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Original Article

An Analysis on Stock Market Volatility in an Emerging and Developing Economy During Global Pandemic

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Abstract

Unavoidably, COVID-19's global epidemic brought about a significant drop in every sphere of the economy. This study examines the impact of COVID-19 on Indian stock market performance by using a moving average and historical values of the Nifty 50 and S&P BSE SENSEX. The investigation's goal is to pinpoint the Indian Stock Exchange's BSE and NSE weaknesses and the volatility during that time span. The results demonstrate that the pandemic had a major influence on the industries included in this research. But the rise in COVID-19 cases starting in January 2020 and the deaths that followed in 2021 caused the biggest stock market decline ever seen. Despite that, the market saw a record-breaking high on both the NSE and the BSE by the end of 2021. Following the Covid's impact, the Indian financial market also experienced a sharp downturn. During this time, the Nifty dropped 7500 points and the BSE dropped about 920 points. This research focuses on the volatility of the stock market across this time frame. By the afternoon of April 5th, 2021, investors had lost more than Rs. 4.54 lakh crore. The investors lost a total of 7.36 lakh crore in just 7 months.

Keywords: ***COVID-19; Bombay Stock Exchange; National Stock Exchange; Stock market; Share price***

Introduction:

The stock market has become more liberalized as part of the process of economic liberalization. The Indian corporate sector has been allocated a significant role in financing. The stock markets' main tasks include providing liquidity to investors, monitoring and disciplining business management, and mobilizing capital for investment directly from investors. The stock market's main draw is that it allows companies and governments to raise funds directly from investors while also providing liquidity to those who invest. Liquid markets are also seen to help with resource allocation and long-term economic growth prospects. Stock markets are also likely to play a significant role in reining in firm executives. Since the early 1980s, when India was still in the early stages of liberalization, equity market growth has been a priority. Following the deepening and widening of the liberalization process in 1991, the development of capital markets was declared an integral aspect of the restructuring agenda. In terms of structure and operational efficiency, Indian markets now comply with international standards.

As a result of the suspension of business due to the epidemic of COVID-19, markets throughout the world, including the Indian market, fell. During this time, volatility has increased, and the situation is becoming worse. Even small investors had it rough since they couldn't position themselves advantageously or profit from the market. COVID-19 directly heated SMEs and clarified minimal

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supply-side actions that even stopped on transit (Pandey & Ojha, 2020). Businesses would be compelled to fire employees, resulting in a spike in the unemployment rate (Agarwalla, Varma & Virmani, 2021). Investors had lost more than Rs 4.54 lakh crore by the afternoon of April 5th, 2021, when markets crashed owing to a huge rise in coronavirus infections around the country. The 30-share BSE index fell 867 points, or 1.73 percent, while the NSE Nifty fell 228 points, or 1.54 percent, to 14,639 points. Nifty IT was the only NSE sub-index trading in the green, while Nifty Bank, PSU Bank, and Financial Services all fell up to 3.94 percent (as of April 5th and later). It was the worst market collapse in seven months, with investors losing a total of Rs 7.36 lakh crore. Benchmark indexes smashed through many levels of support seen on technical charts. Investors' investment choices underwent a shift over the course of COVID-19. Investing in low-risk assets has become increasingly attractive. Gold, bank accounts, and state provident funds round out the top five investment options (PPF) based on what has been learned thus far (Himanshu *et al*., 2021). Equity investors lost a total of Rs 3.22 lakh crore after BSE-listed companies' market values fell by Rs 202.53 lakh crore at the close of trading on Monday. In recent weeks, the number of Covid-19 instances has increased, scaring the D-street bulls and costing investors more than 3.2 lakh billion rupees (Shubham, 2021). Lockdowns and public health measures are strongly related to all areas of the economy, which led to economic instability in the countries and signalled a change in market dynamics (Gupta, Poddar & Ghosh, 2021).

The traditional method of commerce is no longer in use in this day and age, and the securities market is now open to anyone. The world market is additionally called the exchange or share market all over the globe. The securities market is an organized marketplace for the acquisition and sale of commercial and money securities. The exchange is an organized marketplace for the sale and purchase of securities like shares, stocks, and bonds. By following SEBI's well-defined tips, an exchange may be a platform wherever consumers and sellers move to trade money securities. With the assistance of technology, the securities market has become easier by providing quicker trade settlement, increased transparency, increased security, machine-controlled police investigation, and tonnes more.

Stock Market Volatility: The term "volatility" is just another term for the risk associated with any amount of money. It’s the rate at which the value of a security will increase or decrease for a given set of returns. Primarily, volatility is measured by standard deviation; it reflects how the average stock price differs from the mean over a period. Higher volatility represents more uncertainty about financial security and the price fluctuations of that asset. For controversy, lower volatility means less uncertainty and less price fluctuation for financial security. The COVID-19 pandemic created a large amount of risk and uncertainty around the globe. The impact of this is often not as well-known as the other global crises. In crisis-like events like pandemics, partial lockdowns hurt developing nations' economies and financial markets. The stock market's financial performance is expected to decline due to public concerns about diminishing economic activity, lower disposable income, and an unfavorable investor mood.

The direct measurement of volatility is the standard deviation. There are three types of stock market volatility: -

- Historical
- Implied
- Realized

The influence of COVID-19 on the Indian stock market is the subject of this research.

Volatility as a result of the COVID-19 epidemic. The whole world is taken by surprise. To tackle this majority of spreaders, the government of Bharat declared a nationwide imprisonment on the evening of March twenty-four, 2020. These ways of keeping people apart and putting limits on transportation hurt the productivity of businesses by making them more expensive to run, bringing in less money, and

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making it harder to make a living. The crisis and its impact are also mirrored within the stock exchange. Hence, the COVID-19 occurrence event is crucial to looking at stock value volatility.

Review of Literature:

A variety of models are used to model financial data, some of which are more complex than others. When there are still times of low volatility, volatility clustering occurs. Times of high volatility are alternated with periods of great returns. One of the most well-known characteristics of financial data is that it returns. The GARCH and ARCH techniques are two well-known methodologies. ARCH (Autoregressive Conditional Heteroskedasticity) is an acronym for Autoregressive Conditional Heteroskedasticity. Generalized Autoregressive Conditional Heteroskedasticity (GARCH) is an acronym for Generalized Autoregressive Conditional Heteroskedasticity.

Bora and Basistha (2021) examine COVID-19 by presenting a comprehensive study of how COVID-19 has altered the performance of the stock market in India and how much the market was volatile during that time. This study clarifies how markets react to a pandemic.
It's also driven by the demand for additional data on how financial markets react to unforeseen occurrences. Since COVID-19 has infected every nation in a short time, researchers have studied its influence on mature and developing economies.

This study explores the volatility of the stock market during the COVID-19 period for academic research purposes. This research is also driven by a demand for more detailed information on how financial markets react to unexpected or unpredictable events. Using liquid Nifty index options traded on the NSE for the period January 1 to May 31, 2020, (Agarwalla, Varma & Virmani, 2021) evaluated the influence of COVID-19 on Indian stock markets. The influence of COVID-19 on market-wide uncertainty and tail risk represented by the options market was studied. According to the findings, there were significant shifts in the first four seconds of the risk-neutral distribution of the future stock market index.

Zhang *et al.* (2021) By conducting an examination of the top 10 COVID-19-infected nations, this study found that the pandemic increased the risk and uncertainty in the worldwide market. As Baker *et al*. (2020) found, COVID-19's market fluctuations were far larger than those of SARUPEES, swine flu, MERUPEES, and the Ebola and bird flu pandemics of the same era.

(Varma *et al*., 2021) A market-capitalization-weighted NIFTY50 index of 50 stocks of major blue-chip businesses was used to calculate the NIFTY50 index's daily security prices. This index reflects around 65 percent of the NSE's float-adjusted market capitalization. The research makes use of three models: the constant return model, the market-adjusted model, and the market model. Prior to and after the incident, abnormal returns were observed. The financial industry was hit the hardest, but none the less, it was a temporary setback for everybody. Many of these industries had either favourable or limited influence. The car industry was hit hard by the devaluation.

Chaudhary, Bakhshi and Gupta (2020) used two composites to examine the impact of COVID-19 on the performance of the Indian stock market. The daily data from January 2019 to May 2020 has been used to compare the Bombay Stock Exchange's composite indices (BSE 500 and BSE SENSEX) and eight sectoral indices (Auto, Bankex, Consumer Durables, Capital Goods, Fast Moving Consumer Goods, Health Care, Information Technology, and Realty) to three global indices (S&P 500, Nikkei 225, and FTSE 100).

It was shown in the study's conclusions that COVID-19 had a lower mean daily return than particular indexes when the GLS regression was used to assess the influence COVID-19 had on several

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measures of volatility, such as standard deviation, bias, and kurtosis. Relatively poor returns during the crisis compared to the years before it.

As per the study by Bhatia and Gupta (2020), Indian banking sector oral indicators were compared to the overall banking index using asymmetric and symmetric models, taking into account the Sub-prime crisis and COVID-19. Researchers found that despite the leverage impact that occurred during the sub-prime crisis, these indexes' volatility characteristics were sufficient to maintain their market presence. When comparing Nifty Bank Indices and Private Sector Bank Indices to Public Sector Undertaking Bank Indices during COVID-19, this impact disappeared. According to the findings of the research, investors may use the GARCH and EGARCH models to safeguard their portfolio values against global shocks over the long term.

According to the study by Shankar and Dubey (2021), the direction of the shift in trade volume after the pandemic is unknown, especially in real estate. After the pandemic was declared, NIFTY-50 trading volume rose. All nine sectors showed a considerable shift in returns after COVID-19, but it's uncertain which direction. The NIFTY-50 index had similar outcomes before and after COVID-19. COVID-19's mean returns were greater in eight sectors, including metals, financial services, banking, energy, FMCG, IT, pharmaceuticals, and auto. Real estate returns fell after COVID-19. The COVID-19 NIFTY-50 returns were greater than the pre-COVID-19 results. The Indian stock market's volatility dropped during COVID-19, which is negatively connected to investor confidence.

Research GAP: The financial market shock caused by COVID-19 has renewed interest in empirical research. It is noteworthy to see that, as several studies have noted, this pandemic has spread to the financial sector. The Garch model, the arch model, standard deviation, and many more methodologies have all been used in several studies on this topic. Moving average implementation is extremely rare. It is a strategy that helps in acquiring a general picture of the trends in a data set and is an average of any subset of values. This method is used in this study to examine market patterns that occurred throughout the COVID period.

Methodology

The study's goal is to see how the COVID-19 outbreak has affected the Indian stock market. This study relies on secondary data from the NSE and BSE official websites. The market volatility during COVID-19 (data considered for the time period from January 1, 2020 to December 2021) was calculated using historical prices obtained from both sides. The time span encompasses the activity in question during the pandemic. The time period is broken into eight sections. Sections of months will begin on January 1, 2020. Stock market indexes are prepared using NSE and BSE datasets. This research employed the NIFTY 50 index, a weighted average of the 50 biggest Indian corporations listed on the NSE. The S & P BSE SENSEX is a market-weighted index of 30 well-known, financially healthy Bombay Stock Exchange companies.

For data entry and calculations, this study employed Google excel sheets. The project is written in Microsoft Word.

Research Objective:

1. To determine the volatility of the stock market during the COVID19 period.
2. To investigate the impact and fluctuations in the stock market throughout this time period.

Research Design: This study used daily closing prices to calculate the daily percent change of stocks. The daily percent change of stocks is calculated as previous day price minus current day price divided by current day price. The next step is to calculate the moving average volatility of stocks by

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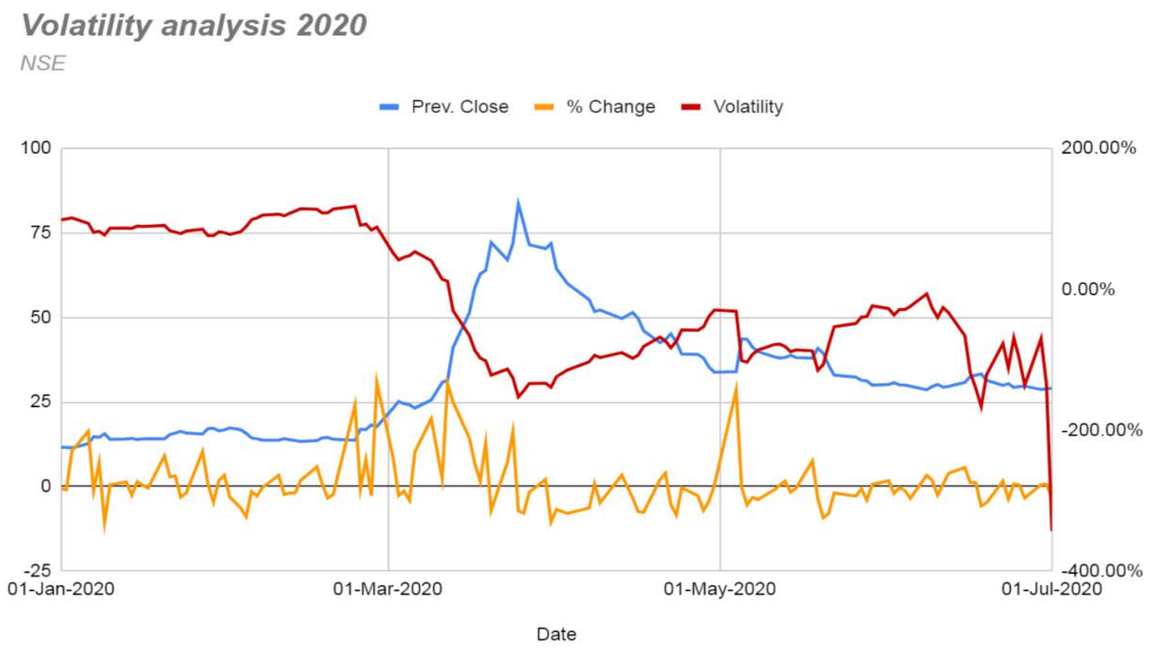
adding up all of the daily percent changes and averaging them. This graphical representation depicts the event's impact.

Results and Discussion:

The volatility is shown in the graph after the data analysis. This graphical representation's data set spans the first months of Covid 19 to July 2021. If one looks at the percent change line on the graph for COVID 19, it is easy to see that prices in India fluctuated significantly during the first few months of the epidemic. The technical analysis of the selected stock Indices (Nifty 50) for the study period are presented in Figure 1.



Source: - NSE nifty fifty stock Index Data

Figure 1: Graphical Representation of NSE

The Nifty 50's volatility is represented by the red line. During COVID-19, the red line plainly represents the market's downturn. The stock market dropped by 20% in the first few months. The graph also shows a big peak in the market during the last month of the year. In the span of two days in March (4th & 6th), the stock market lost roughly 1,000 points and a few million dollars in value.

At 538 points lower, the Nifty-50 was down on March 9, 2020. India has been devastated by the fear of a COVID-19 epidemic, which has spread over the globe. In addition, the markets closed in the red, with the Nifty sharp escalation in restrictions again. -50 closed at 10,451.45. The Nifty-50 fell by 868.2 points on March 12, 2020. Due to the worldwide economic slump, the Nifty fell below the 9200—mark on March 16, 2020, closing at 9,197.40. Nifty fell 1,135 points (12.98 percent) to 7610.25 on March 23, 2020, after coronavirus-related lockdowns around the world sparked worries of a global recession. This is the lowest it's been since 2016. It has lost the most money in a week since October 2008.

From the next Figure 2 it is observed that the massive volatility of stocks during this time.

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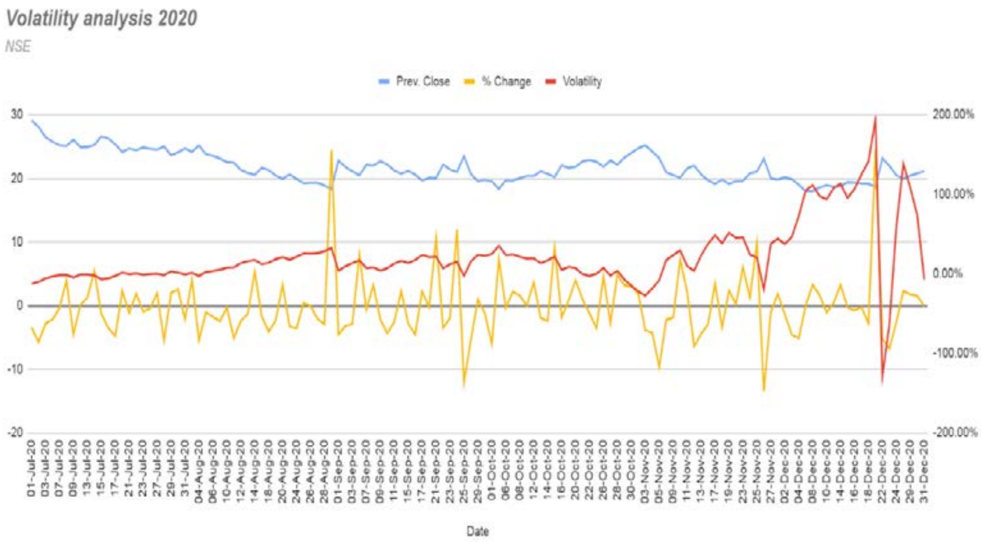

Source: - NSE nifty fifty stock Index Data

Figure 2: Graphical Representation of NSE

The red line in graph is indicating the massive volatility in the period. Initially, it was in normal manner but later on the red line is indicating extreme fluctuation as the volatility indicator.

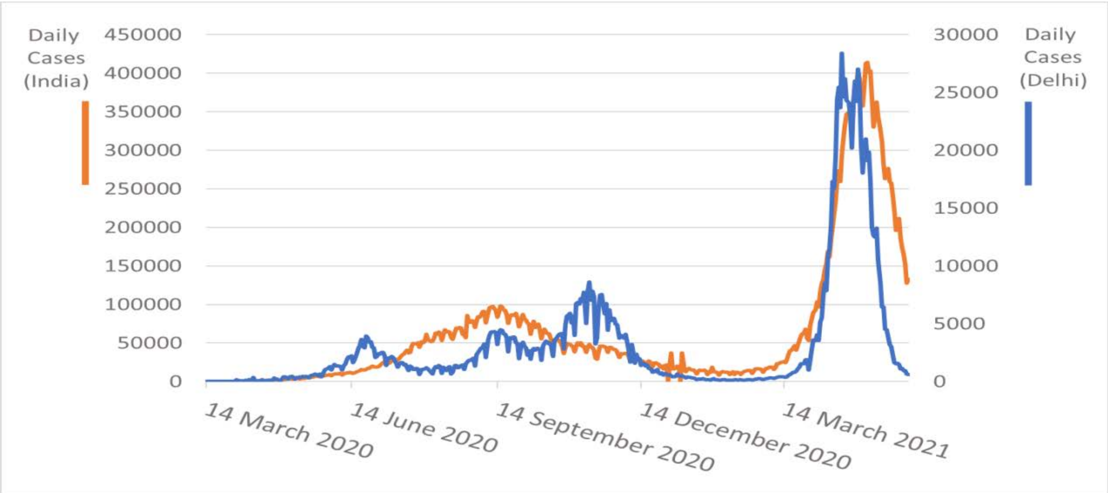

Figure 3: Graphical Representation of: India's two wave's vs Delhi's four waves in the same time span taking into consideration daily COVID-19 instances

In reference to Figure 3, COVID infection cases are observed in the graph. As Delhi is infected in a very bad manner, other cases in India are compared with Delhi. This created an extra effect on the market because there was no hope of ending the situation. Many individuals were taken by surprise when markets reached a lifetime high amid the deadly second wave of the COVID outbreak in India. During the height of the panic in March, net foreign investor withdrawals were $8.4 billion, while the stock market's weak response to India's infectious crisis was only $1.5 billion in April, according to Print magazine. After four straight weeks of outflows, they became net purchasers of Indian shares this week. State governments have averted a fall in economic activity like last year by implementing more restrictive and regional lockdown measures, but the epidemic has the potential to prompt a rapid increase in restrictions again. The volatility of the stock market remains silent this time. According to CNBC, FIIs keep buying because there is a lot of cash available, vaccines are being made, the

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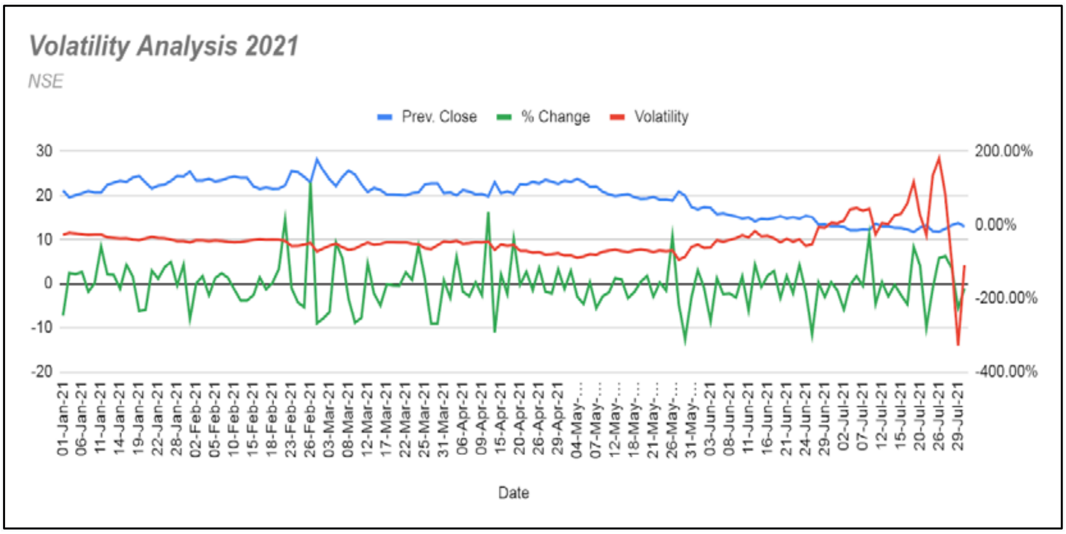
economy is slowly getting better, and they expect stimulus packages from developed countries (Mazumdar & Acharya, 2021).

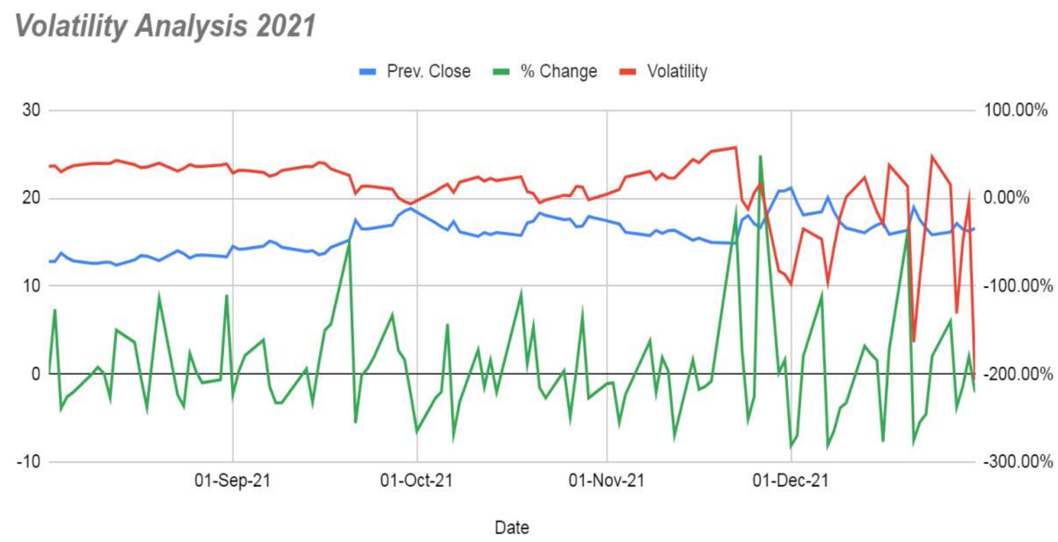
The second wave appears to be a repeat of the March to June 2020 period. However, from the point of view of the market, it is not the same. There was a lack of awareness about the pandemic from the beginning, as it was brought to a halt by an utterly unforeseen and unanticipated disaster (Mazumdar & Acharya, 2021).



Source: - NSE nifty fifty stock Index Data

Figure 4: Graphical Representation of (NSE)

According to the NSE Market Report in Q4 FY 21, aggregate net sales for Nifty 50/Nifty 500 firms increased by 15.7 percent /18 percent Y to Y, the best in eight quarters, albeit from a low base (-6.2 percent /6 percent in Q4 FY20), despite falling by 3.7 percent /4.2 percent in FY21. A strict nationwide lockdown in the same quarter last year exacerbated persistent weakness in consumption demand before the COVID-19 outbreak hit the country.



Source: - NSE nifty fifty stock Index Data

Figure 5: Graphical Representation of (NSE)

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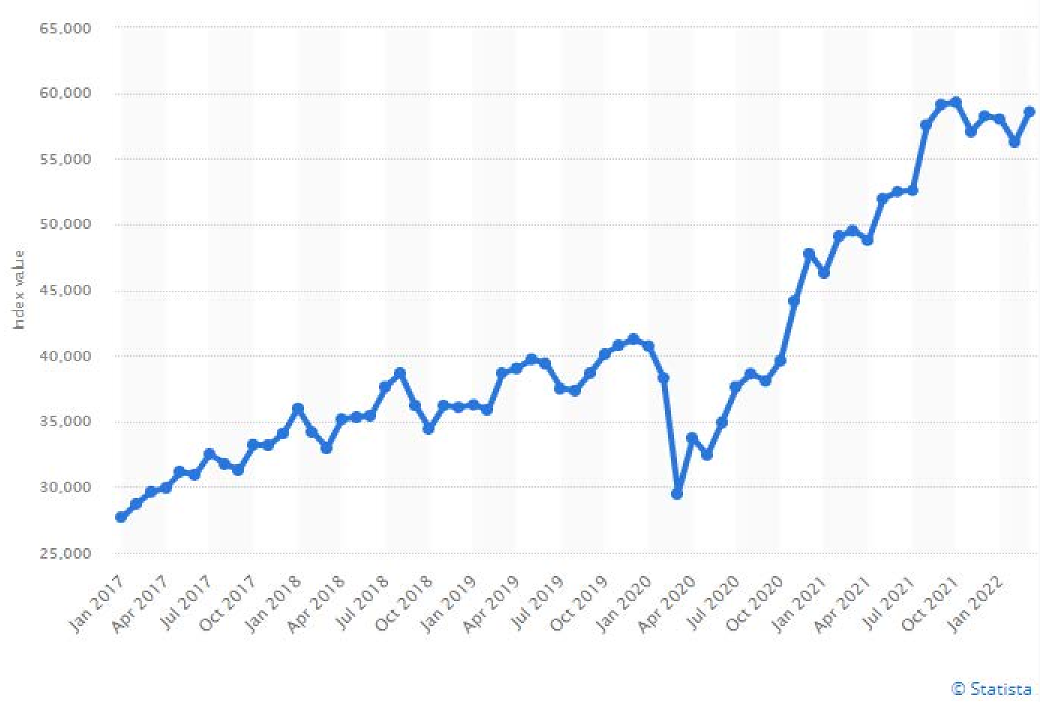
Higher realizations on surging commodity prices, a steady improvement in consumption demand post the festive season and vaccination roll-out, and easing supply-side bottlenecks in amongst the limited lockdown restrictions during the quarter helped Nifty 50/Nifty 500 companies' net sales grow by a strong 9.3 percent /8.0 percent (https://www.nseindia.com/resources/publications-market-reports).

Above the graph represents high price fluctuations and volatility among stocks during this last month of the year. Because to COVID-19's devastating second wave and its impact on the economy in FY21, this was truly the case. With this, the top 200 companies' earnings are predicted to expand at a CAGR of 27.6 % between FY 21 and FY23(https://www.nseindia.com/resources/publications-market-reports).

On February 1st, 2020, the government announced the Union Budget, following a 2% drop in the SENSEX due to the coronavirus scare. On February 28, 2020, the nifty and the Sensex saw their biggest weekly decline since 2009 when the WHO proclaimed a pandemic of the coronavirus, according to the publication "The Week".

On the other hand, the BSE (Bombay Stock Exchange), the SENSEX finished the roller coaster trip of 2020 at a new closing high, supported by optimistic global market sentiment. Despite falling to a multiyear low in March due to the coronavirus outbreak, the index has risen 15.75 percent in 2020. The 30-stock index gained 6,497 points in 2020, closing at a new high of 47,751 on the last trading day of the year. The index also hit an all-time high of 47,896 during the session (Sharma, 2021).



Source: Statista

Figure 6 : Graphical representation

The S&P BSE SENSEX index, one of India's key stock indexes, lost nearly a quarter of its value between the end of February and the end of March 2020 as a result of the economic implications of the worldwide coronavirus (COVID-19) epidemic. On March 23rd BSE SENSEX fell 25981.24 points. It has since rebounded, and in November 2020.

The SENSEX plummeted by 1,941.67 points on March 9, 2020, and the markets closed in the red, with the SENSEX ending at 35,634.95. The SENSEX plummeted by 2919.26 points (-8.18 percent) on

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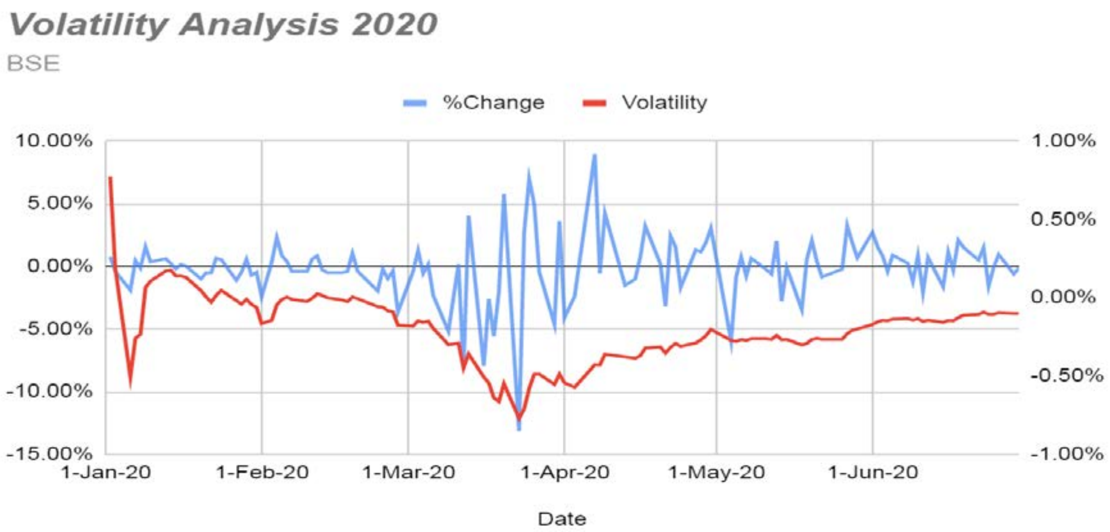
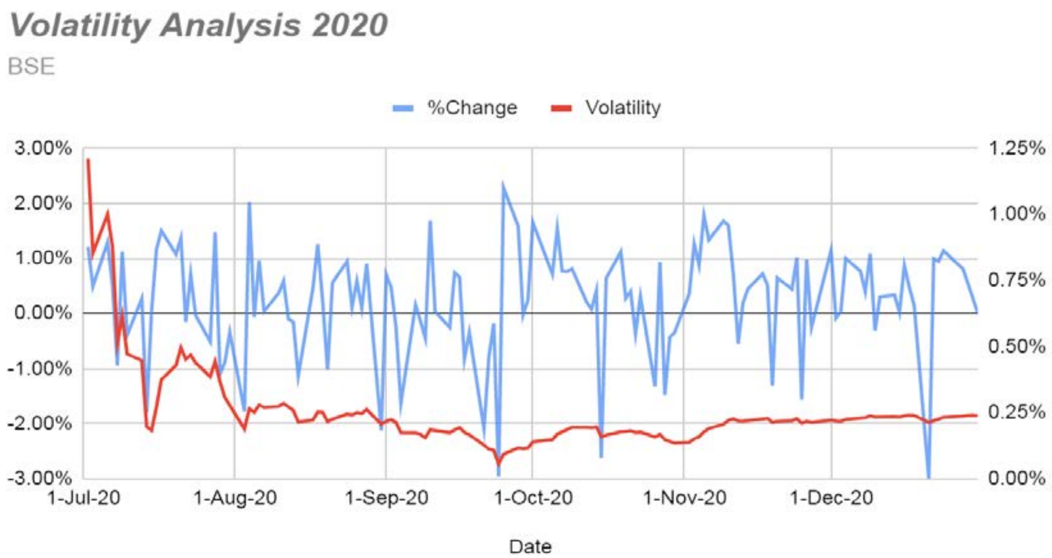
March 12, 2020, the worst week in the index's history. The SENSEX ended at a 33-month low of 32778.14. The SENSEX fell by 2,713.41 points (approximately 8%) on March 16, 2020, the second-worst drop in its history. The SENSEX, on the other hand, continued to plummet for four consecutive days until March 19, 2020, shedding 5815 points in the process On March 23, 2020, the SENSEX dropped 3,934.72 points, or 13.15%, the worst weekly loss since October 2008.



Source: -BSE SENSEX stock Index Data

Figure 7: Graphical representation of (BSE)

In the calendar year 2020, the SENSEX climbed 12% to an all-time high of 46,373.34. The benchmarks plunged to multi-year lows when the government imposed a statewide lockdown to stop the spread of coronavirus. The SENSEX fell to 25,638 points, a multi-year low.



Source: BSE SENSEX stock Index Data

Figure 8: Graphical Representation of (BSE)

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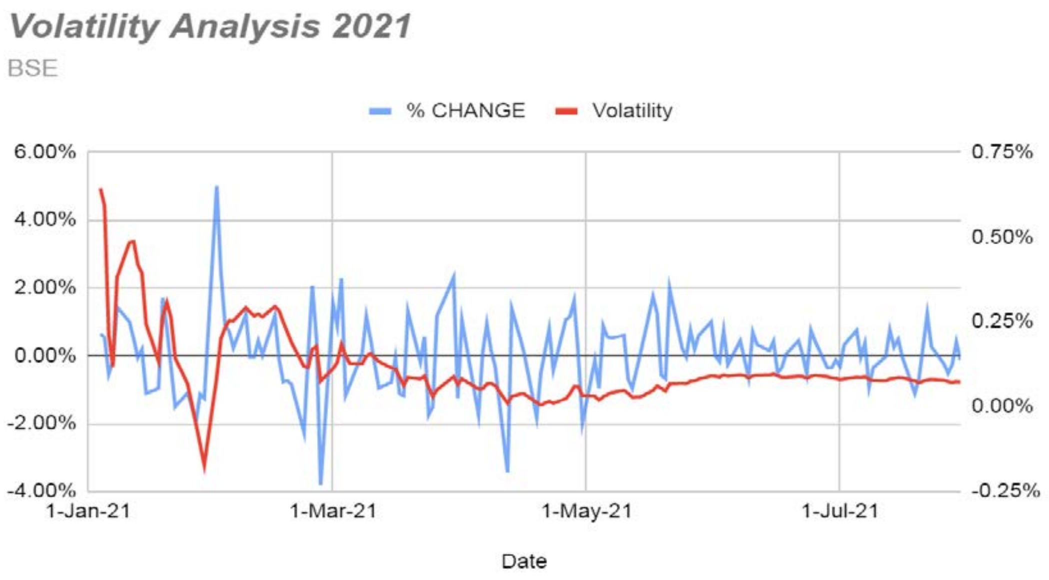
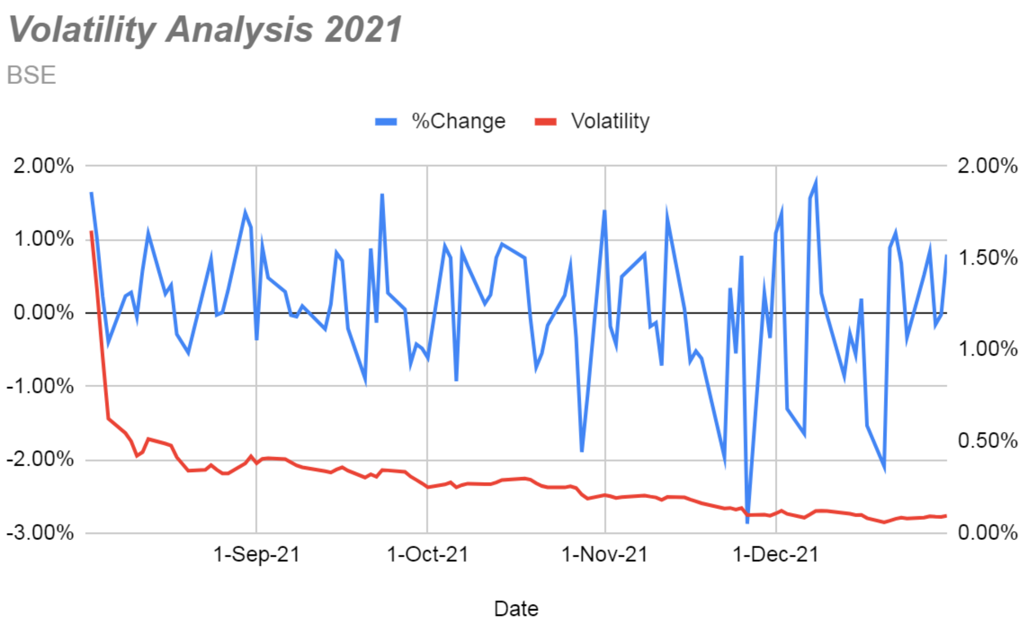
On January 29th 2021 SENSEX fell to 46,287.77 points. The stock market's decline is plainly seen in the graph below. As India continues to confront the second wave of Covid-19, the market maintained its downward trend on Tuesday. The SENSEX ended 243 points down after a tumultuous day.



Source: BSE SENSEX stock Index Data

Figure 9: Graphical representation of (BSE)

SENSEX crashed 10 percent as of Tuesday's closing from its all-time high of 52,516.76 hit on February 16th.



Source: BSE SENSEX stock Index Data

Figure 10: Graphical Representation of (BSE)

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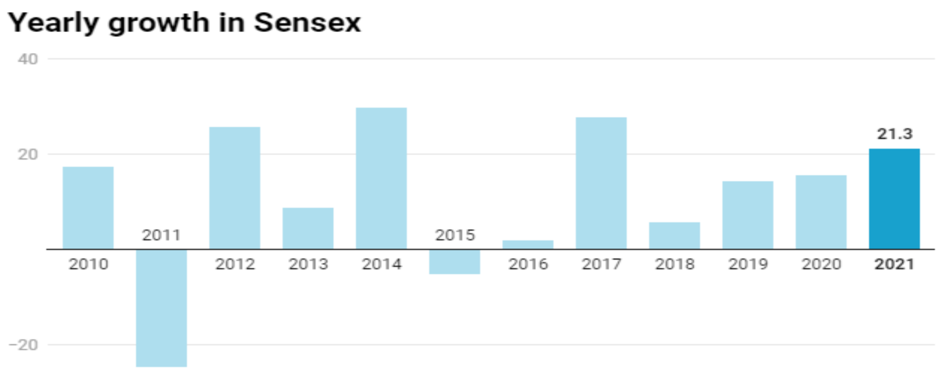
Despite the country reporting over 300,000 diagnosed diseases and over 4,000 fatalities per day, India's benchmark equity index has been increasing at a pace with regional competitors. In comparison to MSCI AC Asia Pacific, the S&P BSE SENSEX index is down 6.6% since mid-February. As a comparison, when the global coronavirus outbreak came out in March of last year, the SENSEX dropped by 23% (Mazumdar & Acharya, 2021).

The VIX rose 16.22% at the start of the week, indicating that Indian markets were experiencing higher volatility. While the market was still tumultuous and the prices of equities fluctuated, the SENSEX managed to rise by roughly 650 points, or 1.3 percent. The market has benefited from a number of corporations' solid fourth-quarter results, according to Indian express (Singh, 2021).



Source: BSE SENSEX stock Index Data

Figure 11: Graphical representation of (BSE)

Despite the Deadly Pandemic the SENSEX rose by over 10,000 points in a single year, making it the best year for BSE. Between January 1, 2021 and December 29, 2021, the BSE SENSEX increased by 10,054 points. In absolute terms, this is the largest year-over-year growth in history. The performance in 2021 is the best in the last four years, even in percentage terms.

Conclusion

As a rising economy, India's is expected to grow. The Indian stock market's reaction to COVID-19 was examined in this study. The Nifty fifty is expected to have a wild ride in 2020, soaring from a low of 7,511 in March to a high of 14,024 at year's end. The Nifty 50 fell from 11380 to 7500 points in March as investors were more concerned about the spread of coronaviruses. The 2 percent drop in SENSEX occurred as a result of the government's announcing the Union Budget on February 1, 2020, due to concerns about the coronavirus. 2021 saw the Bombay Stock Exchange (BSE) hit 60,000 points, while the Indian stock market (NSE) hit 17000 points. COVID restrictions, including lockdowns, curfews, and other measures taken by state governments, resulted in a total loss of Rupees 6.25 lakh crores for 8 crores of Indian dealers in April. It was revealed in a statement by the Confederation of All India Traders, which acts as the community's top authority on things relevant to merchants, by way of more than 40,000 clubs that together represent over 8 million traders. In April, the COVID pandemic cost the nation an estimated $6.25 billion in business damage. CAIT estimates that the government has lost Rupees 75,000 crores in income. BC Bhartia and Praveen Khandelwal, national president and secretary general, respectively, of CAIT, estimate that retail businesses suffered a loss of around Rupees 4.25 lakh crores and wholesale trade suffered a loss of about Rupees 2 lakh crores out of the overall business loss of Rupees 6.25 lakh billion. According to the Federation of Retailer Associations of India (FRAI), which represents India's 4 crore micro, small, and medium-sized businesses, the lockout restrictions may eat up as much as 40% of small retailers' monthly profits. As a result of the

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Covid restrictions, "8 million retail and wholesale trade rupees have incurred a business loss of Rupees 6.25 lakh crore." As reported by the confederation, Maharashtra was the worst-hit state ($1.5 billion in damages), with Delhi coming in second ($40,000), Gujarat coming in at $77,500, upstate New York at $85,000, Madhya Pradesh at $45,000, Rajasthan at $35,000, Chhattisgarh at $27,000, and Tamil Nadu at $80,000. Since localized lockdowns have worsened the losses, the informal commerce sector must bear the brunt of the official restrictions. Dealers are also contemplating reducing the number of employees they employ since they are unable to pay their bills without receiving a paycheck. Traders all throughout the country are considering laying off 30 to 40 percent of their workforces because they are unable to pay their workers' wages. According to the national president of CAIT, BC Bhartia, there are an estimated 8 million small businesses in India that are involved in trade, employing up to 40 million people. There has been a rise in volatility, and things seem to be getting worse. Investors of any size had a difficult time, since no one was able to position themselves favourably or make money due to the volatility in the market.

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Conflict of Interest:

The authors declare that the research review was conducted in the absence of any commercial or economic associations that could be construed as a potential conflict of interest.

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