

STOCK MARKET REACTION TO COVID-19 PANDEMIC: An Empirical Analysis of Major Global Indices

Ruchita Verma¹, Dhanraj Sharma¹ and Shiney Sam²

¹Department of Financial Administration, Central University of Punjab, Punjab, India

²Department of Commerce, Central University of Rajasthan, Rajasthan, India

ABSTRACT

The present study examined the behaviour of the ten major stock indices with the highest market capitalization in the global financial market during the COVID-19 pandemic, using an event study approach. Further, the abnormal returns (AR) from the event study are regressed on the death cases due to COVID-19, on returns of selected stock indices, and on market returns to obtain more robust results. The results revealed that all the major indices were affected by the lockdown announcement in their respective countries and continued to yield negative abnormal returns during the lockdown phase, except the Hang Sheng Index of Hong Kong. The opposite reaction of the investors in Hong Kong led to an unperturbed Hang Sheng stock market amid a global crisis. Findings will help investors understand the behaviour of major stock indices during a crisis period and enable them prepare their portfolios accordingly to withstand risky periods. Also, investors' attitudes towards investment risk can make a notable difference in the economy.

Keywords: Stock market, COVID-19, Lockdown, Event study, Abnormal Returns

JEL classification: C23, G10, G14

1. Introduction

The escalating number of COVID-19 cases within a few months across the globe was a comprehensive example of how fragile and vulnerable the world is to unforeseen risks. The onset of the COVID-19 pandemic has taken a toll across social, epidemiological, as well economic frontiers globally. Due to the coronavirus, every sector went into a coma stage. Maital and Barzani (2020,

p. 5) stated that, "COVID-19 could affect the global economy in three main ways: by directly affecting production (supply), by creating supply chain and market disruption (supply), and by its financial impact on firms and markets (principally, demand)". The impact of the outbreak of COVID-19 reflected well upon capital and other financial markets, which are considered the reflective index of the economy.

The vigorous spread of the virus led economies at large into a lockdown phase. Nationwide lockdowns were announced in countries worldwide to control the spread of the virus. Due to the lockdown, industries and their operations were highly impacted. This consequently affected the domestic economies and the global economy. It is interesting to note the behaviour of assets' returns during these economically-distressed situations (Rameli & Wagner, 2020). Baker et al. (2020) reported that no previous pandemic outbreak had impacted the financial market as strongly as COVID-19. Literature is available investigating the stock price reactions to COVID-19.

The aim of the present study is to comprehensively analyse the behaviour of the ten major stock indices with the highest market capitalization in the global financial market during the lockdown phase of the COVID-19 pandemic using an event study approach. Further, the AR from event study are regressed on the death cases due to COVID-19, returns of selected stock indices, and market returns, to find the factor which impacts the abnormal returns the most, and thereby obtain a more robust result.

2. Review of Literature

The COVID-19 pandemic is the most significant global crisis since World War II which has affected almost all countries across the globe. Researchers are documenting their research findings on how the COVID-19 pandemic has affected domestic and international economies. Baker et al. (2020) observed that no previous disease outbreak has impacted the stock market as strongly as COVID-19, causing higher stock market volatility. Liu et al. (2020) found a quick fall in the stock market of many countries affected by the novel coronavirus. Asian countries had more negative abnormal returns than any other affected countries. Using the event study methodology, Selmi and Bouoiyour (2020) found that the G7 countries' stock markets suffered from

uncertainty in the COVID-19 period and that China was the primary volatility transmitter to other stock markets. Alber (2020) concluded that stock market returns seem sensitive to the coronavirus cases more than to the deaths. Singh et al. (2020) confirmed that the global stock market is recovering from the negative impact of COVID-19 and that it was most affected by the increasing reporting of positive cases of COVID-19. Alam, Alam and Chavali (2020) analysed the impact of the lockdown due to COVID-19 on the Indian stock market and found that the average abnormal returns (AAR) and investors' anticipation which showed negative responses pre-lockdown because investors' panicked, showed positive responses post lockdown.

After extensively reviewing existing studies, we studied the behaviour of the stock markets around the globe with the highest market capitalization during the lockdown phase of the COVID-19 pandemic in their respective countries and root for the theory of information efficiency in the market. The analysis is in two parts. First, an event study was performed to assess the stock market reaction to the spread of the COVID-19 pandemic. Second, the abnormal returns were regressed on the death cases due to COVID-19, returns of selected stock indices, and market returns.

3. Data and Methodology

The study explores the short-term impact of the lockdown due to COVID-19 on major global indices using an event study approach. The literature reveals that the occurrence of certain events found to have an impact on the economy can be measured using the event study methodology (Chen, Jang & Kim, 2007; Elad & Bongbee, 2016; Singh et al., 2020; Liu et al., 2020; Alam et al., 2020). Such occurrences include the spread of contagious diseases such as Ebola, SARS, etc., or political events such as elections, or financial events such as recession, mergers, and acquisitions of firms.

For this study, the event date is different for each country. The event date is when the lockdown was imposed by various countries due to the concern about the huge daily upsurge in the number of COVID-19 cases. Table 1 presents the list of selected stock indices with the highest market capitalization from countries around the globe and the event date in each country. The data collection period ranged from 01/01/2018 to 30/06/2020,

within which the daily closing value of each stock index was considered. Information was obtained from the WHO and *The Economic Times*, while the stock market data was collected from Yahoo Finance, Investing.com, and Bloomberg.

Table 1. Event Period for the Stock Indices

Indices	Estimation period	Pre-Event period	Event date	Post-Event period
<i>DJI</i>	26/02/19 to 21/02/20 (250 days)	24/02/20 to 06/03/20 (10 days)	03-09-20	10/03/20 to 18/05/20 (49 days)
<i>NASDAQ</i>	26/02/19 to 21/02/20 (250 days)	24/02/20 to 06/03/20 (10 days)	03-09-20	10/03/20 to 15/05/20 (49 days)
<i>N225</i>	29/01/19 to 10/02/20 (250 days)	12/02/20 to 26/02/20 (10 days)	27/02/20	28/02/20 to 12/05/20 (49 days)
<i>SSE</i>	10/01/19 to 08/01/20 (240 days)	09/01/20 to 22/01/20 (10 days)	23/01/20	03/02/20 to 10/04/20 (49 days)
<i>HIS</i>	03/1/19 to 08/01/20 (250 days)	09/01/20 to 22/01/20 (10 days)	23/01/20	24/01/20 to 03/04/20 (49 days)
<i>FTSE 100</i>	13/03/19 to 06/03/20 (250 days)	09/03/20 to 20/03/20 (10 days)	23/03/20	24/03/20 to 04/06/20 (49 days)
<i>SZCS</i>	02/01/2018 to 08/01/20 (250 days)	09/01/20 to 22/01/20 (10 days)	23/01/20	03/02/20 to 10/04/20 (49 days)
<i>BSE</i>	25/03/19 to 10/03/20 (250 days)	11/03/20 to 24/03/20 (10 days)	25/03/20	26/03/20 to 08/04/20 (49 days)
<i>NSE</i>	25/02/19 to 09/03/20 (250 days)	11/03/20 to 24/03/20 (10 days)	25/03/20	26/03/20 to 13/04/20 (49 days)
<i>TSX</i>	07/03/19 to 06/03/20 (250 days)	09/03/20 to 20/03/20 (10 days)	23/03/20	24/03/20 to 06/04/20 (49 days)

Source: Authors' compilation.

Further, a panel regression was carried out to find robust results and to investigate the factor affecting the abnormal returns. The panel set used to examine the relationship between the abnormal returns (dependent variable)

and death cases due to COVID-19, daily returns of indices, and daily returns of the market index (independent variables) is as follows:

$$AR_{m,t} = \delta + \varphi_1 \text{lndeath_cases}_{m,t} + \varphi_2 \text{Return_Index}_{m,t} + \varphi_3 \text{MarketIndex_Return}_{n,t} + \varepsilon_{m,t}$$

where $AR_{m,t}$ is abnormal returns of index m at day t , lndeath_cases is the natural logarithm of death cases due to COVID-19 in a country of index m , Return_Index is the daily returns of index m at day t , and $\text{MarketIndex_Return}$ is the daily return of market index n at day t .

4. Empirical Results and Discussion

This section discusses the empirical results obtained employing the event study methodology to explore the impact of COVID-19 on the top ten major stock indices worldwide. The mean and standard deviation of the stock indices returns before and after the event date are shown in Table 2.

Table 2. Mean Returns and Standard Deviation in Returns of Selected Indices

Index	No. of Trading Days		Pre-Event		Post-Event	
	<i>Pre-event</i>	<i>Post-event</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Mean</i>	<i>Std. Dev</i>
DJI	260	49	-3.362E-05	0.00987	-0.00014	0.04327
NASDAQ	260	49	0.00049	0.01112	0.00306	0.04003
N225	260	49	0.00032	0.00910	-0.00153	0.02849
SSE	250	49	0.00074	0.01132	-0.00127	0.019279
HIS	260	49	0.000462	0.00994	-0.00374	0.021275
FTSE 100	260	49	-0.00123	0.01293	0.00487	0.02449
SZCS	260	49	0.00163	0.01445	-0.00075	0.02519
SENSEX	260	49	-0.00118	0.01621	0.003723	0.02560
NIFTY	260	49	-0.00128	0.01611	0.00399	0.02458
S&P TSX	260	49	-0.00115	0.01626	0.00644	0.02497

Source: Authors' calculations

Table 2 shows the mean returns and standard deviation in returns of stock indices for pre and post-event days, along with the number of trading days in the pre and post-event periods. It is interesting to note that indices that

yielded negative mean returns before lockdown had positive mean returns post lockdown announcement (FTSE 100, SENSEX, NIFTY, and S&P TSX). The primary reason for the positive yield in the post-event period is probably because these indices had already steeped low when WHO declared COVID-19 a pandemic on 11th March 2020.

Table 3 gives the abnormal return of the stock indices on the event day and one day after the event. It is imperative to note that all the indices had significant abnormal returns (+/-) one day post the lockdown announcement except the Hang Sheng Index (HSI) of Hong Kong. In addition, NASDAQ, SSE, SZCS, SENSEX, NIFTY, and S&P TSX had significant abnormal returns on the event day and one day after the event day.

Table 3. AR on Event Day and One Day After

Index	Estimation window: (-260,-10)	
	Event Day	One-Day After
DJI	0.0015 (0.484)	0.0178 (5.785)**
NASDAQ	0.0278 (7.381)**	0.0102 (2.712)*
N225	-0.0032 (0.393)	-0.0278 (3.363)*
SSE	-0.0267 (2.437)*	-0.0653 (5.959)**
HIS	-0.0130 (1.533)	0.0049 (0.584)
FTSE 100	-0.0088 (1.590)	0.0166 (2.982)*
SZCS	-0.0350 (2.502)*	-0.0712 (5.086)**
SENSEX	0.0562 (6.099)**	0.0293 (3.185)*
NIFTY	0.0531 (5.731)**	0.0196 (2.114)*
S&P TSX	-0.0321 (10.891)**	0.0604 (20.496)**

(***p*-value<0.01, **p*-value<0.05)

Source: Authors' calculations

As revealed from Table 4, the Hang Sheng Index (HSI) of Hong Kong was not affected by the lockdown, neither before nor after the announcement.

This implies that it is the least volatile index among the top ten stock indices of the world.

Table 4. CAR of the Stock Markets

<i>Index/ Event Window</i>	CAR (-1,1)	CAR (-5,5)	CAR (-10,10)	CAR (0,9)	CAR (10,19)	CAR (20,29)	CAR (30,39)	CAR (40,49)
DJI	0.03289 (2.799)*	0.02339 (1.039)	0.00801 (0.258)	-0.00586 (0.260)	0.01761 (0.821)	0.00588 (0.274)	-0.01624 (0.757)	0.00026 (0.012)
NASDAQ	0.04829 (3.543)*	0.09862 (3.779)*	0.22712 (6.299)**	0.14488 (5.552)**	-0.03039 (1.221)	-0.01004 (0.403)	0.01472 (0.592)	0.00764 (0.307)
N225	-0.03612 (7.553)**	-0.03430 (13.733)**	-0.08644 (47.821)**	-0.07411 (29.675)**	0.06095 (23.267)**	-0.05424 (20.705)**	-0.02084 (7.956)**	0.04327 (16.519)**
SSE	-0.09014 (4.748)**	-0.07534 (2.073)*	-0.07044 (1.403)	-0.05768 (1.587)	0.08550 (2.467)*	0.08627 (2.489)*	-0.08371 (2.415)*	-0.02009 (0.580)
HIS	0.00399 (0.278)	-0.06696 (2.433)*	-0.03672 (0.966)	-0.02624 (0.954)	0.00004 (0.002)	0.04093 (1.560)	0.06591 (2.512)*	-0.03188 (1.215)
FTSE 100	0.03075 (6.508)**	0.05334 (21.617)**	-0.01584 (8.871)**	-0.01284 (5.204)**	-0.02459 (9.500)**	0.00556 (2.149)*	0.00961 (3.714)*	-0.00244 (0.941)
SZCS	-0.09719 (14.985)**	-0.04383 (12.940)**	-0.01629 (6.646)**	-0.03143 (9.279)**	0.12003 (33.791)**	0.06873 (19.349)**	-0.11276 (31.744)**	-0.02841 (7.998)**
SENSEX	0.07823 (14.319)**	-0.08075 (28.300)**	-0.13924 (67.426)**	0.10481 (36.732)**	0.00241 (0.804)	-0.01492 (4.987)**	-0.01202 (4.017)**	0.05382 (17.984)**
NIFTY	0.06437 (11.750)**	-0.08385 (29.311)**	-0.13814 (66.715)**	0.10631 (37.161)**	0.00935 (3.117)*	-0.01141 (3.801)*	-0.00544 (1.815)	0.05736 (19.117)**
S&P TSX	0.01298 (3.354)*	-0.04123 (20.403)**	-0.08306 (56.790)**	0.04354 (21.545)**	0.03457 (16.309)**	0.02498 (11.786)**	-0.01112 (5.244)**	-0.00317 (1.497)

(**p-value<0.01, *p-value<0.05)

Source: Authors' calculations

Table 5 gives the results of the random effects model regression analysis with abnormal returns as the dependent variable. The constant-coefficient is negative and significant, which indicates AR will be harmful in the absence of variables.

Table 5. Performance of Abnormal Return (through Random Effect Model)

Variable	AR	AR	AR
C	-0.0036* (-1.97)	-1.81E-05 (-0.01)	-0.0005 (-0.73)
Ln_deathCases	0.0006* (2.173)	9.03E-05 (0.39)	0.0001 (1.05)
Index_Return		0.4127** (9.47)	0.8753** (5.61)
Market_Return			-0.6632** (-3.39)
R-Square	0.0078	0.3932	0.8192

(***p-value*<0.01, **p-value*<0.05)

Source: Authors' calculations.

The findings reveal that death cases due to COVID had a minute yet statistically significant impact on the abnormal returns of the stock indices, but along with other interacting variables, index return and market return, the impact of death cases due to COVID-19 was insignificant. This finding is in line with Singh et al. (2020). Return_Index had a significant positive impact, while Market Index_Return had a negative and significant impact. Furthermore, death cases had a positive and insignificant impact on abnormal returns, consistent with Ashraf (2020). The results indicate that the number of death cases due to COVID-19 had no significant economic impact on the excessive returns.

Research Implication

All the major indices were found to have been affected by the lockdown announcement in their respective countries and continued yielding negative abnormal returns during the lockdown phase except the Hang Sheng Index of Hong Kong. Furthermore, the results reveal that indeed the number of death cases did not have a significant impact on abnormal return. The findings of the study are helpful for investors to understand the behaviour of major stock indices during the crisis period and prepare their portfolios accordingly to withstand risky periods. Also, investors' attitude towards investment risk can make a notable difference in the economy.

5. Conclusion

The present study examined the behaviour of the major ten stock indices with the highest market capitalization in the global financial market in the period of the COVID pandemic and lockdown using the event-study approach. The results reveal that all the major indices were affected by the lockdown announcement in their respective countries and continued yielding negative abnormal returns during the lockdown phase except the Hang Sheng Index of Hong Kong. News reports reveal that where the global economies were shaken due to the COVID-19 outbreak, Hong Kong investors chose to expose themselves to high-risk investments by making changes to their portfolios. It is noteworthy that where investors around the globe were selling off their investments, Hong Kong investors took an opposite course of action and added to their risk. Further, the results of panel regression reveal that indeed the number of death cases had no significant impact on abnormal returns. On the other hand, Index returns and Market index returns had significant impact on abnormal returns. The findings of the study will help investors to understand the behaviour of major stock indices during crisis periods and prepare their portfolios accordingly to withstand risky periods. Also, the results show that the attitude of investors towards investment risk can make a notable difference in the economy.

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