THE FINANCIAL CRISIS OF COVID19 AND ITS IMPACT ON NIFTY INDICES OF VARIOUS SECTORS IN INDIA

P. RAJESWARI SUSHMA

Lecturer, Jain College, RR Nagar, Bangalore, India

ABSTRACT:

The research paper gives a brief insight of global financial crisis in general and Covid19 in particular. The objective of the paper is analysis of pre pandemic and post pandemic indices of the identified sectors, viz Auto, Pharma, Bank, FMCG, Financial services and IT.

Price indices of key sectors from Nifty (National Stock Exchange) were selected and change percentages of the year 2020 were calculated with respect to price indices of 2019. Huge variations and market volatility in 2020 was depicted through this changed percentages. This study also intended to review the impact of financial crisis on Nifty indices using statistical tools by MVSK parameters (Mean, Variance, Skewness and Kurtosis) for the years 2020 & 2019. The research further emphasizes in identifying the intensity of impact on various sectors varying from low to high. The price indices of pre and post pandemic were subjected to the statistical concept of hypothesis by determining the t-test. The t-test values had shown positive and negative values, which had shown the intensity of impact owing to Covid19 on different sectors, elaborated under conclusions.

KEYWORDS: Financial crisis, Nifty indices- Covid19 impact, MVSK parameters, Skewness, Kurtosis, Nifty Indices- Covid19 statistical tools, t-test.

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INTRODUCTION

The world has seen former Great financial crisis during 1929 and subsequently financial recession in the USA and European countries in 2008. Currently, we are facing a threat and economies are under severe strain due to Covid19 Pandemic.

Covid19 has created lots of disruptions across the globe impacting various sectors and the economy as a whole. This pandemic has pushed the global economy into a recession, which means the economy starts shrinking and growth stops.

According to the IMF, the global economy is expected to shrink by over 3 percent in 2020, the steepest slowdown since the great depression of 1930s and it is estimated that the global economy is expected to grow at - 3 % for 2020 which is much worse than the outcome of the crisis that occurred in 2007-08. Economies such as US, Japan, UK, Germany, France, Italy and Spain are expected to contract this year by 5.9, 5.2, 6.5, 7, 7.2, 9.1 and 8 percentages of their GDP's respectively.

As per the latest reports, India is expected to contract by 7-8 % of its GDP and as per RBI, India has entered into first ever recession in its history. All the major nations have announced economic relief packages ranging from 10-20% of their GDP's to address interim relief to the damages caused by this ongoing Pandemic.

Based on preliminary analysis or study, intensity of impact on major sectors owing to Covid19 varies from low impact to high impact and few of the details are reproduced as below:

Sectors with less impact due to Covid19, to name a few are Agriculture/Agricultural products, Telecom Sector, FMCG (Impact would be minimal as majority fall under essential commodities and are need based).

Banking, Electronics, Power, Healthcare/Pharma – these sectors may have medium impact and with ease of lockdown and opening up of economies, may restore to pre covid levels in medium to long terms.

The sectors that have highest impact include Banking (due to moratoriums on loan EMIs, negative market outlook), Aviation, Textiles, Hotels & Tourism, luxury items- Jewellery etc., retailing including malls & multiplexes.

OBJECTIVE

- The study is intended to review the impact of financial crisis on Nifty indices using statistical tools.
- Analysis of pre pandemic and post pandemic indices of the identified sectors.
- Identifying intensity of impact on various sectors varying from low to high impact.

LITERATURE REVIEW

The past financial crisis includes

Table 1: List of Gathered Financial Crisis

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	South east 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

Across the globe, extensive research had been done particularly after the global recession during 2008. The proposed study is intended to concentrate on the impact of sectors in terms of pre and post pandemic Covid19. The impact caused by Covid19 pandemic is yet to be analyzed in detail as the pandemic is far from over and many countries are in fear of a second wave and undergoing extended lockdown.

RESEARCH METHODOLOGY

Indices prices of NIFTY for some identified sectors listed in Table 2 are being collected from secondary data of NSE website for the period of Jan'20- Nov'20 and for the corresponding period of 2019 are collected. Statistical tools being used for the research include MVSK Parameters – Mean, Variance, Skewness and Kurtosis.

Table 2: Selected Indices of Sectors

Sl No	Name	Source
1	NIFTY AUTO	NSE/ NIFTY INDEX
2	NIFTYPHARMA	
3	NIFTY BANK	
4	NIFTYFMCG	
5	NIFTY FIN SERVICE	
6	NIFTY IT	

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

NIFTY AUTO				
	2020		2019	
Date	Price	Chg%	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: Percentage Change in the Prices of Indices for NIFTY PHARMA

NIFTY PHARMA				
	2020		2019	
Date	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: Percentage Change in the Prices of Indices for NIFTY BANK

NIFTY BANK				
	2020		2019	
Date	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%
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Table 6: Percentage Change in the Prices of Indices for NIFTY FMCG

NIFTY FMCG				
	2020		2019	
Date	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: Percentage Change in the Prices of Indices for NIFTY IT

NIFTY IT				
	2020		2019	
Date	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: Percentage Change in the Prices of Indices for Nifty Finservice

NIFTY FIN SERVICE				
	2020		2019	
Date	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 the year 2020 have depicted huge variations than that of 2019. A large impact can be seen in the month of March due to COVID outbreak, which led to market volatility.

Table 9: Calculations Derived from the Values of 2019 for the Identified Sectors

	2019				
	MEAN	VARIANCE	SD	SKEWNESS	KURTOSIS
NIFTY AUTO	7932.06	2,87,358.99	536.06	-1.02	2.53
NIFTY PHARMA	8423.17	3,40,609.55	583.62	0.40	1.93
NIFTY BANK	29470.63	27,60,252.52	1,661.40	-0.21	1.79
NIFTY FMCG	30170.11	8,86,729.24	941.66	0.89	2.97
NIFTY IT	15762.75	1,74,805.40	418.10	0.54	3.48
NIFTY FIN SERVICE	12789.79	7,39,681.64	860.05	-0.32	2.34

Table 10: Calculations Derived from the Values of 2020 for the Identified Sectors

	2020				
	MEAN	VARIANCE	SD	SKEWNESS	KURTOSIS
NIFTY AUTO	7112.34	12,58,428.31	1,121.80	-0.54	2.68
NIFTY PHARMA	9923.38	25,80,838.05	1,606.50	-0.44	1.79
NIFTY BANK	23801	1,60,45,083.22	4,005.63	0.66	1.94
NIFTY FMCG	29818.57	13,63,138.68	1,167.54	-0.39	2.93
NIFTY IT	16902.47	87,10,965.50	2,951.43	0.36	1.81
NIFTY FIN SERVICE	11501.09	28,82,089.16	1,697.67	0.59	1.98

From the means calculated above, it can be inferred that Pharma and IT sectors have an increased trend and other sectors have shown a decline. Standard deviation (SD) & variance depicts exponentially higher values in 2020 compared to 2019, due to high volatility and substantial variation of values owing to pandemic.

Skewness describes the characteristics of a frequency distribution and measures the symmetry of distribution. A negatively skewed distribution reflects uncertainty and unpredictable approach, as investors may tend to loose and result in discouragement of investment. A positively skewed distribution reflects a predictable approach with desirable returns leading to chances of profits than losses.

Kurtosis depicts heaviness of the distribution tails; a large kurtosis generally refers to a risky investment with small returns and vice versa. It is found that Skewness and Kurtosis do not have a significant change for the sample period of data.

Calculation of t-test for Two Pre and Post Pandemic Periods i.e. 2019 & 2020 of Different Sectors

As the price indices of 2019 & 2020 are paired observations, we consider t-test with difference between population means using sample means.

Null hypothesis H_0 : There is no significant price difference between the periods 2019 & 2020. (Two tailed test)

Alternative hypothesis H_1 : There is significant price difference between the periods 2019 & 2020.

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

d = difference between paired observations

$\bar{d}$ = 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 $\alpha = 5\%$ (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. $k = \pm 2.57$ as it is a two tailed test.

For two tailed test, H_0 is accepted, if $-k \leq t_{cal} \leq k$ (Here, $-2.57 \leq t_{cal} \leq 2.57$). Otherwise, H_0 is rejected at certain L.O.S α and for different d.f.

Table 11: Table showing t-test Values for Different Sectors

	t value	Hypothesis Inference
NIFTY AUTO	1.868	H_0 is accepted
NIFTY PHARMA	-2.239	H_0 is accepted
NIFTY BANK	3.636	H_0 is rejected**
NIFTY FMCG	0.700	H_0 is accepted
NIFTY IT	-1.114	H_0 is accepted
NIFTY FIN SERVICE	1.939	H_0 is accepted

**From the above table it can be inferred that t test value for NIFTY BANK indices is $t_{cal} = 3.636$ which is greater than k value ($3.636 > 2.57$). So, null hypothesis H_0 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 FINSERVICE are in $-k \leq t_{cal} \leq k$, so H_0 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. 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.

CONCLUSIONS

Banking is the worst affected sector due to Covid19 and Pharma and IT are the beneficial sectors.

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