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## Measuring Financial Impact Of COVID-19 Pandemic On Global Stock Markets

**Dr. Liaqat Ali**, Lecturer, The University of Agriculture, Peshawar, Email: [liaqatlecturer@gmail.com](mailto:liaqatlecturer@gmail.com)

**Dr. Waheed Ullah**, Lecturer, The University of Agriculture, Peshawar, Email: [waheed\\_hr@aup.edu.pk](mailto:waheed_hr@aup.edu.pk)

**Zia Ul Islam**, Lecturer, Capital University of Science and Technology, Islamabad, Email: [zac.yousafzai@gmail.com](mailto:zac.yousafzai@gmail.com)

**Dr. Imran Khan**, Associate Professor, Qurtuba University of Science and IT, Peshawar Email: [imk\\_mgt@yahoo.com](mailto:imk_mgt@yahoo.com)

**Arif Shah**, Ph.D Scholar, The University of Malakand, KP, Pakistan Email: [arifshah507@gmail.com](mailto:arifshah507@gmail.com)

**Dr. Saima Urooge**, Assistant Professor, Islamia College University Peshawar, Email: [saimaurooge@icp.edu.pk](mailto:saimaurooge@icp.edu.pk)

**Dr. Muhammad Irshad Khan**, University of Enigneering and Technology, Peshawar Email: [irshadmohmand@gmail.com](mailto:irshadmohmand@gmail.com)

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### Abstract

The present study has analyzed the impact of COVID-19 on the stock market. The study was intended in the context of Pakistan Stock Exchange. The paper attempted on the basis of two major objective i.e. analyzed direct impact of COVID-19 on the stock market and the COVID-19 impact on foreign markets spillover effects on Pakistan Stock Exchange. The paper has adopted conventional t-test and Mann Whitney test on the average return on the basis of stock market indexes. The results have been estimated on two basis i.e. domestic & foreign timeline. Three event windows were selected for the estimation of average return i.e. pre-event window (starting time of COVID-19), short-event window (increasing time of COVID-19 cases) and long-event window (Peak time of COVID-19). The time period has been taken from January 1<sup>st</sup> to 30<sup>th</sup> December 2020. The stock markets of Pakistan, India, Canada, Japan, UK, & United States were included in the study. The findings show (1) COVID-19 has negative but limited impact on the stock market; (2) there is an evidence of spillover effect of COVID-19 on Europe and US markets on Pakistan Stock Exchange. The findings contribute towards the economic and financial impact of COVID-19 in the context of stock market. The proof has been received that the Europe and US markets have impact on the Asian Stock Markets.

**Keywords:** COVID-19, Stock Market, Europe, US, Spillover, impact, t-value, PSX etc

### 1. Background

The unanticipated viral disease called COVID-19 has spread all over the world after emergence in china in the last of December 2019. The Chinese health department has reported many cases in the start of New Year who have been infected by this virus. Due to the importance of Wuhun as a transportation hub for China and all over the world; large of number of people migrated at the start of New Year which makes the source of spreading COVID-19 (Baldwin et al., 2020). After some time,

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different cases have been registered in other cities of China and then authorities alarms a new viral threat. In the last of January 2020 World Health Organization (WHO) issues their first report for the COVID-19 and consider it as a global phenomena (WHO, 2020).

The spread of COVID-19 leads to the disaster situation in most of the countries. After one month, in March 2020, COVID-19 has been spread from China to Korea, Spain, France, US, Germany, Japan and even US. In a short span of time COVID-19 reaches US and Europe. The spread of COVID-19 is showing severe impact on the different sectors around the world (Barro et al., 2020; Wang, 2020). The negative effects can be seen on education and financial markets as well. In the first month of emergence of COVID-19 about 107 countries have decided to close their education sector and later on decided what to do with the ongoing academics. First China has decided to close down their educational institutes and shift them to online learning system and later one the other country have also decided and went on the same path (Cochrane, 2020; Ichino et al., 2020).

The economic and financial turmoil related to COVID-19 is now showing its negative effects on the financial markets i.e. stock, bonds and even in the commodity market. The negative effect of COVID-19 has been shown on the oil prices around the world (Andersen, 2020). The lockdown in US market and consistently decreasing in the stock prices, the investors and private companies are now hesitating to do business in the market. In this situation, the crude oil market in US has been decreased below zero per barrel and makes it the worst case in the history of US. To quantify the impact of COVID-19, the financial experts, economists and the credit rating agencies are facing challenges in reassessing the companies to get space in the market (Duan et al., 2020; Velde, 2020).

In the emergence of COVID-19 and declaring as viral disease by WHO bring a very tough situation for the financial market. In this situation, the UK stock market has faced about 12 percent in their prices on the next, Pakistan Stock Exchange 100 index has been decreased about 3 percent or 1131 points which shows the most critical face to the investors. The continue lockdown in Pakistan is making the serious situation for the policy makers to manage the earnings of middle class families and even to save their fragile economy from the severe impact (Khursheed, Arab News, April, 2020).

After the continue disastrous situation due to COVID-19, Pakistan Stock Exchange 100 index reaches to 25 percent decrease which shows the decline in the trust of investors in the market. The impact of COVID-19 can be seen on the economy like rupee has faced 6 percent devaluation since emergence and GDP has seen 4 percent decrease due to the disruption in trade and continue decline in the foreign remittances (Naeem, 2020).

Pakistan Stock Exchange is the one of the fastest growing stock market in the world. The performance of the market is crossing the limits from last a few years and the market capitalization reaches to US \$ 84 billion in 2018 but the capitalization lower to US \$ 50 billion in 2019 due to the devaluation of rupee. Pakistan Stock Exchange was one of the best growing stock market between 2009 to 2015 and delivering 26% every year. When COVID-19 emerge in China, Pakistan Stock Exchange and global stock markets does not showed any negative response to investors but with the passage of time, negative impacts of COVID-19 become visible including Pakistan Stock Exchange (The Economic Times, March, 2020).

After evaluating different articles not specific study has been found who explored the impact of COVID-19 on the stock markets especially in Pakistan. No specific study has been conducted by researchers who examined the impact of COVID-19 on Pakistan Stock Exchange. The

existing study has been conducted to explore the impact of COVID-19 on the global stock markets in the context of Pakistan Stock Exchange. The existing study has been conducted in the following questions;

- Does the outbreak of COVID-19 have any impact on the stock market?
- Does the impact of COVID-19 on the global stock markets have any spillover effect on Pakistan Stock Exchange?

## **2. Data & Methodology**

To analyze the effect of COVID-19 pandemic on global stock exchanges, London Stock Exchange, Toronto Stock Exchange, Tokyo Stock Exchange, Pakistan Stock Exchange, Mumbai Stock Exchange, S&P 500 & Nadaq Index were included. The selected stock exchanges are representing the majority of the operations in the world's secondary markets. The daily indexes returns have been collected from January 1<sup>st</sup> to 30<sup>th</sup> December, 2020. The analysis is divided on the monthly basis and also the markets returns have been examined and compared to PSX 100. The existing study has included the above eight stock exchange not only on the basis COVID-19 cases but these are one of the fastest growing stock exchanges in the world. The selected countries are also having the highest numbers of COVID-19 i.e. US market is having the highest number of COVID-19 cases but also showing its severe effects on the US markets. The US crude oil market crash in which the prices per barrel is below zero dollar which makes the lowest price in the history and all credit goes to the most critical influence shows by COVID-19.

The historical data of stock exchanges indexes have been collected from yahoo finance and organized in excel sheet. The market returns of these stock exchanges have been calculated and then percentages of changes have been estimated on month basis for all stock exchanges. The COVID-19 have been emerge in the January 2020 in most of the countries and then almost all the countries have decided to lockdown their markets which shows severe effects on the economies and financial markets.

The analysis has been divided into multiple event windows and evaluated on month basis. 1<sup>st</sup> window is from 1<sup>st</sup> January to 30<sup>st</sup> March; 2<sup>nd</sup> window 1<sup>st</sup> April to 31<sup>st</sup> July and third window from 1<sup>st</sup> August to 30<sup>th</sup> December 2020. The main objective of dividing the analysis into windows is that the COVID-19 has been spread from January and in March it has been spread all over the world. The daily stock returns of stock exchange have been divided into short three sample time periods, pre-COVID-19 and longer time for the event down by following the concept of Qing et al., (2020). 1<sup>st</sup> January to 30<sup>th</sup> March 2020 has been considered as pre-event window which shows the emergence of COVID-19; 1<sup>st</sup> April to 31<sup>st</sup> July as the short event window and shows the faster spread of COVID-19 and 1<sup>st</sup> August to 30<sup>th</sup> December 2020 is now showing the peak growth of COVID-19 as a long event window. The study has compared PSX 100 index and 30 indexes with the performance of global stock markets. The study has used heterstastic t and non parametric test Mann Whitney (1947) test for the analysis.

## **3. Empirical Results**

The analysis in the existing study has been done by taking the mean return, its standard deviation and also checks its significance by using t-value. According to Qing et al., (2020) t-value can be found significant when the study is based on checking the effect of event on the stock market. The analysis has been divided into pre-event window, short event window and long event window. The number of trading days is also included in the table.

**Table 1: domestic timelines (mean difference return)**

Index	No of trading days	Event group's mean and std dev	Event group's t-value
<b>Panel A: Full time period (1<sup>st</sup> January to 30<sup>th</sup> December 2020)</b>			
PSX 100	113	0.13% (0.71%)	
MSE	110	0.140% (0.10%)	
LSE	113	0.048% (0.21%)	
Nikkei 250	107	0.18% (0.18%)	
S & P 500	114	0.10% (0.54%)	
TSX	114	0.08% (0.33%)	
Nasdaq Index	113	0.05% (0.29%)	
<b>Panel B: Pre-event (1<sup>st</sup> January to 30<sup>th</sup> March)</b>			
PSX 100	31	0.12% (0.03%)	0.51
MSE	30	-0.05 % (0.24%)	-0.64
LSE	33	-0.12 % (0.14%)	-0.28
Nikei 250	30	0.11 % (0.19%)	2.16**
S & P 500	31	0.04 % (0.20%)	2.01**
TSX	33	0.07 % (0.11%)	1.19
Nasdaq Index	33	-0.17 % (0.13%)	-1.58
<b>Panel C: Short-event (1<sup>st</sup> April to 31<sup>st</sup> July)</b>			
PSX 100	30	-1.16% (0.03%)	-0.80
MSE	30	-0.13% (0.31%)	-0.66
LSE	32	-0.10% (0.06%)	-1.16
Nikkei 250	31	-0.09% (0.13%)	-2.52
S & P 500	30	-0.16% (0.04%)	-3.41**
TSX	31	-0.08% (0.32%)	-0.46
Nasdaq Index	32	-0.11% (0.19%)	
<b>Panel D: Long-event (1<sup>st</sup> August to 30<sup>th</sup> December)</b>			
PSX 100	50	-0.23% (0.02%)	-0.44
MSE	46	-0.22 % (0.01%)	-2.19**
LSE	50	-0.39 % (0.02%)	-3.79**
Nikkei 250	48	-0.41 % (0.09%)	-2.69**
S & P 500	50	-0.17 % (0.01%)	-2.11**
TSX	49	-0.46 % (0.04%)	-1.92**
Nasdaq Index	50	-0.38 % (0.03%)	-2.82**

The findings of the table shows that the mean return of capital markets are showing positive return on daily basis, this shows that the capital is having satisfactory position before the emergence and spread of COVID-19. Before the event, the capital markets are having profitable position as they are showing positive mean return.

The panel B has included the findings pre-event windows which mean that the returns of the capital markets have been collected before the severe effects of COVID-19. The findings show that the majority of the capital markets are having low average return which means that the markets have been affected soon after the emergence of COVID-19. Some of the capital markets are having significant average return while majority of the markets are not having significant returns due to the negative effects of COVID-19.

The panel C is basically the findings of short event window which is the period of spreading the COVID-19 around the world. The findings argued that the majority of the capital markets are now showing the harms of COVID-19 but exhibiting underperformance markets. S&P 500 and Nikkei 225 are showing significant t-value but the negative average return is showing the affected market condition.

Panel D is the findings of long event window which is the longest period for the COVID-19 spread around the world. The results show that majority of the capital markets are showing under performance while some of the capital markets are having significant t-value but the average return of the markets are below zero. The findings of the table show that the capital markets are not being affected by COVID-19 initially but later on they have been captured by severe effects. This has been concluded that COVID-19 is having negative impact on the stock but this impact can be considered as limited impact. The same findings can be seen in the study conducted by Qing et al., (2020).

The findings of Mann Whitney (W) test has been mentioned in table 2. According to Qing et al., (2020) and Perme and Manevski (2019) argued that the non parametric test i.e. Mann Whitney test can be used when the study wants to know that the selected factors are showing shared distribution. The t-test can be consider as the alternate of Mann Whitney test especially when the findings is based

**Table 2: Domestic timeline (Median Return)**

Index	No of trading days	Median Return	W-value
<b>Panel A: Full time period (1<sup>st</sup> January to 30<sup>th</sup> December 2020)</b>			
PSX 100	113	-0.06%	
Mumbai SE	110	0.19%	
London SE	113	0.23%	
Nikkei 250	107	0.31%	
S & P 500	114	0.13%	
Toronto SX	114	0.17%	
Nasdaq Index	113	0.43%	
<b>Panel B: Pre-event (1<sup>st</sup> January to 30<sup>th</sup> March)</b>			
PSX 100	31	-0.10%	13952
MSE	30	0.09%	13875**
LSE	33	0.21%	12790
Nikkei 250	30	0.32%	14650
S & P 500	31	0.19%	13589**
TSX	33	0.27%	14577
Nasdaq Index	33	-0.06%	16791*
<b>Panel C: Short-event (1<sup>st</sup> April to 31<sup>st</sup> July)</b>			
PSX 100	30	0.06%	14656**
MSE	30	0.61%	13891
LSE	32	-0.29%	14121*
Nikkei 250	31	-0.31%	16479
S & P 500	30	-0.17%	16534
TSX	31	-0.30%	14891**
Nasdaq Index	32	-0.19%	13779
<b>Panel D: Long-event (1<sup>st</sup> August to 30<sup>th</sup> December)</b>			

PSX 100	50	-2.11%	16455*
MSE	46	0.06%	15791*
LSE	50	-0.16%	14697
Nikkei 250	48	-0.21%	13487
S & P 500	50	-0.41%	12655**
TSX	49	-0.15%	14599
Nasdaq Index	50	-0.20%	13679

The findings of comparison time periods show that the medium returns of the capital markets are showing some significant movement in their returns but with the passage of time of COVID-19, the pre-window time shows the same trend and not showing some significant return of the capital markets. The PSX 100 index is not having significant position as the starting of COVID-19 affect the behavior of investors and they hesitate to invest in the market. The short event window result exhibits that the PSX 100 index is having struggling performance but however it cannot be consider as significant performance and still it is under performance. The MSE are having significant performance and showing positive median of market return. However, majority of the capital markets are struggling and showing under performance median of average return affected by COVID-19.

The findings of longer event window is having more negative results as with the passage of time, majority of the markets are closed permanently and following consistent lockdown. The findings of median show that markets are now in the most critical condition due to COVID-19. In this condition majority of the markets are having no effect in the start but they are in underperformance condition with the passage of time. This shows that the COVID-19 is having negative but limited effects on the capital markets. According to Qing et al., (2020) in this type of situation, the psychological factors are the most significant factors which can negatively associated to the performance of the market. The markets are running positive in the start of COVID-19 but with time going they are under the psychological pressure and then the investors are not willing to trade in the market.

The comparative results of all included indexes in relation to S & P 1200 are showed in table 3. The performance of stock markets as comparative to the S & P 1200 Global Index return has been divided into three event periods which were included in table 1 and 2. The findings have been divided into two panels i.e. A has included the findings of mean return by estimating the t-values of the stock markets. Panel B is comprises of estimation of Mann Whitney test by measuring the median of the return for the included countries. The findings argued that in the start of COVID-19 no market is having significant t-value but the mean return of the markets show that the market is having positive return. But the t-value of Pakistan SE, Mumbai SE and S & P 500 is having significant t-value while the PSX 100 index is having significant W value for the short event period. The findings show that the negative impact of COVID-19 also hit Pakistan but due to the faster performance of PSX for the last a few months, the negative impact was not continued for the longer period of time.

**Table 3: Return related to S & P 1200 domestic timeline**

Index	Pre event period		Short Event period		Long Event Period	
	Mean	t-value	Mean	t-value	Mean	t-value
<b>Panel A: t-test on daily return relative to S &amp; P 1200 index</b>						

S & P 1200	0.12%(0.04%)					
PSX 100	0.12%	1.64	-0.16%	2.12	-0.23	
	(0.03%)		(0.03%)		(0.02%)	
Mumbai SE	0.05 %	-0.61	0.13%	-2.67	-0.22	-0.57
	(0.24%)		(0.31%)		(0.01%)	
London SE	0.12 %	-1.61	0.10%	-0.63	-0.39	-0.69
	(0.14%)		(0.06%)		(0.02%)	
Nikkei 250	0.11 %	0.49	-0.09%	-1.12	-0.41	-1.47
	(0.19%)		(0.13%)		(0.09%)	
S & P 500	0.04 %	1.27	-0.16%	-3.58	-0.17	-0.61
	(0.20%)		(0.04%)		(0.01%)	
Toronto SX	0.07 %	0.62	0.08%	-0.23	-0.46	-1.02
	(0.11%)		(0.32%)		(0.04%)	
Nasdaq Index	0.17 %	-0.78	0.11%	-0.29	-0.38	-0.51
	(0.13%)		(0.19%)		(0.03%)	
<b>Panel B: Mann Whitney Test</b>						
	Median	W	Median	W	Median	W
PSX 100	-0.10%	320	0.06%	156*	-2.11%	1287
MSE	0.09%	219	0.61%	149	0.06%	1180
LSE	0.21%	189	-0.29%	127	-0.16%	1079
Nikkei 250	0.32%	310	-0.31%	96	-0.21%	988
S & P 500	0.19%	187	-0.17%	150	-0.41%	1364
TSX	0.27%	245	-0.30%	128	-0.15%	1297
Nasdaq Index	-0.06%	309	-0.19%	136	-0.20%	1364

At first, the study findings were based on domestic timeline and the objective was to compare the domestic performance of the stock exchanges on the basis of estimating the mean return of these markets. The findings of this timeline show that the COVID-19 has negative but limited effects on the stock exchange. The COVID-19 is having limited influence on the domestic stock exchange in the light of mean return. Majority of the stock exchanges show no impact COVID-19 on the stock by having positive mean of return but with the passage of time, the mean return were negative and also have insignificant t-values. But when the findings of mean return has been compared with the performance of S & P 1200 Global Index performance then PSX is showing significant performance in the short event period.

But it is important that the performance of the market should be compared across the board and in this regard, the study has included foreign timeline for comparing the performance of stock markets. The major objective of this analysis is to check the spillover effect of selected foreign stock markets over Pakistan Stock Exchange.

Table 4 has included the findings of mean return calculated on the foreign timeline. The findings of table 4 are change as compared to table 1. The result indicated that the mean return of the stock indexes are not been affected by COVID-19 in the starting and all the stock return are positive showing satisfactory performance. The pre-event window result show that the effect of COVID-19 is now showing and some of the mean of the stock markets are negative and also having significant effect except PSX which is showing positive return but insignificant t-value.

#### **Table 4: Foreign timelines (mean difference return)**

Index	No of trading days	Event group's mean and std dev	Event group's t-value
<b>Panel A: (1<sup>st</sup> January to 30<sup>th</sup> December 2020)</b>			
PSX 100	113	0.06% (0.33%)	
MSE	110	0.12% (0.41%)	
LSE	113	0.27% (0.59%)	
Nikkei 250	107	0.19% (0.32%)	
S & P 500	114	0.32% (0.40%)	
TSX	114	0.17% (0.44%)	
Nasdaq Index	113	0.22% (0.33%)	
<b>Panel B: Pre-event (1<sup>st</sup> January to 30<sup>th</sup> March)</b>			
PSX 100	31	0.12% (0.59%)	0.19
MSE	30	0.07% (0.47%)	2.36**
LSE	33	0.10% (0.38%)	4.21**
Nikkei 250	30	-0.19% (0.61%)	-2.66**
S & P 500	31	-0.16% (0.54%)	-4.48**
TSX	33	-0.21% (0.51%)	-2.03**
Nasdaq Index	33	-0.15% (0.65%)	-0.39
<b>Panel C: Short-event (1<sup>st</sup> April to 31<sup>st</sup> July)</b>			
PSX 100	30	-0.47% (0.43%)	-2.05
MSE	30	-0.13% (0.35%)	-2.97**
LSE	32	-0.49% (0.67%)	-1.11
Nikkei 250	31	-0.37% (0.58%)	-2.97**
S & P 500	30	-0.52% (0.63%)	-3.51**
TSX	31	-0.40% (0.59%)	-2.66**
Nasdaq Index	32	-0.39% (0.78%)	-4.49**
<b>Panel D: Long-event (1<sup>st</sup> August to 30<sup>th</sup> December)</b>			
PSX 100	50	-0.59% (0.56%)	-2.73**
MSE	46	-0.37% (0.79%)	-1.81
LSE	50	-0.32% (0.34%)	-3.51**
Nikkei 250	48	-0.55% (0.69%)	-0.69
S & P 500	50	-0.61% (0.77%)	-0.49
TSX	49	-0.58% (0.81%)	-0.02
Nasdaq Index	50	-0.48% (0.76%)	-0.72

The findings in Panel C is showing more negative effect but majority of the stock markets included PSX is having negative but significant effects which exhibits the negative but limited effects of COVID-19. Panel D results are changed to Panel C which shows the negative impact of COVID-19 gets severe and argued that that all the mean of the stock markets are negative but a few of them are significant but having negative mean of the markets.

The findings of Table 5 are based on median of return and significance has been checked by Mann Whitney Test. The findings argued that pre event is showing that the median of return are negative and also having insignificant values of W-value except S & P 500 who have significant value. While the PSX 100 index is having significant value with negative median is showing that the foreign markets are having spillover effects due to COVID-19. The same findings can be seen in Panel D which is also showing the significant value of median and W-value for PSX 100 index. The



impact of COVID-19 on the foreign markets confirms the spillover effect on Pakistan Stock Exchange.

**Table 5: Foreign timeline (Median Return)**

Index	No of trading days	Median Return	W-value
<b>Panel A: (1<sup>st</sup> January to 30<sup>th</sup> December 2020)</b>			
PSX 100	113	0.14%	
Mumbai SE	110	0.31%	
London SE	113	0.27%	
Nikkei 250	107	0.37%	
S & P 500	114	0.49%	
Toronto SX	114	0.32%	
Nasdaq Index	113	0.40%	
<b>Panel B: Pre-event (1<sup>st</sup> January to 30<sup>th</sup> March)</b>			
PSX 100	31	-0.18%	13465
MSE	30	-0.09%	12549
LSE	33	-0.12%	11431
Nikkei 250	30	-0.08%	12489
S & P 500	31	0.15%	13487**
TSX	33	-0.11%	13691
Nasdaq Index	33	-0.13%	14681
<b>Panel C: Short-event (1<sup>st</sup> April to 31<sup>st</sup> July)</b>			
PSX 100	30	-0.20%	13578**
MSE	30	-0.18%	12645
LSE	32	-0.36%	13879**
Nikkei 250	31	-0.24%	12446
S & P 500	30	-0.17%	13589**
TSX	31	-0.26%	14680**
Nasdaq Index	32	-0.32%	14578
<b>Panel D: Long-event (1<sup>st</sup> August to 30<sup>th</sup> December)</b>			
PSX 100	50	-0.34%	13697**
MSE	46	-0.20%	12431
LSE	50	-0.16%	13968
Nikkei 250	48	-0.09%	14593**
S & P 500	50	-0.17%	16791**
TSX	49	-0.10%	14687
Nasdaq Index	50	-0.13%	13699**

Table 6 shows the findings of comparative results for the selected stock indexes with S & P 1200 Global Index. The results consist of the estimation of pre-event windows, short and long event windows on the basis of t-value and Mann Whitney test. The findings show that no significant mean have been estimated for the selected countries stock markets and having insignificant t-values. The findings argued that the stock markets are having insignificant and negative performance as compared to S & P 1200 Global Index.

**Table 6: Return related to S & P 1200 domestic timeline**

Index	Pre event period		Short Event period		Long Event Period	
<b>Panel A: t-test on daily return relative to PSX 100 index</b>						
	Mean	t-value	Mean	t-value	Mean	t-value
S & P 1200	-					
	0.04%(0.03%)					
PSX 100	-	1.06	-	1.49	-0.59%	1.89
	0.12%(0.59%)		0.47%(0.43%)		(-0.56%)	
Mumbai SE	0.07%(0.47%)	0.64	-0.13%	0.53	-0.37%	1.62
			(0.35%)		(0.79%)	
London SE	0.10%(0.38%)	0.89	-0.49%	0.48	-0.32%	1.43
			(0.67%)		(0.34%)	
Nikkei 250	-	1.43	-0.37%	0.61	-0.55%	1.62
	0.19%(0.61%)		(0.58%)		(0.69%)	
S & P 500	-	0.48	-0.52%	0.57	-0.61%	1.19
	0.16%(0.54%)		(0.63%)		(0.77%)	
Toronto SX	-	0.93	-0.40%	1.96	-0.58%	1.56
	0.21%(0.51%)		(0.59%)		(0.81%)	
Nasdaq Index	-	1.09	-0.39%	0.09	-0.48%	1.72
	0.15%(0.65%)		(0.78%)		(0.76%)	
<b>Panel B: Mann Whitney Test</b>						
	Median	W	Median	W	Median	W
PSX 100	-0.18%	794	-0.20%	461	-0.34%	98
MSE	-0.09%	895	-0.18%	493	-0.20%	67
LSE	-0.12%	961	-0.36%	357	-0.16%	65
Nikkei 250	-0.08%	1089	-0.24%	356	-0.09%	69
S & P 500	0.15%	934	-0.17%	318	-0.17%	83
TSX	-0.11%	862	-0.26%	352	-0.10%	61
Nasdaq Index	-0.13%	956	-0.32%	401	-0.13%	78

The same findings can be seen for the results of Mann Whitney Test that no index is having positive median and significant w-value. The findings suggested that COVID-19 is having negative effects on the global markets as per the findings of foreign timeline show. Table 6 results are not very much different from table 3. The conclusion of the result is that COVID-19 has shown negative impact on the global stock markets and the selected countries are also showing the same pattern of performance which confirms the COVID-19 pandemic. The impact of COVID-19 cannot be related to the outcome of financial crises of recession time period. The negative impact of COVID-19 on the stock markets can be taken as a short run impact and as this disease has been controlled then the markets will emerge will full boom. The findings argued that the COVID-19 is having negative impact on the foreign markets and these markets are having spillover effect on the Asian markets i.e. Pakistan Stock Exchange.

#### 4. Conclusion

COVID-19 is the major cause of financial disturbance among the largest stock markets in the world. In the beginning time of COVID-19, it does not showed negative impact on the stock markets but with the passage of time majority of the economies goes lockdown and the impact become visible

and showed its negative impact on the performance of stock market. The study has evaluated the concept of direct impact and spillover of COVID-19 on the domestic and foreign markets. In this regard, the study has taken two timelines i.e. domestic and foreign timeline. In the domestic timeline, the impact of COVID-19 was evaluated on the performance of Asian markets. Three events time period were used in the study i.e. pre-event window, short-event window and long event window. The selected time period has been divided into these three events time period. The study has used t-test and Mann Whitney test for the estimation of significance of the return of each stock market. The findings argued that the COVID-19 is showing negative and insignificant effects on the stock while it has significant in some cases which confirms that the COVID-19 is having negative but limited impact on the Asian stock markets. The spillover effect of foreign markets due to COVID-19 was found on Pakistan Stock Exchange. Despite of the fact that the COVID-19 is currently harming the most stable economies in the world but it is also confirmed that these economies including Pakistan will be back on track when the COVID-19 has been controlled. The findings confirm that the foreign stock markets are having spillover effect on the Asian markets including Pakistan Stock Exchange. Excluding some stock markets, no evidence was seen for the negative impact of COVID-19 on the stock market as compared to the S&P 1200 Global Index. The existing study contributes to the concept of impact of COVID-19 on the stock markets. As there is not comprehensive work available for the estimation of direct effect of COVID-19. The existing study has estimated the direct effect of COVID-19 on the stock market but also the spillover effect of foreign markets on Pakistan Stock Exchange.

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