Impact of Lockdown on Firms Performance: A Quantitative Analysis of Large Firms in India

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Abstract

The purpose of this study explores the impact of the COVID-19 pandemic on the stock prices in Indian markets. With a first-hand analysis of the economic situation and an appreciation of structural risk trends in financial markets,we attempt to explain the liquidity and volatility during the different announcement of lockdown and tries to capture multiple dimensions of the pandemic across three important sectors. The study also tried to gauge the anxiety and psyche of Indian investors in such a turbulent time and impacted on country's present economic crisis and our results suggest that increases in confirmed cases and deaths due to coronavirus are associated with significant changes in market illiquidity and volatility.

Similarly, declining sentiment and the implementations of restrictions and lockdowns contribute to the deterioration of the liquidity and stability of markets.

Keywords: COVID-19, Pandemic, Volatility, Lockdowns, Sentiment, Coronavirus, Financial markets,Repeated Measures ANOVA

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Introduction

Since December 2019, the whole world comes under the grimes of the pandemic which has infected over two and a half million people and has resulted in more than 150,000 deaths globally in the first 100 days of 2020. India is also a part of this worldwide pandemic since the first reported case on 30th January 2020 till the last week of June as per the Ministry of Health and Family Welfare report confirmed a total of 473,105 cases, 271,696 recoveries, and 14,894 deaths in the country.

In the last week of June new infections and deaths have been rising faster in India in comparison to other badly-hit countries. The country's death toll is now the eighth-worst in the world with more than 5,000 deaths which have recorded the biggest spike in deaths and the biggest jump in confirmed cases over in last two weeks of June.

These unprecedentedly incident impacted trading at major stock markets has reflected uncertainty surrounding the spike in cases and deaths associated with the virus. During the time of financial crises, liquidity also becomes a crucial policy area (Brunnermeier, 2009). Similarly, uncertainty has been known to adversely impact the volatility of stock markets (Veronesi, 1999; and Pastor and Veronesi, 2012).

The purpose of the study contributes to the literature in the following dimensions. First, it adds to the evolving literature on shareholder's wealth judged by share prices of that company, and share prices reflect firm performance. (Yahanpath, N., et al. 2011; Grinyer, J. R., 1986; Yahanpath, N., 2009;

Nohel, T., 1998; Demsetz, H., 2001) and Second, we focus our analysis of market reaction towards present pandemics (Zhang et al., 2020; Al-Awadhi et al., 2020; Albulescu, 2020), on two fronts; volatility and liquidity sector-wise. We focus our analysis at the stock level, adding to the heterogeneity of literature in financial markets based on different studies (Westerlund and Narayan, 2015; Bannigidadmath and Narayan, 2016; Phan et al., 2015 & 2016; Rizvi and Arshad, 2018). And we examine the association of media/news originated sentiment with stock market volatility and liquidity (Uhl et al., 2015; Barberis et al.; 1998 Tetlock, 2007).

Third and last, we examine the literature on macroeconomic shocks leading in such a pandemic situation and response towards market uncertainty and therefore, volatility (Gomes et al., 2003; Bloom, 2009; Paye, 2012 and Drechsler, 2013).

Literature Review and Hypotheses Development

Worldwide as per records approx. infected people are more than 7 billion and approximate deaths are more than 40 million. As a precautionary measure, different cities have gone under lockdown and seizes the border like many other health measures across the globe (over 136 countries) to slowdown the ill effects of the pandemic (WHO, 2020) undoubtedly this situation not only create unrest among the population and as on date no vaccine is available. This grim situation not only affects the routine life but also the psyche of investors. (Walter et al. 2020) and due to these measure leads towards the economic slowdown across the world (Barro et al., 2020)
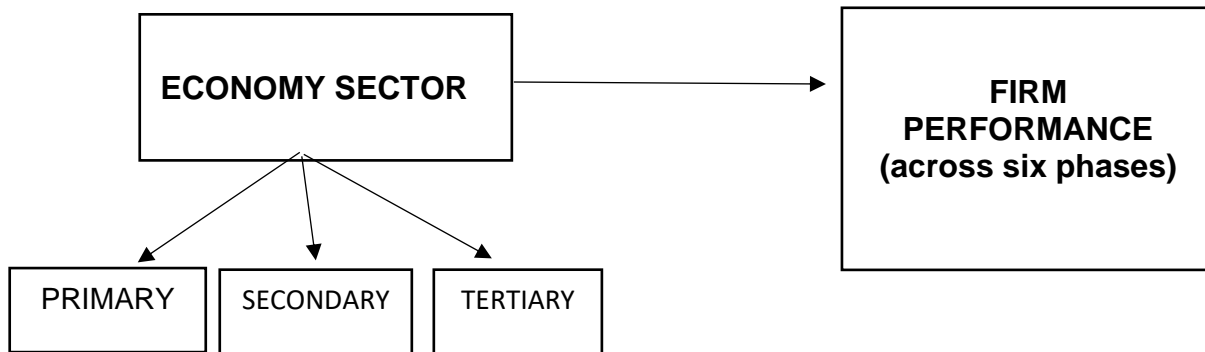
A similar situation arises during the 2007-2008 financial crisis or in previous cases of recession it was assumed and proved that the impacts were largely restrained to be localized e.g subprime mortgage crisis would be a relatively trivial problem impacted not only the US, but at the last affected the worldwide financial system (Elliot, 2020).Atthe beginning of December 2019,The perception was that the pandemic of COVID-19 would impact and it will be confined to China only. But later on, it was spread not only in China but around the globe through the community spread with traveling without taking many security measures. When government asked individuals to stay at home,the economic situation became worse, and its influence was felt across the economic sectors. Ban on movement has not only impacted the travel and tourism industry but also the hospitality industry and bad effects have been seen in the economy as well as spilling across industries.(Horowit, 2020; Elliot,2020).

According to the wealth maximumfirms' performance is linked with the economic view of profit maximization ofthe organization and the (Aifuwa, 2019). Firm performance is a particular measure to evaluate a firm effectively and to know that it utilizes its assets efficiently.(Nnamani, Onyekwelu&Ugwu,2017).As we discussed earlier that, due to the government's decision of the lockdown per previous studies have suggested that pandemics affected the financial performance of firms.(Kim, Kim, Lee and Tang 2020)

During SARS (severe acute respiratory syndrome) attack It has been projected that it would cost the world between 30 and 100 billion USD (Smith, 2006). Though SARS was primarily in China, the pandemic of COVID-19 has already become a global epidemic, serving as "the once-in-a-century pathogen"(Gates, 2020). It is projected to have a much more significant effect on the global economy. During 2003.

Conceptual Model

Research Objectives and Hypothesis

Research Objective 1: To determine whether there is any significant difference in the share prices among the three sectors of the economy across the phases of the coronavirus pandemic in India.

Null Hypothesis (H0): There is no significant difference in the share prices among the three sectors of the economy across the phases of the coronavirus pandemic in India.

Methodology:

Population, Sample, and Data Collection

Since the scope of this study is India, the population is comprised of all the firms in India belonging to the three sectors of the economy viz. Primary, Secondary, and Tertiary. The target population was large listed firms that are traded in the stock markets (The Bombay Stock Exchange (BSE), in our case). The authors took extensive use of the CMIE Prowess database to extract the name and share price of top-performing firms at the BSE across the six phases (table attached)

	Column 2		Cases	Deaths	Total Cases	Total Deaths
1	Public Curfew	Monday, March 23, 2020	119	3	439	7
2	Phase 1	Wednesday, March 25, 2020	70	0	562	9
3	Phase 2	Wednesday, April 15, 2020	1075	38	11438	377
4	Phase 3	Monday, May 4, 2020	2553	72	42533	1373
5	Phase 4	Monday, May 18, 2020	5242	157	96169	3029
6	Phase 5	Monday, June 1, 2020	8392	230	190535	5394

Hence, the data has been collected from secondary sources. The query was run in Prowess and in total, 218 firms listed on the BSE were chosen for the study which became the size of the sample.

The authors took each firm and classified it into one of the three categories using the criteria- primary for related to agriculture products, secondary for related to manufacturing, and tertiary for related to services. Hence Agro firms were kept in the primary sector while service firms such as information technology and banks were put in the tertiary sector.

Data Mining and Analysis

The data was then entered into SPSS v23. The predictor named Economy Sectors is a categorical variable with three sectors whereas the outcome name firm performance is a continuous variable determined by the share price of the firm, taken across six phases (repeated measures). The number

of firms by category of economic sectors is depicted in table 1.

Table 1

Number of firms by economic sectors

Between-Subjects Factors

		Value Label	N
EcoSect	1	Primary	10
	2	Secondary	114
	3	Tertiary	94

Next, a one way ANOVA with repeated measures was conducted to compare the effect of IV (economy sectors) on the DV (share price of the firm) during the six phases of coronavirus lockdown in India.

Table 2

One Way Repeated Measures ANOVA of Share Price across phases

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
Phases	Pillai's Trace	.142	7.012[b]	5.000	211.000	.000
	Wilks' Lambda	.858	7.012[b]	5.000	211.000	.000
	Hotelling's Trace	.166	7.012[b]	5.000	211.000	.000
	Roy's Largest Root	.166	7.012[b]	5.000	211.000	.000
Phases * EcoSect	Pillai's Trace	.098	2.177	10.000	424.000	.018
	Wilks' Lambda	.903	2.199[b]	10.000	422.000	.017
	Hotelling's Trace	.106	2.220	10.000	420.000	.016
	Roy's Largest Root	.093	3.938[c]	5.000	212.000	.002

a. Design: Intercept + EcoSect
   Within Subjects Design: Phases

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Refer table 1, there was a significant effect of phases on the share price of the firms, Wilk's Lambda=0.000, $F_{(5,211)}$ =7.012, p=0.000 at 0.05 level of significance.

Next, we check for the sphericity of the data using Mauchly's test (refer table 3)

Table 3

Test of Sphericity and within subject-effects

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Phases	.002	1290.328	14	.000	.319	.324	.200

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + EcoSect
Within Subjects Design: Phases
b. May be used to adjusting the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Phases	Sphericity Assumed	11998406.556	5	2399681.311	15.690	.000
	Greenhouse-Geisser	11998406.556	1.597	7514258.188	15.690	.000
	Huynh-Feldt	11998406.556	1.622	7398320.256	15.690	.000
	Lower-bound	11998406.556	1.000	11998406.556	15.690	.000
Phases * EcoSect	Sphericity Assumed	6766506.747	10	676650.675	4.424	.000
	Greenhouse-Geisser	6766506.747	3.194	2118834.634	4.424	.004
	Huynh-Feldt	6766506.747	3.244	2086143.010	4.424	.004
	Lower-bound	6766506.747	2.000	3383253.374	4.424	.013
Error(Phases)	Sphericity Assumed	164414491.238	1075	152943.713		
	Greenhouse-Geisser	164414491.238	343.302	478921.322		
	Huynh-Feldt	164414491.238	348.682	471532.017		
	Lower-bound	164414491.238	215.000	764718.564		

A significance value of 0.000 infers that we can't assume sphericity and hence should consider the Greenhouse-Geisser value.

Refer table 3, there was a significant effect of phases on the share price of the firms, F (1.597,343.302) =15.690, p=0.000 at 0.05 level of significance. Also, there is a significant effect of phases and economy sectors on the share price of

the firms, F (3.194, 343.302) =4.424, p=0.004 at 0.05 level of significance

Since we found a significant effect of phases on shared price, next we determine where the difference occurred. Table 4 depicts the pairwise comparison to determine mean differences

Table 4
Pairwise comparison of phases

Pairwise Comparisons

Measure: MEASURE_1

(I) Phases	(J) Phases	Mean Difference (I-J)	Std. Error	Sig.^{b}	95% Confidence Interval for Difference^b	
					Lower Bound	Upper Bound
1	2	-116.456	49.463	.292	-263.281	30.369
	3	-341.628*	85.332	**.001**	-594.923	-88.333
	4	-391.506*	95.341	**.001**	-674.514	-108.499
	5	-318.001*	76.912	**.001**	-546.302	-89.700
	6	-471.441*	113.817	**.001**	-809.292	-133.590
2	1	116.456	49.463	.292	-30.369	263.281
	3	-225.172*	47.662	**.000**	-366.649	-83.695
	4	-275.050*	56.615	**.000**	-443.103	-106.998
	5	-201.545*	42.720	**.000**	-328.353	-74.737
	6	-354.985*	71.723	**.000**	-567.884	-142.087
3	1	341.628*	85.332	**.001**	88.333	594.923
	2	225.172*	47.662	**.000**	83.695	366.649
	4	-49.878	19.671	.179	-108.270	8.513
	5	23.627	27.335	1.000	-57.513	104.767
	6	-129.813	56.156	.326	-296.505	36.879
4	1	391.506*	95.341	**.001**	108.499	674.514
	2	275.050*	56.615	**.000**	106.998	443.103
	3	49.878	19.671	.179	-8.513	108.270
	5	73.505	26.691	.096	-5.722	152.732
	6	-79.935	48.436	1.000	-223.711	63.841
5	1	318.001*	76.912	**.001**	89.700	546.302
	2	201.545*	42.720	**.000**	74.737	328.353
	3	-23.627	27.335	1.000	-104.767	57.513
	4	-73.505	26.691	.096	-152.732	5.722
	6	-153.440	58.282	.136	-326.441	19.560
6	1	471.441*	113.817	**.001**	133.590	809.292
	2	354.985*	71.723	**.000**	142.087	567.884
	3	129.813	56.156	.326	-36.879	296.505
	4	79.935	48.436	1.000	-63.841	223.711
	5	153.440	58.282	.136	-19.560	326.441

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

It was found that the effect was non-significant between phases 1 and 2 but then became significant. However, the significance between phases 3 and 4, 4 and 5, and 5 and 6 are non-significant indicating that share price movement is not significant after the third phase. Moreover, the post-hoc test (Bonferroni) conducted by Economy Sectors found out that the effect is significant between secondary and tertiary sectors but not between primary and secondary, and primary and tertiary sectors. (referto table 5).

Table 5

Post hoc test of multiple comparisons of Economy Sectors

Multiple Comparisons

Measure: MEASURE_1
Bonferroni

(I) EcoSect	(J) EcoSect	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Primary	Secondary	-13.2613	1639.26463	1.000	-3968.5736	3942.0511
	Tertiary	1858.4255	1653.26851	.787	-2130.6762	5847.5273
Secondary	Primary	13.2613	1639.26463	1.000	-3942.0511	3968.5736
	Tertiary	1871.6868[*]	692.47798	**.022**	200.8360	3542.5377
Tertiary	Primary	-1858.4255	1653.26851	.787	-5847.5273	2130.6762
	Secondary	-1871.6868[*]	692.47798	**.022**	-3542.5377	-200.8360

Based on observed means.

 The error term is Mean Square(Error) = 24704797.652.

*. The mean difference is significant at the .05 level.

Findings and Discussion

A repeated-measures ANOVA with a Greenhouse-Geisser correction determined that share price of BSE listed firms differed statistically significantly between the six phases $(F (1.597, 343.302) =15.690, p=0.000$ at 0.05 level of significance) and by economy sectors$(F (3.194, 343.302) =4.424, p=0.004$ at 0.05 level of significance). Pairwise comparison pointed out that the significant effect is becoming non-significant since phase 3 of lockdown, and that too the significant difference is between secondary and tertiary sectors.

The results of this study point to some interesting aspects of investor sentiments and the movement of the share price. Between the "Janta curfew" and the first lockdown, the share price fluctuation was not significant. However, the next three lockdowns created a significant impact on the share prices of chosen firms. However, the situation is being eased from phase 3 as the relationship has become insignificant since phase 3 of lockdown which indicates regained investor confidence. We see two reasons for this. First, as we move from one lockdown to another, investors are increasingly speculating that the economy would open anytime soon and hence are going bullish on the markets. Second, for labor-intensive sectors, it is expected that certain revival schemes could be announced by the government that will benefit large firms. As a result

Conclusion

Since coronavirus has impacted many economies and public perception about the economy, this study was carried out with an intention to check how the top firms listed in BSE fared on the stock market across phases of lockdown and by economy

sectors viz. primary, secondary, and tertiary. Taking the share prices of the top 218 firms on BSE, we conducted a one-way ANOVA test with repeated measures to find out the effect of phases on the share price and its combined effect with the economic sector. It was found that phases had a significant impact on the share price of the firms and the effect remained significant for all the three economic sectors across phases. However, it was further found out that the effect was significant between secondary and tertiary sectors and that the significant effect of phases on share price is becoming insignificant from phase 3. Hence we can conclude that the investor's sentiment affected the share price of the firms during the first three phases of the lockdown however, the situation is becoming more bullish as the effect has become insignificant since lockdown phase 3.

Limitation of the Study

The purpose of this study was to empirically understand the effect of the COVID-19 pandemic on firm performance but the study isconfined only tothe Indian context so results may differ in other countries as per respective circumstances. Secondly,the present study conducted only on companies in BSE listed 200 companies which do not include unlisted MSMEs and other small companies and lockdown announcement reacted differently and which could not be captured in this study. Similarly due to lockdown and movement of labors, lack of raw material, and numerals other factors affected them differently and which also could not be captured in the present study.

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