

## COVID-19'S FINANCIAL CRISIS AND ITS IMPACT ON INDIA'S NIFTY INDICES IN VARIOUS SECTORS

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### ABSTRACT

*The research paper provides a brief overview of the worldwide financial crisis in general, as well as Covid19 specifically. The purpose of this research is to examine the pre-pandemic and post-pandemic indices of the identified sectors, which include automobiles, pharmaceuticals, banks, fast-moving consumer goods, financial services, and information technology. Nifty (National Stock Exchange) price indices of important industries were chosen, and change percentages for the year 2020 were determined in comparison to price indices for 2019. This altered percentages represented huge swings and market volatility in 2020. This research also aimed to look at the influence of the financial crisis on the Nifty indices using statistical methodologies based on the MVSK parameters (Mean, Variance, Skewness, and Kurtosis) for the years 2019 and 2020. The study also focuses on determining the level of impact on various industries, which ranges from low to high. By calculating the t-test, the pre- and post-pandemic price indices were exposed to the statistical concept of hypothesis. The t-test values revealed positive and negative results, indicating the magnitude of Covid19's impact on several sectors, as detailed in the conclusions.*

**Keywords:** National Stock Exchange, Pandemic, Covid-19, Skewness, Kurtosis.

### Introduction

The breakout of COVID-19 has had an extraordinary impact on the global financial system. Due to the worldwide market disruptions, the Indian financial market also reacted to the epidemic and experienced significant volatility. This article empirically explores the influence of COVID-19 on the Indian stock market in light of the COVID-19 situation. This study evaluates the volatility of indices such as the Nifty and the Sensex using daily closing prices from September 3, 2019 to July 10, 2020. The world has seen a previous Great Financial Crisis in 1929, as well as a following financial recession in the United States and Europe in 2008[1]. We are currently facing a threat, and economies are being strained as a result of the Covid19 Pandemic. Covid19 has caused numerous disruptions around the world, affecting a variety of industries and the economy as a whole. The world economy has entered a recession as a result of the epidemic, which implies the economy is shrinking and growth has slowed. According to the IMF, the global economy is predicted to contract by over 3% in 2020, the worst downturn since the Great Depression of the 1930s, and the world economy is expected to expand at -3% in 2020, which is significantly worse than the outcome of the crisis in 2007-08. The economies of the United States, Japan, the United Kingdom, Germany, France, Italy, and Spain are predicted to decrease by 5.9, 5.2, 6.5, 7, 7.2, 9.1, and 8% of GDP this year, respectively. According to recent projections [2,] India's GDP is anticipated to decline by 7-8 percent, and the RBI has declared India to be in its first ever recession. To address interim relief to the damages caused by the current Pandemic, all of the major nations have declared economic relief packages ranging from 10% to 20% of their GDP. According to early investigation or study, the strength of Covid19's impact on major sectors ranges from low to high, and a few of the specifics are reprinted below.

Agriculture/Agricultural items, Telecom Sector, and FMCG Sector, to name a few, have had less of an impact as a result of Covid19 (Impact would be minimal as majority fall under essential commodities and are need based). Banking, electronics, power, and healthcare/pharmaceuticals and these sectors may have a medium impact, and with the ease with which economies can be locked down

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and opened up, they may be able to return to pre-crisis levels in the medium to long term [3]. Banking (due to EMI moratoriums and a poor market outlook), Aviation, Textiles, Hotels & Tourism, luxury items like as jewelry, and retailing, especially malls and multiplexes, are the sectors with the most impact.

### Objectives

- Using statistical tools, the study will examine the impact of the financial crisis on the Nifty indices.
- Analysis of the specified sectors' pre- and post-pandemic indexes.
- Identifying the impact intensity on various industries, ranging from low to high.

### Literature Review

The following are examples of previous financial crises, as seen in table 1.

**Table1: The following is a List of Financial Crises that have been Gathered Over Time**

Year	Description	Major Countries Affected
1930s	The great recession/financial crisis	Across the countries
1987	Financial crisis owing to Stock Market Crash	United states
1990	High interest rates	Some European countries
1995	Mexico	South America (Brazil and Argentina) and Asia (Philippines, Malaysia, and Thailand)
1997	Asian Financial Crisis	Southeast Asian countries and Japan
2001	NASDAQ	USA majorly post 9/11 attacks
2007-2008	Global Recession-Mortgages/Credit	USA, EU and all major economies impacted
2020	Covid-19 Pandemic-Ongoing	Across all the countries

Extensive study had been conducted around the world, notably following the global recession of 2008. The planned research will focus on the impact of several sectors before and after the Covid19 epidemic. The impact of the Covid19 pandemic has yet to be fully assessed, as the outbreak is far from over, and many countries are fearful of a second wave and are on high alert [4].

### Research Methodology

Prices of NIFTY indices for some designated industries listed in Tables 01 to 10 are gathered from secondary data on the NSE website for the months of January to November 2020, as well as for the same period in 2019. MVSK parameters — Mean, Variance, Skewness, and Kurtosis – are among the statistical methods utilized in the study.

**Table 2: Sector-Specific Indices**

SINo	Name	Source
1	NIFTYAUTO	NSE/NIFTYINDEX
2	NIFTYPHARMA	
3	NIFTYBANK	
4	NIFTYFMCG	
5	NIFTYFINSERVICE	
6	NIFTYIT	

**Table 3: NIFTY AUTO: Percentage Change in Indices Prices during the Sample Period (2019-2020)**

Date	Nifty Auto		2019	
	2020		Price	Chg%
Nov	8,887.95	14.56%	8,086.00	-4.30%
Oct	7,758.40	-1.89%	8,449.50	12.76%
Sep	7,908.10	0.86%	7,493.15	6.90%
Aug	7,840.35	7.70%	7,009.30	2.30%
Jul	7,279.75	8.34%	6,851.65	-13.58%
Jun	6,719.15	8.05%	7,928.05	-3.03%
May	6,218.80	5.38%	8,175.50	-2.10%
Apr	5,901.40	24.73%	8,350.60	0.18%
Mar	4,731.30	-31.47%	8,335.35	-0.24%
Feb	6,903.95	-14.62%	8,355.15	1.66%
Jan	8,086.55	-1.96%	8,218.40	-11.01%

**Table 4: Nifty Pharma Indices Price Variations in Percentage**

Nifty Pharma				
Date	2020		2019	
	Price	Chg%	Price	Chg%
Nov	11,880.80	5.67%	8,189.95	3.96%
Oct	11,243.75	-4.49%	7,878.15	4.38%
Sep	11,772.85	6.26%	7,547.75	-6.50%
sAug	11,079.80	-0.62%	8,072.05	1.06%
Jul	11,148.90	11.65%	7,987.50	-0.96%
Jun	9,985.15	2.22%	8,065.15	-4.61%
May	9,768.60	4.08%	8,455.10	-10.08%
Apr	9,385.45	30.78%	9,402.50	0.60%
Mar	7,176.50	-5.28%	9,346.55	5.20%
Feb	7,576.75	-6.90%	8,884.85	0.67%
Jan	8,138.60	1.22%	8,825.35	-0.49%

**Table 5: Nifty Bank Index Price Change in Percentage for Nifty Bank**

Nifty Bank				
Date	2020		2019	
	Price	Chg%	Price	Chg%
Nov	29,737.25	24.42%	31,946.10	6.25%
Oct	23,900.90	11.42%	30,066.25	3.31%
Sep	21,451.80	-9.69%	29,103.15	6.11%
Aug	23,754.35	9.77%	27,427.85	-5.02%
Jul	21,640.05	1.26%	28,876.00	-7.17%
Jun	21,370.15	10.74%	31,105.20	-0.86%
May	19,297.25	-10.39%	31,375.40	5.41%
Apr	21,534.50	12.49%	29,764.80	-2.18%
Mar	19,144.00	-34.32%	30,426.80	13.58%
Feb	29,147.15	-5.47%	26,789.90	-1.85%
Jan	30,833.60	-4.13%	27,295.45	0.50%

**Table 6: Nifty FMCG Indices Price Change as a Percentage Change**

Nifty FMCG				
Date	2020		2019	
	Price	Chg%	Price	Chg%
Nov	31,832.20	8.17%	30,975.50	-4.16%
Oct	29,428.45	-1.38%	32,319.75	3.81%
Sep	29,841.75	-2.46%	31,134.50	6.42%
Aug	30,595.15	-0.90%	29,257.35	0.66%
Jul	30,872.45	2.69%	29,065.95	-1.62%
Jun	30,063.25	2.62%	29,546.05	-1.02%
May	29,296.95	2.19%	29,850.40	-1.60%
Apr	28,669.30	4.94%	30,336.90	0.05%
Mar	27,319.20	-6.79%	30,321.40	3.62%
Feb	29,310.25	-4.76%	29,262.85	-1.80%
Jan	30,775.30	2.17%	29,800.55	-2.35%

**Table 7: Change in Indices' Prices in Percentage for NIFTY IT**

NIFTYIT				
Date	2020		2019	
	Price	Chg%	Price	Chg%
Nov	22,064.30	5.49%	14,998.05	-3.61%
Oct	20,916.85	4.84%	15,559.40	0.12%
Sep	19,951.35	11.28%	15,540.15	-2.94%

Aug	17,928.85	-0.79%	16,010.40	2.50%
Jul	18,071.85	22.49%	15,620.20	-1.98%
Jun	14,754.30	5.31%	15,936.45	-1.39%
May	14,010.50	-0.69%	16,160.65	-3.26%
Apr	14,108.40	10.54%	16,705.40	6.89%
Mar	12,763.65	-16.10%	15,628.20	-0.66%
Feb	15,212.95	-5.77%	15,732.00	1.50%
Jan	16,144.15	3.14%	15,499.30	7.33%

**Table 8: Nifty Fin Service Indices Price Changes as a Percentage**

Nifty Fin Service				
Date	2020		2019	
	Price	Chg%	Price	Chg%
Nov	14,275.25	22.68%	14,208.85	5.12%
Oct	11,636.05	9.54%	13,516.45	3.83%
Sep	10,622.40	-6.73%	13,017.30	4.82%
Aug	11,389.00	6.15%	12,418.15	-2.28%
Jul	10,728.85	1.58%	12,707.30	-6.26%
Jun	10,561.90	10.86%	13,556.40	0.57%
May	9,527.05	-9.87%	13,479.80	7.36%
Apr	10,570.80	13.45%	12,555.45	0.09%
Mar	9,317.30	-31.32%	12,544.15	11.73%
Feb	13,566.45	-5.24%	11,227.40	-2.00%
Jan	14,316.90	-1.65%	11,456.40	-1.12%

The percentage changes in prices for 2020 have shown large differences from those for 2019[5]. Due to the COVID outbreak, which caused market instability in March, there was a significant impact.

**Table 9: Calculations based on the 2019 Values for the Selected Sectors**

2019					
	Mean	Variance	SD	SKEWNESS	KURTOSIS
NIFTYAUTO	7932.06	2,87,358.99	536.06	-1.02	2.53
NIFTYPHARMA	8423.17	3,40,609.55	583.62	0.40	1.93
NIFTYBANK	29470.63	27,60,252.52	1,661.40	-0.21	1.79
NIFTYFMCG	30170.11	8,86,729.24	941.66	0.89	2.97
NIFTYIT	15762.75	1,74,805.40	418.10	0.54	3.48
NIFTYFINSERVICE	12789.79	7,39,681.64	860.05	-0.32	2.34

**Table 10: Calculations based on 2020 Values for the Identifying Sectors**

2020					
	Mean	Variance	SD	SKEWNESS	KURTOSIS
NIFTYAUTO	7112.34	12,58,428.31	1,121.80	-0.54	2.68
NIFTYPHARMA	9923.38	25,80,838.05	1,606.50	-0.44	1.79
NIFTYBANK	23801	1,60,45,083.22	4,005.63	0.66	1.94
NIFTYFMCG	29818.57	13,63,138.68	1,167.54	-0.39	2.93
NIFTYIT	16902.47	87,10,965.50	2,951.43	0.36	1.81
NIFTYFINSERVICE	11501.09	28,82,089.16	1,697.67	0.59	1.98

From the above-mentioned means, it can be deduced that the pharmaceutical and information technology industries are on the rise, while other industries are on the fall. Because of the extreme volatility and large change of results caused by the pandemic, the standard deviation (SD) and variance in 2020 are tenfold higher than in 2019. Skewness is a term that specifies the properties of a frequency distribution and gauges its symmetry [6]. A negatively skewed distribution shows unpredictability and an unexpected approach, as investors may lose money, leading to investment discouragement. A positively

skewed distribution illustrates a predictable strategy with acceptable results, resulting in a higher probability of profit than loss. Kurtosis is a measure of the heaviness of the distribution tails; a big kurtosis indicates a riskier investment with low returns, and vice versa. Skewness and Kurtosis were shown to have no significant change across the sample period of data [7].

**Calculation of t-tests for two pre- and post-pandemic periods, 2019 and 2020, in various sectors**

We use a t-test with difference between population means using sample means because the price indices for 2019 and 2020 are paired data.

**Null hypothesis H<sub>0</sub>:** Between the years 2019 and 2020, there is no substantial pricing change. (This is a two-tailed test.) **Alternative hypothesis H<sub>1</sub>:** The price difference between 2019 and 2020 is large.

$$t = \frac{\bar{d}}{s_d / \sqrt{n-1}} \sim t \text{ with } (n - 1) d. f.$$

Where, *d*= the mean of the difference between paired observations

$$s_d = \text{S.D of difference of samples} = \sqrt{\left(\frac{\sum d^2}{n} - \left(\frac{\sum d}{n}\right)^2\right)}$$

Sample size n=6; degrees of freedom = n-1 i.e. 6-1= 5 Level of significance =5 % (0.05). For 5% level of significance and with 5 degrees of freedom, the critical value 'k' that obtained from the 't-test' critical value table is 2.57 i.e.k =±2.57 as it is a two tailed test. For two tailed test, H<sub>0</sub> is accepted, if -k < t<sub>cal</sub> < k (Here, -2.57 < t<sub>cal</sub> < 2.57). Otherwise, H<sub>0</sub> is rejected at certain L.O.S and for different d.f.

**Table11:T-test Values for Different Sectors are shown in a table.**

	<b>t Value</b>	<b>Hypothesis Inference</b>
NIFTY AUTO	1.868	H <sub>0</sub> is accepted
NIFTY PHARMA	-2.239	H <sub>0</sub> is accepted
NIFTY BANK	3.636	H <sub>0</sub> is rejected
NIFTY FMCG	0.700	H <sub>0</sub> is accepted
NIFTY IT	-1.114	H <sub>0</sub> is accepted
NIFTY FIN SERVICE	1.939	H <sub>0</sub> is accepted

From the above table it can be inferred that t test value for NIFTY BANK indices is t<sub>cal</sub>= 3.636 which is greater than k value (3.636 > 2.57). So, null hypothesis H<sub>0</sub> is rejected. Therefore, it can be determined that there is a significant price difference between the periods 2019 & 2020. So banking sector is the sector that had a greater negative price impact. NIFTY AUTO, NIFTY FMCG and NIFTY FIN SERVICE are in -k < t<sub>cal</sub> < k, so H<sub>0</sub> is accepted and there is no significant price difference between the periods 2019 & 2020. Further, in case of NIFTY PHARMA & NIFTY IT, the t -test value is negative [8]. The negative t- value indicates a reversal in the directionality of the effect. Though the hypothesis is accepted in these two sectors, they have negative t -test value. It can be inferred that there is a positive price increment owing to pandemic.

**Conclusion**

The influence of COVID-19 on the performance of the BSE and NSE, India's two stock exchanges, was explored in this study. Banking has been hit the worst by Covid19, while pharmaceuticals and information technology have benefited. The results demonstrate that during the pandemic, the stock market, particularly the BSE Sensex, becomes extremely volatile. In the instance of another stock index, the NSE Nifty, it was discovered that the COVID-19 period had no substantial impact on the volatility of NSE stock prices. The mean return is determined separately for the pre-COVID-19 and COVID-19 periods. The results demonstrated that the stock market will lose money during the pandemic if mean returns are negative, whereas mean returns are positive in the pre-COVID-19 phase. When the standard deviations of the COVID-19 and pre-COVID-19 periods are compared, it is clear that the COVID-19 period has a higher standard deviation than the pre-COVID-19 period. Similarly, the price of stock indices has changed dramatically. The price was high prior to COVID-19, but it began to decline throughout COVID-19, until the first lockdown phase, which lasted until the end of March, after which it gradually began to rise again. It is as a result of the Indian government's easing of the lockdown policy.

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