To 09-04-2020
4 week	20-01-2020 To 24-01-2020	13-04-2020 To 17-04-2020
5 week	27-01-2020 To 31-01-2020	20-04-2020 To 24-04-2020
6 week	03-02-2020 To 07-02-2020	27-04-2020 To 30-04-2020
7 week	10-02-2020 To 14-02-2020	04-05-2020 To 08-05-2020
8 week	17-02-2020 To 20-02-2020	11-05-2020 To 15-05-2020
9 week	24-02-2020 To 28-02-2020	18-05-2020 To 22-05-2020
10 week	02-03-2020 To 06-03-2020	26-05-2020 To 29-05-2020
11 week	09-03-2020 To 13-03-2020	01-06-2020 To 05-06-2020
12 week	16-03-2020 To 20-03-2020	08-06-2020 To 11-06-2020

The sample period to study the volatility in Indian Stock Market is 12 weeks before Covid Lockdown and 12 weeks after Covid lockdown as we mentioned in the above table 1. The following Table 2 clearly describes the week wise descriptive statistics of Nifty50 during pre Covid-19 and Post Covid-19.

Table 3

Week- Wise Nifty50 Changes during Pre Covid-19 and Post Covid-19

Week	Pre Covid Average change in percentage	Post Covid Average change in percentage
1	-0.93	-0.93
2	1.98	6.98
3	-1.31	1.80
4	-1.57	1.49
5	0.07	3.69
6	1.02	-2.88
7	-0.90	-0.26
8	-3.22	-2.56
9	-3.77	4.12
10	-9.61	6.99
11	-13.69	0.50
12	-5.98	-5.10

Table 4
Week- Wise Descriptive Statistics for Nifty50

	Pre Covid-19	Post Covid-19
Mean	-3.16	1.33
Maximum	1.98	6.99
Minimum	-13.69	-5.10
SD	4.58	3.75
VARIANCE	-1.45	2.82

The above table shows Nifty50 index statistical analysis. The analysis was interpreted in two views i.e.; Pre Covid-19 and Post Covid-19. In case of Pre Covid-19 mean value of 12 weeks was observed as -3.16, the maximum average index among 12 weeks was 1.98 and minimum of -13.69, Standard Deviation is 4.58 and with the variance of -4.5. In case of post Covid-19 it was observed that mean is 1.33, maximum is 6.99 in week and minimum is -5.10 in week, SD is 3.75 and variance was 2.82. From this analysis we can found that, it would be foolish to expect a quick economic rebound from the current COVID-19 effect. Though the financial crisis is inevitable, considering all-out efforts by central banks and fiscal authorities, to soften the blow, deep economic slump might be avoided. The problem in the current scenario is that until we know how quickly and thoroughly the public-health challenge will be met, economists cannot predict the endgame of this crisis. Trade-in 2020 is expected to fall steeply in every region of the world and basically across all sectors

Nifty Infra:

The majority infrastructure companies make the bulk of their annual sales and new orders in the 4th quarter of a fiscal year. The pandemic and the subsequent nationwide lockdown in the country more added to the woe of these companies that have already been facing growth challenges.“There is no doubt that most infrastructure companies will not meet their FY20 order inflow and sales. Not anything happened in the last pandemic period, which generally sees a lot of activity. Anyway, the orders had slowed down and companies were under force; this has only made it not as good as,” Kejriwal said.

The following Table 5 clearly describes the week wise descriptive statistics of Nifty50 during pre Covid-19 and Post Covid-19.

Table 5

Week- Wise Nifty Infra changes during Pre Covid-19 and Post Covid-19

Week	Pre Covid Average change in percentage	Post Covid Average change in percentage
1	-0.30	2.90
2	2.11	7.58
3	0.34	4.14
4	-1.92	1.51
5	-0.53	2.38
6	0.35	0.34
7	-0.82	1.66
8	-4.19	-1.19
9	-3.66	3.47
10	-9.90	5.32
11	-11.66	0.87
12	-6.68	-4.97

Table 6

Week- Wise Descriptive Statistics for Nifty Infra

	Pre Covid-19	Post Covid-19
Mean	-3.07	2.00
Maximum	2.11	7.58
Minimum	-11.66	-4.97
SD	4.32	3.20
VARIANCE	-1.40	1.59

The above table shows Nifty Infra index statistical analysis. The analysis was interpreted in two views i.e; Pre Covid-19 and Post Covid-19. In case of Pre Covid-19 mean value of 12 weeks was observed as -3.07, the maximum average index among 12 weeks was 2.11 in 2nd week i.e; from 06-01-2020 To 10-01-2020 and minimum is -11.66 11th week i.e; from 09-03-2020 To 13-03-2020 and Standard Deviation is 4.58 and with the variance of -4.5. In case of post Covid-19 it was observed that Mean is 2.00, Maximum is 7.58 in 2nd week from i.e; 30-03-2020 To 03-04-2020 week and Minimum is -4.97 in 12th week i.e.; 08-06-2020 To 11-06-2020, SD is 3.75 and variance was 2.82. From this analysis it is being believed that corona virus outbreak's impact on the infrastructure and construction segment is expected to be worse than that of the 2008 financial crisis-led economic slowdown. Reports say that the imposition of Section 144 by state governments and suspension of public transport till March 31 has already impacted manpower mobility. Strict checks on the same have led too many corporate scaling down their operations.

Nifty FMCG:

The three-week long lockdown will impact earnings of FMCG sector in Q1 (April-June quarter), and it is not clear if it will linger to the second quarter, according to a Godrej Consumer top official.FMCG will be more resilient than other sectors and should bounce back faster. And within FMCG, consumer staples should recover faster than discretionary items," In the past two months, the coronavirus-induced lockdown has led to innovative partnerships when it comes to delivery of essential goods, particularly from FMCG companies. Most FMCG companies plan to continue the partnership even after the lockdown. At a time when, stepping out has become risk for consumers due to risk of COVID-19, FMCG companies are entering in to tie ups to enable door-step delivery to consumers. With supply chain concerns, and acute shortage of manpower, last mile delivery was becoming challenging for companies, particularly when there was high demand of essentials. This affected the sales of FMCG companies.

The following Table 7 clearly describes the week wise descriptive statistics of Nifty50 during pre Covid-19 and Post Covid-19.

Table 7

Week- Wise Nifty FMCG changes during Pre Covid-19 and Post Covid-19

Week	Pre Covid Average change in percentage	Post Covid Average change in percentage
1	-0.60	7.76
2	3.83	8.80
3	0.24	1.32
4	0.15	-1.67
5	-1.17	0.18
6	-3.24	-6.65
7	2.72	-0.16
8	-0.50	1.78
9	-2.16	4.43
10	-9.38	3.50
11	-8.71	-0.40
12	-0.57	-0.88

Table 8

Week- Wise Descriptive Statistics for Nifty FMCG

	Pre Covid-19	Post Covid-19
Mean	-1.61	1.50
Maximum	3.83	8.80
Minimum	-9.38	-6.65
SD	3.95	4.21
Variance	-2.44	2.80

The above Table No 8 shows Nifty FMCG index statistical analysis. The analysis was also interpreted in two views i.e.; Pre Covid-19 and Post Covid-19. In case of Pre Covid-19 mean value of 12 weeks was observed as -1.61, the maximum average index among 12 weeks was 3.83 in 2nd week i.e.; from 06-01-2020 To 10-01-2020 and minimum is -9.38 in 10th week i.e.; from 02-03-2020 To 06-03-2020 and Standard Deviation is 3.95 and with the variance of -2.44. In case of post Covid-19 it was observed that Mean is 1.50, Maximum is 8.80 in 2nd week from i.e.; 30-03-2020 to 03-04-2020 week and Minimum is -6.65 in 6th week i.e.; 27-04-2020 to 30-04-2020, SD is 4.21 and variance was 2.80.

Conclusion:

Infra: A research report by Emkay Global Financial Services experiential that the fiscal condition in the construction sector for both the Centre and states is already worsening and continued funding of infrastructure capital expenditure (Capex) will be a confront in close proximity to future. The report pointed out that furthermore all these problems will be further provoked by the relief packages that are being roll out by many states to support the loss of income caused by the lockdowns. This may additional stress the government's ability to expend on the infrastructure over the next one or two years, further dampening the construction and the infrastructure sector.

one more report on the infrastructure segment bring out by HDFC Securities piercing out that the lockdown has resulted in various infrastructure project sites stare at closure. The reports avowed that it is mainly due to an effect on the labour movement due to the lockdown and also due to supply chain disruption that may contract further over the next three or four days as more states put into effect COVID-19 lockdown. The report observed that the state borders are also getting sealed to restrict movement and only essentials items are allowed to pass.

Even companies providing bitumen, steel and cement might look at a wait and watch move toward as liquidity tighten. The HDFC Securities report further observed that the elongation of working capital will also impact payment to suppliers. Besides this the bank are also anticipated to slow down disbursals due to shortage of manpower at their head offices and overall reduction in implementation at site.

FMCG: Five trend that are likely to play out for the FMCG sector due to Covid Most FMCG companies forged swift tie-up with delivery companies such as Zomato and Swiggy.

Ruralconsumption-driven growth Reverse relocation, a good monsoon and increased government expenditure through MNREGA and other public projects are likely to guarantee increased demand from rural India. Rural consumption has been a straggler during the quarters preceding the pandemic. According to a World Bank report, the nationwide lockdown impacted 40 million internal migrants. Now, such a large migration from urban to rural areas may well tilt the growth in consumption in favor of Bharat.

E-commerce demand is here to stay Most FMCG companies' forged swift tie-ups with delivery companies such as Zomato, Swiggy, Dominos, Big Basket and Dunzo to ensure that their products reach the customers ordering online. Companies expect this demand to increase over the pre-Covid levels since the lockdown prompted people to get used to online ordering and the convenience of home-delivered groceries. Ullas Kamath, joint managing director of Jyothy Labs, expects the share of sales through e-commerce for the industry to increase from 2-3% before Covid to 4-5% post-Covid.

Brand equity and distribution strength to be the determinants of recent forays Seizing the opportunity offered by Covid, almost every FMCG company launched its brands in the hygiene categories of hand wash and sanitizer, adding to the clutter in these categories that were otherwise small and niche. However, brand equity, size of the SKUs, the company's distribution strength and competition from private labels are likely to decide the fate of brands, which will stick around on a longer term basis and those that won't. Vegetables wash is another category that is emerging to see more players entering it.

Renewed focus on cost control with top line growth under constraint during lockdown, companies are likely to be keener on enhancing profitability. Cost control is a major tool for the companies to improve the margins. Tighter credit terms, judicious advertising and effective use of digital marketing will help companies rein in costs. For instance, HUL's investor presentation for the March quarter listed laser focus on receivables, dynamic inventory management, unlocking cash from surplus assets, optimizing Capex and restructuring spends as measures towards controlling costs.

The Q1 FY21 show is likely to be an aberration—positive or negative For companies selling staple foods, the lockdown period has seen super-normal sales with increased home consumption and also stocking up. In contrast, companies with largely optional portfolio are likely to report passive off-take. Biscuit companies such as Britannia and Parle Products, for instance, reported a unexpected jump in sales in March due to lockdown and are likely to likewise report exceptional sales in the June quarter, which bore the brunt of lockdown the most. The normalcy in sales is likely to be seen from the second quarter of this fiscal.

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