IMPACT OF NCOC DECISIONS REGARDING COVID-19 ON STOCK RETURNS: AN EVENT STUDY ANALYSIS

Abstract

Purpose - The outbreak of COVID-19 has severely affected the Pakistani economy. Pakistan stock exchange reported a drop of 25% in the KSE-100 index during the month of March-2020. This study has discussed the effect of different COVID-19 related events on the industrial stock returns. In addition, this study has also analyzed the industrial spillover effect of COVID-19 related newsacross different sectors.

Design/Methodology- Data was collected from individual companies based on the 17 main industries including both financial and non-financial sectors in Pakistan Stock Exchange. Stock returns of the individual companies were averaged to see the whole impact of these companies asthe economic groups/industries. This study has selected six major COVID-19 related events from the first wave in the Pakistan.

Findings- Results show that COVID-19 had strong negative impact in the beginning but later on the overall adverse impact was alleviated. Also, there is an evidence of industrial spillover effect that was passed through construction related sectors to the oil & gas sector and chemical sector. Textile sector was observed to be the most negatively affected sector by the first wave of COVID-19 in the Pakistan.

Research Limitation/Implication- Results are based on economic groups/industries however implication of results is based on economic group or industries.

Practical Implication- In the situations like epidemic or pandemic some immediate actions must be taken by policy makers to gain the confidence of the investors to stop panic selling of stocks. Such kind of actions can help to reduce the short-term impact of any disastrous situation. All policies must be formulated by considering the trickledown effect of any action. Industries/sectors are required to be classified as homogeneous and heterogeneous groups. However, such kind of classification will help to formulate uniformed policy to benefit the economy on a large scale.

Future Direction- There is further need to study cross-country industrial spillover effect that passes from one sector or industry in one country to the sectors or industries in the other trading partner countries.

Originality/Value- This study discusses the concept of industrial spillover effect in the black swan event COVID-19.

Keywords: *Event Study, COVID-19, Spill-over, Sector-wise Performance, Pakistan Stock Exchange*

1. Introduction

The spread of Covid-19 has significantly influenced the business dynamics across the world. Neither developing nor developed economies could safeguard themselves whilst no certainty how and when the situation will be completely controlled. WHO had declared the Covid-19 outbreak as an Epidemic (Health Emergency) in January 2020 but later on it was declared as a pandemic in March 2020 which has halted the entire world. As of June 2021, there have been more than 150 million reported cases of coronavirus and more than 3 million reported deaths (Worldometers 2020). Yet, the actual number of cases or death could be even higher as the testing capacity in developing countries is less than what exactly World Health Organization (WHO) recommends.

Many countries are passing through the second and third waves of COVID-19 even health experts fear a 'surge upon a surge', which has also been witnessed in some countries (Mertens *et al.*,

2020). COVID-19 has adversely affected economic progress since its inception. In February 2020, the industrial production index (IPI) was declined by 54 % in China (*Pak et al.*, 2020) and declined by 15.71 % in the US as reported in April, 2020 (CEIC, 2021). On the other hand, world-leading stock indices including S&P 500, FTSE 100, and Dax had lost almost 1/4 of their value by the end of March 2020 (Pak, et al., 2020). The sudden decline in the stock prices caused by panic-selling of investors in Black Swan events such as terror attacks and epidemics. A study conducted by Burch *et al.* (2016) had analyzed price reaction and trading patterns after the 9/11 terror attacks. A sharp decline in stock prices was observed for the next two weeks after happening of the event because of panic-selling by individuals as well as institutional investors. This is an example of panic selling due to Black Swan events. Panic-selling causes to earn abnormal returns for a shorter period covering the events (Li *et al.*, 2021; Bruch *et al.*, 2016). Present study aims to investigate how COVID-19 news impacts industrial stock returns in the (PSX) Pakistan Stock Exchange.

To cope up with challenges faced by COVID-19, National Command Operation Center (NCOC) in Pakistani takes decisions to control the spread of COVID-19 and reduce its harmful effect on the economy (Ahmad and Ashraf, 2021). NCOC has broadened the spectrum of coordination amid provinces and federal bodies to form a national integrated response to the challenges posed by COVID-19 (NCOC, 2021). In its role, NCOC collects processes and integrates COVID-19 related information to provide its recommendations taking onboard financial and health experts. NCOC ensures to implement data-driven strategies, communicate timely policy statements, addressing disinformation for public awareness. Positive outcomes of NCOC decisions have been acknowledged in flattening the successive curves of COVID-19 in all four waves in Pakistan (Haq *et al.*, 2021). Although, NCOC decisions were taken into account the economic implications of COVID-19 still Pakistani economy suffered severely during the first phase. Economic growth was negative, huge job losses for low or unskilled workers were observed, a significant increase in poverty took place, millions of people fell below the poverty line, while more the 40 percent of the population have faced moderate to severe food insecurity (World Bank, 2021).

The agriculture sector is being one of the leading sectors of the Pakistani economy faced huge losses owing to the lockdowns and closures of transportation sectors. The manufacturing sector comprises three constituents, Large-Scale Manufacturing, Medium-Scale Manufacturing, and Small-Scale Manufacturing sectors which contribute more than 13 percent of the overall GDP of Pakistan. The industrial production index in Pakistan was declined by 41.56 % during April 2020 (CEIC, 2021).

Manufacturing sectors had reported negative growth in the first six months of 2020 from February to July (ICMAP, 2020). Negative growth was mainly due to some important reasons such as the interrupted supply of raw material mostly coming from China and Japan that directly hits steel and automobile sectors (ICMAP, 2020). On the other hand, the cement and textile sectors were also negatively affected by lockdown due to low economic activities and exports. Pakistan stock exchange reported its largest single-month decline of about 25% in the KSE-100 index during March 2020. It was mainly due to the investors' nervousness about the increasing numbers of infectious cases of COVID-19 (PIDE, 2020). However, investors were found it better to adopt a dump-run approach, to get rid of risky assets. On the other hand, the exchange rate was increased from Rs. 154/USD in the first week of March 2020 to Rs168/USD by end of the month (PIDE, 2020).

Existing evidences by (He, et al., 2020; He, et al., 2020) found an adverse effect of COVID-19 on stock market performance but provide mixed evidences in the short-run and long-run. Direct and spillover impact was also observed using cross-countries evidences from major world market indices (He, et al., 2020). Yet, no known research had observed the industrial spillover effect of COVID-19 on stock performance. Most of the studies have used conventional parametric and non-parametric t-test approaches to measure the accumulative abnormal returns. Some other studies mainly focused on the short-term effect of COVID-19 on various stock indices (Liu *et al.*, 2020) and (Yan *et al.*, 2020). Also, Papadamou *et al.* (2020) studied the impact of the COVID-19 pandemic on the volatility of stocks from different regions using a panel approach (VAR model).

The short-term impact of good or bad news on investors' behavior is influenced by various fundamental factors such as behavioral factors, cultural differences, and risk tolerance levels (Li *et al.*, 2013). Under behavioral finance perspective investment decisions based on emotional and cognitive ability, also, there is important role of risk tolerance level. On the other hand, Emergent Norm Theory describes that group norms influence to investment decisions (Turner and Killian, 1987). Pakistani stock markets react strongly against Good or Bad News, political instability, or terrorism activities (Khan *et al.*, 2017). Investors instantly react against news information publicly available in form of good or bad events occurring in the market. The same happened in March 2020, when Pakistan Stock Exchange (PSX) hits its lowest value in the last 5 years due to the Covid-19 pandemic (Waheed *et al.*, 2020). Consequently, number of strategic decisions were taken by NCOC to prevent the spread of COVID-19. Even to keep all decisions align with the economic scenario so Covid-19 may not hit hard to escalate poverty in the country. In this study, NCOC decisions are the main sources of information to measure the influence on stock returns in the Pakistan. This study will investigate the short-term impact of COVID -19 on stock returns based on NCOC decisions and also the spillover impact of COVID -19 related events on industrial stock returns.

In situations such as pandemics, some sectors outperform than others owning to the nature of business and market opportunities available. However, investors follow the information available to them and formulate their investment strategies. This entire process causes significant changes in the stock returns, sometimes in form of abnormal returns. This study will investigate the effect of COVID-19 on stock returns in the various sectors of the Pakistan Stock Exchange. Findings from this study will bring more clarity to the investors that how sector-wise performance was affected by COVID-19 and what sectors were linked to each other in terms of abnormal returns.

2. Literature Review

The adverse effect of COVID-19 on stock returns was evidenced by (He *et al.*, 2020) and (He *et al.*, 2020) some other studies (Liu *et al.*, 2020) and (Yan *et al.*, 2020) provide mixed evidence in the short-run. As reported by a recent study Khatatbeh *et al.* (2020), all industries are not equally affected by COVID-19 and even some industries are benefiting from a pandemic situation such as e-commerce and pharmaceutical industries. This argument is based on Broken Window Fallacy, where the loss of one could turn into a benefit for others. It is evidenced by He, *et al.* (2020) that COVID-19 impact spilled over from one country to other related countries, yet there is no known study conducted to measure the industrial spillover effect of COVID-19 on industrial stock returns. In Pakistan, NCOC recommends sector-wise lockdown and also lifts lockdown the same way. However, the stock market reactions for all sectors could not be the same. Sector-wise lockdown may cause industrial spillover because of interdependency of various sectors. There are no unknown studies that have evaluated industrial spillover effect during the period of COVID-19 pandemic. The present study aims to fill the gap by investigating the spillover effect of COVID-19 on industrial stock returns. This study will theoretically contribute how COVID-19 effect was spilled over from one sector to other related sectors in Pakistan Stock Exchange. Stock markets strongly react to the new information publicly available. Information even good or bad may significantly affect the stock market returns in the short-run or in the long run. if so, then how this effect spillovers from one sector/industry to other related sectors/industries.

2.1 Concept of Epidemic/Pandemic

A crisis may cause typically a significant effect on the complete economic system or some of its sectors that are directly threatened by the crisis. Crisis may be classified as disasters/events come suddenly in response to that system faces a sudden change (Chen *et al.*, 2007). Disasters can be distinguished based on their origin. Disasters can be classified as natural, socio-political, and human-made disasters. Epidemics and pandemics are natural disasters but directly influence socio-economic structure in any society (Kock and Zenker, 2020). Some of pandemics which the world has faced in

recent years are Severe Acute Respiratory Syndrome (SARS), Ebola, Novel Avian Influenza, and Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2 or COVID-19).

2.2 Some Recent Epidemics before COVID-19 and their Influence on Stock Markets

The novel avian influenza A (H7N9), disease causes a high fatality rate that was initially reported in China in 2013. In terms of economic consequences, it has had adverse economic consequences in various sectors owing to the changes in consumers' confidence and its trickle-down effect was observed in terms of low trade volume. In 2013, huge economic losses were attributed to Novel Avian Influenza. These economic losses were spontaneously reflected in stock markets (Jiang *et al.,* 2013). The stock market is one of the major pillars of any economy that strongly responds to any change in economic patterns. Epidemics and pandemic consequences can be seen more clearly in those sectors where the damages of infectious diseases are high. On the other hand, behavioral finance proposes that investor sentiments shape investment behavior and it ultimately reflects in stock prices. Marinč (2016) elaborated that media coverage of events such as the Ebola outbreak increased high anxiety among investors and fear to invest. However, in such a situation information dissemination induces risk aversion behavior (Ichev and Marinč, 2017). The Ebola outbreak strongly influenced the behavior of investors if their investments were geographically closer to the origin of the Ebola outbreak. On the other hand, individual investors with a lack of professional information processing capabilities and guidance are more likely to influence by such events covering by media. People who have experienced an outbreak of any fatal disease develop a fear of new epidemic diseases or especially given the perception that new emerging infectious disease may cause high human fatalities (Jiang *et al.,* 2013).

On the other hand, SARS was discovered in 2003 with its origin from China when tourists from different countries were infected, and then returning to their countries they became the cause of the spread (Hui *et al.,* 2020). Siu and Wong (2004) studied the influence of the SARS epidemic in terms of economic consequences for Hong Kong. This study suggests that the most serious negative impact was found on the consumer side, with a significant decrease in local consumption. On the other hand, tourism and air travel industries were also negatively influenced by the SARS epidemic. However, the severe consequences of an epidemic or pandemic may vary from industry to industry. Another study by Loh (2006) specified that stock returns during the period of the SARS epidemic were more sensitive to the news of disease spread. It was evidenced that stocks of some industries were more sensitive to the news about SARS than others and that sensitivity was reflected in the form of high volatilities in the stock prices. Hence, it is more obvious that stocks of some industries are more sensitive to the news of epidemics or pandemics than others. Chen *et al.* (2007) evidenced that the SARS epidemic has harmed the stock returns of Taiwani hotels by using the event study approach to differentiate timelines of pre-event and post-event windows. Stocks return showed negative cumulative mean abnormal returns (CMAR) during the period of the SARS outbreak. Another reference to the cross-country analysis is a study by Chen *et al.* (2018) that examined the spill-over effect of SARS between China and four other linked Asian countries. It was evidenced that the SARS epidemic adversely affected the stock returns even it spilled over in terms of financial integration or financial linkages among economic blocks.

2.3 Health Emergency Warnings and Potential Consequences before Covid-19 Outbreak

Ahead of Covid-19 which is marked as a global health emergency, Bloom et al. (2018) emphasized the concerns about the potential emergences of epidemics or pandemics such as different types of influenza or unknown pathogens may severely damage world economies. There are several economic risks attached to the epidemics or pandemics such as an overall decline in the economic activity, owning to the costs attached to the health system, reduction in the overall productivity of employees, collapse in the tourism sector, and also the disruption in supply chain channels (He *et al.,* 2020). Such type of emergencies discourages investments as investors lose confidence on the market performance. Currently, the COVID-19 pandemic is one of the biggest unexpected shocks to

the global economy. By this pandemic the economic destruction is observed on an unprecedented scale (Waheed *et al.,* 2020).

2.4 Pakistan's Response to COVID-19

In Pakistan, COVID-19 emerged as a challenge to the prospect of assessing the capacity, readiness, and implementation of strategic plans. NCOC has contributed successfully to bridge the governance gap by revamping existing mechanisms and integrated institutional arrangements to strengthen the healthcare system to deal with health as well as economic challenges in Pakistan (Ahmad and Ashraf, 2021). Considering the adverse economic consequences of COVID-19 government has emphasized to improve the quality of life of the general public and approved Rs. 2.1 trillion economic relief packages in March, 2020. One hundred fifty billion (Rs.150) from this package was allocated to the lower-income people, the laborer classes. On the other hand, a special package for the construction sector was announced to provide tax amnesty for investors, Rs. 30 billion subsidies to Naya Pakistan Housing Scheme, and special tax rates for the construction industry (Wang *et al.,* 2021). Furthermore, the government ordered to defer interest on loan payments temporarily to support exporters and released Rs. 100-billion for subsidies to the agriculture sector along with small industries. The relief package offered a significant reduction in the petroleum prices, electricity and gas bills which helped to improve the quality of life of general public (Latif *et al.,* 2020).

2.5 COVID-19 and its Influence on Stock Markets

COVID-19 is depressing the overall global economy but economic consequences are not similar for each country. Similarly, its consequences are even unequally distributed throughout the economy (He *et al.,* 2020). When most of the industries are in distress owing to the economic disruption, some industries are benefiting from the situation (Khatatbeh *et al.,* 2020). However, the impact of the COVID-19 outbreak is unique to the industry characteristics. Since the total socio-economic costs related to the COVID-19 outbreak remains uncertain, yet the devastating consequences of the pandemic are being observed around the world. Moving ahead, the COVID-19 outbreak poses a serious threat to the developing economies to their economic growth. In particular, countries with scarce resources, weak healthcare facilities, and weak financial systems are more vulnerable to pandemic situations (Takyi and Bentum-Ennin, 2020). Considering the potential economic consequences of COVID-19, many studies have been conducted using econometric techniques in different regions to signify how the COVID-19 outbreak influences stock returns or stock market performance. Several approaches have been used to study the impact of COVID-19 outbreak on stock returns, such as pre-event, event, and post-event windows (He *et al.,* 2020), short event and long event windows (Al-Awadhi et al., 2020), and parallel event windows to compare regional impact (Liu *et al.,* 2020). He *et al.* (2020) examined both the direct impact of COVID-19 on stock markets and how that impact was spilled over in various economies from China to some of the European countries including Italy, France, Germany, Spain, and in the Asian region Japan, South Korea and also United States of America (USA). It was observed that the COVID-19 outbreak adversely affected stock returns in the short run. Similarly, there is a significant influence of news reports related to the daily increasing number of cases and number of deaths as Al-Awadhi *et al.* (2020) used two different measurements (i) growth in total confirmed cases and (ii) growth in daily deaths using panel regression approach. It was evidenced that stock volatility was not equal for all sectors, as A shaped (low capitalization and high domestic investors concentrated industries) performed better than those B shaped (high capitalization and high foreign investors concentrated industries).

Investors rationally process market information even they also follow current developments attached to any kind of events such as epidemic or pandemics, therefore, it is obvious that demand for biomedicine and biological products increase with infectious diseases (Jiang *et al.,* 2013). However, Al-Awadhi *et al.* (2020) also observed that medicine and technology-related industry stocks performed better than others. He *et al.,* (2020) signified that there are some industries outperformed

in COVID-19 outbreak and their stock returns were higher than others. On the other hand, Liu *et al.* (2020) found that stock returns of 21 world-leading indices quickly dropped in the short run with the news that COVID-19 is a global health emergency. Information dissemination induces risk aversion behavior to avoid risky investments (Ichev and Marinč, 2017). Even, Asian economies were found to be more affected at the beginning with more abnormal returns than others (Liu *et al.*, 2020). As initially, China was the main hotspot of the COVID-19 outbreak. However, geographical proximity strongly influences the behavior of investors if their investments are closer to the origin of the disease outbreak (Jiang *et al.*, 2013). On the other hand, Yan *et al*. (2020) proposed possible ways that an individual investor could profit from a global pandemic outbreak by examining the impact of the COVID-19 outbreak on the stock markets. The stocks of industries that are immediately affected by the virus are to be sold out immediately in the short run and then eventually buy back the same stocks of those industries after their prices had significantly dropped. Speculators make profit in such situations.

2.6 Theory of Broken Window Fallacy

The underlying theory broken window fallacy by Bastiat (1850) proposed an unfortunate baker's window has been broken by someone else's carelessness. But in response to the incident glazier gets the job to replace window. Then the same glazier spends money to expand his business as a good business opportunity so additional income is earned from the expanded business. However, this incident generated overall economic activity. In disastrous situations, some industries may behave as Broken Windows fallacy theory suggests however, if any economy is passing through such kind of emergency (outbreak of infectious diseases), there is a possibility that some stocks may keep going up and others going down.

Some industries like biomedicine and biological products are benefiting from the COVID-19 situation however, there is chance that some sectors are giving higher returns than their past performance (pre-event window). This is also related to investment psychology, the way investors process information during disastrous situation (Jiang *et al.*, 2013). However, there are chances that some sectors of the economy are outperforming in the situation. On the other hand, the occurrence of natural disasters brings innovations and technological advances to cope up with ongoing situations (Chaiechi, 2014). In the light of Broken Window Fallacy theory, it is assumed that COVID-19 outbreak impact may not be the same for all sectors and even there is chance that spillover effect may pass through one sector to another sector.

3. Research Methodology and Research Design

This study uses Event study methodology. Event study has examined the abnormal returns at a specified event in form of a pre-event window, the time immediately before the occurrence of an event, the event window when an event occurs, and post-event window, the time immediately after the occurrence of an event (He *et al.*, 2020; Han and Ming, 2018).

In this study, three different types of analysis will be performed including

1) Impact of decisions taken to counter Covid-19 by NCOC on industrial stocks' performance in PSX.

Here, the total numbers of industries are 17

2) Impact of six major events based on NCOC decisions on sector-wise stocks performance in PSX.
3) Spillover impact of NCOC decisions to counter Covid-19 from those sectors where lockdown lifted early on other sectors where lockdown lifted later.

3.1 Events Period

In this study sector-wise returns are investigated separately during the emergence of COVID-19 in Pakistan. There were some important events that occurred from 26th February 2020 when the first two cases of COVID-19 were reported in Pakistan. Before that period from 1st January to 25th February lockdowns were being imposed worldwide. In the Pakistan, first death from COVID-19 was reported on 18th of March, 2020. On 21st of March, the province-wide lockdown was imposed

in Sindh and in Punjab province-wide lockdown was imposed on 24th of March, 2020 (NCOC, 2020). After 24th March all other provinces also imposed lockdown within a week. However, before 1st April, 2020 countrywide lockdown was imposed for all industries and manufacturing units except the pharmaceuticals sector, Food & Personal Care sector, and Banking sector (NCOC, 2020).

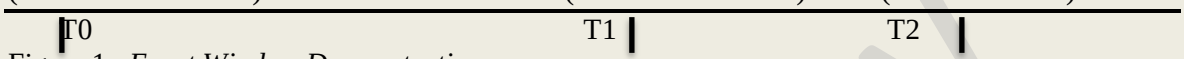

Figure 1. *Event Window Demonstration*

A very important announcement was made by the Prime Minister of Pakistan on 3rd of April 2020. It was related to amnesty for the construction industry to boost the economic activity after an ease in lockdown. On the other hand, it was announced that countrywide lockdown will be lifted in phases and the construction industry will be the first to get the relief.

On 15th April construction and some other related industries were allowed to resume their operations in the wake of the alarming economic situation (NCOC, 2020). So, the lockdown was eased to the cement sector, fertilizer sector, chemical sector, glass manufacturing sector, paper & packaging sector, and mining industry. While, commerce sector was also allowed to operate to boost up the exports of the country. In the 2nd phase, other industries were allowed to operate from 9th May, 2020 (NCOC, 2020). All these sectors were operational until vaccination process was initiated from 1st February, 2021. However, six important events were occurred from first wave of the COVID-19 pandemic in Pakistan until the vaccination process started.

Table I. List of Events

Date	Event	Economic Activity
1st January, 2020 to 25th February, 2020	Pre-Event Window	Continued
26th February, 2020 to 17th March 2020[1]	First reported case of COVID-19 in Pakistan	Continued
18th March 2020 to 31th March 2020[2]	First reported death from COVID-19 in Pakistan and lockdown was imposed countrywide	Suspended in Phases
3rd April 2020 to 14th April 2020[3]	Amnesty for the Construction industry	Fully suspended[4]
15th April 2020 to 8th May 2020[5]	Ease in lockdown for construction and other related industries	Partially suspended[6]
9th May 2020 to 5th June[7]	Ease in lockdown for most of the industries. Start of vaccination process	Resumed
1st January 2021 to 15th January 2021		Continued

3.2 Sectors Chosen for Analysis

There are 17 different economic groups/industries based on State Bank classification chosen in this study including all financial and non-financial sectors whether lockdown was not imposed, the lockdown was imposed only for 2 to 3 weeks and the lockdown was imposed for 5 to 6 weeks.

[1] COVID-19 live dashboard (Pakistan): national institute of health Islamabad. https://www.nih.org.pk/novel-coranavirus-2019-ncov/.

[2] https://covid.gov.pk/stats/pakistan

[3] https://ncoc.gov.pk/Sitrep/Apr/20.%20%20Sitrep%20-%2020%20Apr%20%20(Updated).pdf

[4] suspension does not include pharmaceuticals, food & personal care and banking sectors

[5] https://ncoc.gov.pk/updates.php

[6] suspension does not include pharmaceuticals, food & personal care, banking, cement, fertiliser, chemical, glass manufacturing, paper and packaging sectors

[7] https://ncoc.gov.pk/updates.php

Sector-wise stock returns were calculated based on average daily stock returns (He *et al.*, 2020) for all 17 economic groups/industries.

3.3 Period of Analysis

The total period for all event windows is 115 days starting from 26th February to 5th June 2020 and then 1st February 2021 to 15th February 2021 (first two weeks and vaccination started) and pre-event window period is 55 trading days starting from 1st January 2020 to 25th February 2020. The study uses event study methodology as per the nature of the data. It is considered one of the most often engaged investigative techniques in the field of finance. The purpose of conducting an event study is to explore the response of the market to some event with a distinct outline through the sector-wise returns across all events.

To conduct analysis data was collected from two main sources, Pakistan Stock Exchange official website (https:// https://www.psx.com.pk/) to collect data of daily stock prices of individual stocks. On the other hand, COVID-19, related news information data was collected from the NCOC website (https://ncoc.gov.pk).

Economic Groups/Industries
(1) COMMERCIAL BANKS
(2) OTHER FINANCIAL INSTs.
(3) AUTOMOBILE
(4) CABLE & ELECTRICAL GOODS
(5) CEMENT
(6) CHEMICAL & PHARMACEUTICALS
(7) ENGINEERING
(8) FOOD & PERSONAL CARE
(9) GLASS & CERAMICS
(10) MISCELLANEOUS
(11) OIL & GAS
(12) OTHER MANUFACTURING
(13) PAPER & BOARD
(14) POWER GENERATION
(15) SUGAR
(16) TECHNOLOGY & COMMUNICATION
(17) TEXTILE

Table II. List of Economic Groups/Industries (Classification given by State Bank of Pakistan)

3.4 Procedure of Analysis

The returns of stocks of the respective sectors and the market index i.e. market returns for 115 days (events period) and 55 days (pre event period) were considered for data analysis. To estimate the market model, the following formula has been presented:

$$E(R_{it}) = a_i + \beta_i R_{mt} + \mu_i \qquad (1)$$

Where, $E(R_{it})$ is the expected sector or individual i returns on any given day t. a_i is the constant term, β_i is the sensitivity of sector or individual$i$stocks to R_{mt} market returns.

Actual returns on each sector stocks are calculated for the market model and windows engaging the formula as follow:

$AR_{it} = (P_{it} - P_{it-1})/P_{it-1}$ (2)

Where, AR_{it} is the actual returns on the sector or individual $i$stocks' returns on any given day t. P_{it} is the closing stock prices of sector or individual stocks$i$ on any given day t, and P_{it-1} is the closing stocks price of sector stocks$i$ the previous day $t-1$.

Market returns are calculated using the formula as follows:

$R_{mt} = (MKTindex_t - MKTindex_{t-1})/MKTindex_{t-1}$ (3)

Where, R_{mt} is the market returns on any given day t. $MKTindex_t$is the index value (KSE-100 Index) at any given day t, and $MKTindex_{t-1}$ is the index value of the previous day $t-1$. Further, the cumulative abnormal returns are calculated using the following formula.

$$CAR_t = \sum_{t=ti}^{tj} CAR_t$$

Where, CAR_t is the cumulative abnormal returns on any given day t, whereastj andti contemplate researchers specified window time to examine the cumulative effect of Event announcement on the sector or individual stocks' returns using the event windows. The study engaged a t-test to deduce the results. The analysis is performed on STATA 16 to calculate cumulative abnormal returns for the event periods identified to all industries/economic groups.

4. Empirical Findings

Results from event study analysis are given in the below tables for each event window separately.

Industry	Days	CAR	T-Test
COMMERCIAL BANKS	55	-0.024	-0.406
OTHER FINANCIAL INSTs.	55	-0.153	-1.650
AUTOMOBILE	55	-0.119	-1.783
CABLE & ELECTRICAL GOODS	55	0.212	3.929
CEMENT	55	-0.119	-1.799
CHEMICAL & PHARMACEUTICALS	55	-0.113	-1.904
ENGINEERING	55	-0.002	-1.074
FOOD & PERSONAL CARE	55	0.118	1.745
GLASS & CERAMICS	55	0.180	2.718
MISCELLANEOUS	55	-0.077	-1.201
OIL & GAS	55	0.152	3.161
OTHER MANUFACTURING	55	-0.079	-1.194
PAPER & BOARD	55	-0.141	-1.800
POWER GENERATION	55	0.188	2.739
SUGAR	55	-0.336	-4.485
TECHNOLOGY & COMMUNICATION	55	0.192	2.932
TEXTILE	55	-0.912	-2.301

Table III. Pre-Event Window from 1st, January, 2020 to 25th, February, 2020

Table 3 indicates the CAR of 17 industries before the outbreak of COVID-19 in Pakistan. It has been observed that the banking sector and other financial institutions in the country had CAR -0.024 and -0.153 however, the pre-event window had insignificant impact with t -value of 0.406 and -1.650 respectively. The cumulative abnormal returns for Cable & Electrical Goods, Glass and Ceramics, Oil and Gas, Power Generation, and Technology and Communication remained positive and

Significant. For, Sugar and Textile sectors cumulative abnormal returns were remained significant and negative. While, auto mobile, cement, chemical & pharmaceuticals, food & personal care and other manufacturing industries had insignificant CAR with t test values < 1.96. This pre-event window is the largest window, it covers the period when COVID-19 was spreading in various countries quickly. However, this period is also very important in terms of global pandemic spillover effect as Covid-19 outbreak had already spread in many countries during these two months.

Industry	Days	CAR	T-Test
COMMERCIAL BANKS	20	-0.303	-3.605
OTHER FINANCIAL INSTS.	20	-0.176	-1.658
AUTOMOBILE	20	-0.263	-2.825
CABLE & ELECTRICAL GOODS	20	-0.193	-2.159
CEMENT	20	-0.025	-0.304
CHEMICAL & PHARMACEUTICALS	20	-0.151	-1.711
ENGINEERING	20	-0.084	-0.785
FOOD & PERSONAL CARE	20	-0.242	-2.383
GLASS & CERAMICS	20	-0.262	-2.501
MISCELLANEOUS	20	-0.193	-1.726
OIL & GAS	20	-0.295	-3.342
OTHER MANUFACTURING	20	-0.233	-2.683
PAPER & BOARD	20	-0.248	-2.475
POWER GENERATION	20	-0.241	-1.961
SUGAR	20	-0.264	-2.674
TECHNOLOGY & COMMUNICATION	20	-0.283	-2.924
TEXTILE	20	-0.580	-2.654

Table IV. Event Window First Reported Case 26th February, 2020 to 17th March, 2020

Table 4 demonstrates the outbreak of COVID-19 in Pakistan i.e. first case reported on 26th February 2020. CAR of cement and engineering were negative i.e. -0.025 and -0.084 but not significantly different from zero with t-values -0.304 and -0.785 respectively on the event window when first COVID-19 case was reported. CAR of the commercial banks, other financial institutions, automobile, cable & electrical goods, chemical & pharmaceuticals, food & personal care, glass & ceramics, miscellaneous, oil & gas, other manufacturing, paper & board, power generation, sugar, technology & communication, and textile industries significantly declined at the event widow where first case was reported. At this event window strong negative impact of COVID-19 outbreak was observed in most of the industries. This event window was covering 20 days during the start of COVID-19.

Industry	Days	CAR	T-Test
COMMERCIAL BANKS	13	-0.057	-0.514
OTHER FINANCIAL INSTS.	13	-0.039	-0.195
AUTOMOBILE	13	-0.101	-0.697
CABLE & ELECTRICAL GOODS	13	-0.063	-0.550
CEMENT	13	-0.067	-0.525
CHEMICAL & PHARMACEUTICALS	13	-0.048	-0.508
ENGINEERING	13	-0.091	-0.795
FOOD & PERSONAL CARE	13	0.004	-0.012
GLASS & CERAMICS	13	-0.434	-1.913
MISCELLANEOUS	13	0.031	0.095
OIL & GAS	13	-0.122	-1.076
OTHER MANUFACTURING	13	-0.119	-0.846
PAPER & BOARD	13	-0.044	-0.514
POWER GENERATION	13	-0.098	-0.729
SUGAR	13	0.000	-0.036
TECHNOLOGY & COMMUNICATION	13	-0.086	-0.634
TEXTILE	13	1.191	-0.831

Table V. Event Window First Reported Death 18th March, 2020 to 31th March, 2020

Another event window was created from the first reported death from COVID-19. This event window is covering 13 days. Table 5 indicates that all of the industries examined in the research study i.e. commercial banks, other financial institutions, automobile, cable & electrical goods, cement, chemical & pharmaceuticals, engineering, food & personal care, glass & ceramics, oil & gas, other manufacturing, paper & board, power generation, and technology & communication were all showing statistically insignificant CAR. Whereas, the CAR of miscellaneous and textile industries were positively influenced but not significantly on the event window of first COVID-19 death reported in the country. This event window gives different results from previous window and here almost all sectors remained statistically insignificant in terms of CAR.

Table 6 indicates the response of CAR from the 17 industries on the event window when relief package was announced by the Government of Pakistan for the construction sector. The construction sector falls under different categories engineering industry, cement industry and glass & ceramics and CAR for the engineering industry is positive i.e. 0.017 and statistically significant i.e. t-value 2.147 other than zero on the event window of relief package for construction sector. CAR for the glass & ceramics is positive i.e. 0.056 and statistically significant i.e. t-value 1.986 other than zero on the event window of relief package for construction sector. CAR for the cement industry is positive i.e. 0.187 and statistically significant i.e. t-value 2.471 other than zero on the event window of relief package for construction sector. It was observed that this affect was spilled over positively in chemical & pharmaceutical and oil and gas industry.

Industry	Days	CAR	T-Test
COMMERCIAL BANKS	12	-0.005	0.027
OTHER FINANCIAL INSTS.	12	-0.033	-0.316
AUTOMOBILE	12	-0.061	-0.760
CABLE & ELECTRICAL GOODS	12	0.016	0.096
CEMENT	12	0.187	2.471
CHEMICAL & PHARMACEUTICALS	12	0.028	2.342
ENGINEERING	12	0.017	2.147
FOOD & PERSONAL CARE	12	-0.009	-0.238
GLASS & CERAMICS	12	0.056	1.986
MISCELLANEOUS	12	0.031	0.328
OIL & GAS	12	0.035	2.391
Other Manufacturing	12	0.048	0.389
PAPER & BOARD	12	0.005	0.198
POWER GENERATION	12	-0.027	-0.297
SUGAR	12	0.004	0.296
TECHNOLOGY & COMMUNICATION	12	0.014	-0.269
Textile	12	-0.559	-0.608

Table VI. Event Window Relief Package for Construction Sector, 3rd April, 2020 to 14th April, 2020

CAR for the oil & gas industry is positive i.e. 0.035 and statistically significant i.e. t-value 2.391 other than zero on the event window of relief package for construction sector. CAR for the chemical and pharmaceutical industry is positive i.e. 0.028 and statistically significant i.e. t-value 2.342 other than zero on the event window of relief package for construction sector.

On the other hand, CAR of the commercial banks, other financial institutions, automobile, food & personal care, power generation, and textile industries remained negative but statistically insignificant. Whereas, CAR of the cable & electrical goods, miscellaneous, other manufacturing, paper & board, sugar, and technology and communication remained positive but not statistically significant. It can be observed from the results that there is significant impact of relief package announcement on various sectors directly and indirectly through industrial spillover.

Table 7 represents the CAR for event window of 23 days when government announced ease in lockdown for some sectors. It has been observed that technology & communication industry CAR's has been significantly increased to 0.33 percent with t-value 1.982. Also, it has been observed that cable & electrical goods industry CAR's has been significantly increased to 0.08 percent with t-value 2.36. CAR for the chemical and pharmaceutical industry is positive i.e. 0.075 and statistically significant i.e. t-value 2.893.

Industry	Days	CAR	T-Test
COMMERCIAL BANKS	23	-0.020	-0.572
OTHER FINANCIAL INSTS.	23	0.059	0.393
AUTOMOBILE	23	0.163	1.941
CABLE & ELECTRICAL GOODS	23	0.083	2.036
CEMENT	23	0.146	2.650
CHEMICAL & PHARMACEUTICALS	23	0.075	2.893
ENGINEERING	23	0.164	2.369
FOOD & PERSONAL CARE	23	-0.229	0.771
GLASS & CERAMICS	23	0.085	0.729
MISCELLANEOUS	23	0.129	1.322
OIL & GAS	23	0.136	1.632
OTHER MANUFACTURING	23	-0.017	-0.528
PAPER & BOARD	23	0.139	1.968
POWER GENERATION	23	0.006	0.064
SUGAR	23	-0.105	-0.575
TECHNOLOGY & COMMUNICATION	23	0.339	1.982
TEXTLE	23	-1.139	-0.657

Table VII. Event Window Ease in Lockdown for Some Sectors 15th April, 2020 to 8th, May 2020

CAR for the cement industry is positive i.e. 0.146 and statistically significant i.e. t-value 2.650. CAR for the engineering industry is positive i.e. 0.164 and statistically significant i.e. t-value 2.369. The only industries having a negative but insignificant impact of government announcing ease in lock down for some sectors on CAR are commercial banks, food & personal care, other manufacturing, sugar industry, and textile industry. On the other hand, industries with a positive but insignificant impact of government announcing ease in lock down for some sectors on CAR are other financial institutions, automobile, glass & ceramics, miscellaneous, oil & gas, paper & board, and power generation.

Table 8 indicates the CAR for event window of 27 days when government announced to lift lockdown for most of the sectors. It has been observed that CAR of automobile, cable & electrical goods, miscellaneous, oil & gas, paper & board, technology & communication and food & personal care are positive i.e. 0.198, 0.183, 0.264, 0.105, 0.143, 0.278 and 0.665 respectively and significantly different from zero in the 16 trading days of lifting lockdown. Whereas, CAR of commercial banks, other financial institutions, cement, chemical & pharmaceuticals, engineering, glass & ceramics, and power generation industries remained positive but statistically insignificant to the announcement of lifting the lockdown. On the other hand, CAR of other manufacturing, and sugar industries declined but statistically insignificant. Nevertheless, the only industry having a statistically significant impact has a negative CAR -1.192 is textile industry, showing a significant decline.

Industry	Days	CAR	T-Test
COMMERCIAL BANKS	27	0.024	0.536
OTHER FINANCIAL INSTS.	27	0.020	0.008
AUTOMOBILE	27	0.198	2.491
CABLE & ELECTRICAL GOODS	27	0.183	2.358
CEMENT	27	0.078	1.367
CHEMICAL & PHARMACEUTICALS	27	0.156	1.760
ENGINEERING	27	0.170	1.825
FOOD & PERSONAL CARE	27	0.655	2.436
GLASS & CERAMICS	27	0.140	1.138
MISCELLANEOUS	27	0.264	2.627
OIL & GAS	27	0.105	2.078
OTHER MANUFACTURING	27	-0.002	-0.221
PAPER & BOARD	27	0.143	2.211
POWER GENERATION	27	0.039	0.621
SUGAR	27	-0.052	-0.009
TECHNOLOGY & COMMUNICATION	27	0.278	3.165
TEXTILE	27	-1.192	-2.322

Table VIII. Event Window Lift in Lockdown for Most of the Sectors 9th May, 2020 to 5th June, 2020

Table 9 indicates the CAR for event window of 14 days when government started free vaccination process. It has been observed that CAR for all industries/economic groups are insignificant except power generation companies with positive significant cumulative abnormal returns. Whereas, CAR of automobile, cement, oil & gas, other manufacturing, paper & board, technology & communication and textile industries remained positive but statistically insignificant to the announcement of lifting the lockdown. On the other hand, CAR of other financial insts., cable & electrical, chemical & pharmaceuticals, engineering, food & personal care, glass & ceramics, miscellaneous, and sugar industries declined but statistically insignificant.

5. Discussion

In the wake of COVID-19, NCOC has taken strict measures to control its spread however every decision was implemented in the context to see its economic consequence. All NCOC decisions were taking economic situation of country into account and it was priority to impose lockdown for minimum possible time. The industrial stock returns had responded in the mixed pattern in response to COVID-19 events or NCOC decisions based on COVID-19. Overall, most of the industries/sectors suffered negatively when lockdown was announced in the whole country, and mixed behavior was observed with the first reported cases and reported deaths in the country among which the textile industry was the most severely affected. On the announcement of countrywide lockdown almost all sectors of Pakistani economy had reported negative impact in the short event window of three trading days. Although many of sectors recovered quickly with the news relief package for constructions sector and tax amnesty for those investing in construction industry. Many

of the listed sectors in Pakistan Stock Exchange are directly linked with construction industry such as cement, engineering, glass & ceramic, cable & electrical goods and paper & board. It was observed that with the news of relief package for construction sector some of industries recovered from negative CAR and behaved positively including cement, engineering, glass & ceramic. While this impact was also spilled over in oil & gas sector and chemical sector. Other sectors were also alleviated when lockdown was lifted in the phases among those technology & communication and food & personal care were remained most positively affected.

Industry	Days	CAR	T-Test
COMMERCIAL BANKS	14	0.011	-0.526
OTHER FINANCIAL INSTS.	14	-0.039	-0.727
AUTOMOBILE	14	0.060	0.869
CABLE & ELECTRICAL GOODS	14	-0.022	-0.623
CEMENT	14	0.058	1.199
CHEMICAL & PHARMACEUTICALS	14	-0.035	0.317
ENGINEERING	14	-0.011	-0.137
FOOD & PERSONAL CARE	14	-0.015	-0.446
GLASS & CERAMICS	14	-0.051	-0.561
MISCELLANEOUS	14	-0.801	-0.763
OIL & GAS	14	0.036	0.314
OTHER MANUFACTURING	14	0.014	0.309
PAPER & BOARD	14	0.017	0.248
POWER GENERATION	14	0.181	2.476
SUGAR	14	-0.009	-0.588
TECHNOLOGY & COMMUNICATION	14	0.168	1.268
TEXTILE	14	0.015	0.213

Table IX. Start of Vaccination from 1st February, 2020 to 14th February, 2020

6. Conclusion

This research study examines the influence of NCOC decisions regarding COVID-19 on stock returns. This study has selected 17 economic groups/industries including financial and non-financial sectors based on the classification provided by State Bank of Pakistan. These economic groups/industries include all sectors where lockdown was not imposed, lockdown was imposed only for 2 to 3 weeks, and lockdown was imposed for 5 to 6 weeks. Based on the average daily stock returns, the industry-wise stock returns were calculated. Event study analysis was performed and the total period for all event windows is 115 days starting from 26th February, 2020 to 5th June, 2020 and from 1st February 2021 to 14th February. Total six events were identified.

Results show that many of industrial stock returns were significantly affected by COVID-19 related events identified. However, the quick response of government to relief some sectors alleviated that effect, such as, construction related industries including cement, engineering, glass & ceramic, paper & board and cable & electrical goods while other industries include oil & gas,

technology & communication, chemical and pharmaceutical. Textile sector was remained most negatively affected sector. COVID-19 is one of the black swan events, as its occurrence, major developments, or its depth, and intensity of impact all were unknown. The stock market is one of barometers of the economy and quick developments in the stock market gives the projection of overall economy. This research study discusses the industrial stock performance in Pakistan under the effect of COVID-19 and analyzed, in detail, the response trends and capabilities of industries that are hard hit. The study also discussed and explored homogeneity and heterogeneity of reaction of industries to major events occurred in first wave of COVID-19 in Pakistan. The conclusion of this research provide reference for other countries across the world in their fight against the pandemic and to manage economic consequences.

7. Policy Implications

In the situations like epidemic or pandemic some immediate actions must be taken by policy makers to gain the confidence of the investors to stop panic selling of stocks. Such kind of actions can help to reduce the short-term impact of any disastrous situation. All policies must be formulated by considering the trickledown effect of any action. Industries/sectors are required to be classified as homogeneous and heterogeneous groups. However, such kind of classification will help to formulate uniformed policy to benefit the economy on a large scale.

Some important policy recommendations are

1. Issue loans to the businesses with minimum possible interest rate that will help them to meet business expenses.
2. Encourage businesses to use digital technologies and online selling techniques that will help them to operate under extreme situations when lockdown is indispensable.
3. High uncertainty during the epidemic or pandemic requires policymakers to inject not only capital to help business sectors but, also proper communication is necessary to gain confidence into the business sector. Therefore, timely communication with business community is important to let them understand the situation and the government initiatives.

8. Future Direction

Most of the existing evidence supports the adverse effect of COVID-19 on overall stock market performance in the short run. Direct and spillover impact was also observed using cross-countries evidence on different indices. Yet, no known research has measured the industrial spillover effect of COVID-19 on industrial stocks' performance. This gap is bridged in this research study. Now, there is need to identify the cross-country industrial spillover effect as number of sectors/industries through imports or exports are linked with sectors or industries from other trading partners.

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