

Impact of COVID-19 on Karachi Stock Exchange (KSE) of Pakistan

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Abstract

Our study was just to know about the impact of most infectious disease worldwide with in the Karachi stock exchange. As it is known that COVID-19 is spreading so rapidly that in many places 2nd lockdown has been announced so we can say that it is not a common disease and it can impact further. In this study we have taken three independent variables (exchange rates, oil prices and COVID-19 daily cases) and selected KSE indices as dependent variable of our study. We have extracted secondary but daily data for our research from different related websites of data base. We run our data in a software and get some unexpected results which you will find in detail through the paper. It is found in many previous studies that COVID-19 has impact temporarily in the stock market during the earliest period of this disease. According to our data and studies, COVID-19 is not considering as significant variable and did not showed any permanent significant relationship with stock market.

Keywords: COVID-19, KSE, Oil prices, Exchange Rates.

1. Introduction

1.1 Background

Coronavirus or COVID-19, a fast spreading illness, first appeared in Wuhan City, Hubei Province, China, in December 2019. (WHO, 2020), and has resulted in an ongoing pandemic. The coronavirus has spread a lot from city of china throughout the different cities of world because of no banned and improper measures in travelling. (Waheed, Sarwar, Sarwar, & Khan, 2020). COVID-19 infections have remained stable at over 4 million new cases worldwide, but new fatalities have risen to around 73 000. Since the start of the epidemic, there have been more than 65.8 million recorded illnesses and 1.5 million fatalities worldwide (WHO 08 Dec). Trade is considered as the pillar of any economy but it is noticed that COVID-19 has affected economies, and facing an extreme decline in economic activities. Small businesses are also facing difficulties in their sales and looking for packages from government. Business failure ratio has also increased a lot due to this pandemic and lockdown situation. (Waheed, Sarwar, Sarwar, & Khan, 2020).

1.2 COVID-19 in Pakistan

When the Pakistan regularities decided to close the industry and markets due to extreme rise in quantity of COVID-19 cases in Pakistan, reported that stock market starts declining. (Waheed, et al., 2020).

The virus has reached over Pakistan, when the 1st infected case of corona virus got confirmed in Karachi and other from Islamabad on 26 February, 2020. Pakistan currently has the 9th highest rank in confirmed cases of COVID-19 in Asia. Mostly cases recorded from the

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province of Sindh about 134000 and also has recorded most deaths because of highest infected number of cases from this disease. On October 28,2020, Pakistan has announced the second wave of COVID-19 that is the second season of pandemic situation. ultimately, the second wave in Pakistan has been explode but the situation is critical, COVID-19 -19 can be very dangerous to our country.

In addition, the stock market and exchange rate still emerging changes due to increasing number of countries brought spread of virus.

1.3 COVID-19 and Karachi Stock Exchange:

The impact of COVID-19 on financial markets and over all world's economy is still unfolding because this virus is still not fully vaccinated and its impact seems to temporary on stock markets and economy. However, if it would not recover soon its impact could be turn into financial crisis.

COVID-19 deaths, recoveries, and positive cases are expected to have an impact on the performance of the Karachi stock exchange. (2020, Ahmed S.)

1.4 Rate of Exchange and Stock Markets:

Exchange rates are the values of local currency rate in the exchange of foreign currency rate. US dollar is considered as the international exchange that is acceptable for the international transaction in all over the world. Multiple variables, including exchange rate variations, can have a substantial impact on the market value of businesses and stock prices.

It is predicted that there is an extreme decline in US dollar because of alternative assets i.e. bitcoins, gold prospering in this pandemic situation. The euro has been appreciated against the dollar so far in 2020. In Pakistan, foreign direct investment (FDI) is a major element of stock prices and exchange rate. It is found that rate of exchange and FDI has strong positive correlation. (Bilawal, et, al., 2014)

1.5 Oil Price and Stock Markets:

Oil prices are hard to predict and these are uncontrollable because it keeps fluctuate and affected by many different factors (Alqattan, A. A., & Alhayky, A. 2016). The brent crude oil is widely used oil and use as fuel and gasoline. According to study the involvement between stock markets and oil prices is considered as low, except some emerging or developing economies. (Gourène and Mendy, 2018). The theoretical and empirical inquiry into the relationship between oil prices and stock markets that indicates importance of crude oil to economy through its huge impact of earnings and liquidity. (Gourene and Mendy, 2018).

1.6 Research Problem:

COVID-19 is the disease that impact and disturbed the economies of several countries, the gap of our research paper is to analyzing the impact of spreading and highly affect disease COVID-19 on Karachi stock markets (KSE) and to examine that how it fluctuates with the increasing number of COVID-19 cases in Pakistan.

1.7 Objective:

The main objective of our studies is that we are trying to figure out the situation of the financial position of Pakistan during this pandemic season and we are also considering the exchange rate and oil price changes and its impact on PSX.

- To investigate relationship between the COVID-19 and the Pakistan stock market.
- To investigate relationship between the oil prices and Pakistan stock exchange.
- To investigate relationship among the exchange rate and Pakistan stock exchange.

As it is mention above that in this study, we will conclude that whether these three independent variables are significant or not. Our conclusions will not only provide us a clear image of the situation of the Pakistan stock market but will also help us to provide recommendations that what steps should be necessarily taken according to the situation or we can say the position of the stock market. Our research paper would only limit the COVID-19 season (6 months 01 march - August-31). We are going to cover the area and analyzing the impact of COVID-19, exchange rate, and oil prices on the Pakistan stock exchange only.

1.8 Justification:

As it is mentioned above that the in this study, we will conclude that whether these three independent variables are significant or not. Our conclusions will not only provide us a clear image of the situation of the Pakistan stock market but will also help us to provide recommendations that what steps should be necessarily taken according to the situation or we can say the position of the stock market.

1.9 Scope:

This research paper would only limit the COVID-19 season (6 months). We are going to cover the area and analyzing the impact of COVID-19, exchange rate, and oil prices on the Pakistan stock exchange only.

1.10 Limitations:

Oil prices are uncontrollable due to uncertainty, also exchange rate cannot be control or change on an individual base because it is based on entire economy. KSE index rates are also depends on market changes and rumors.

FIGURE 01- KSE AND COVID-19 CASES

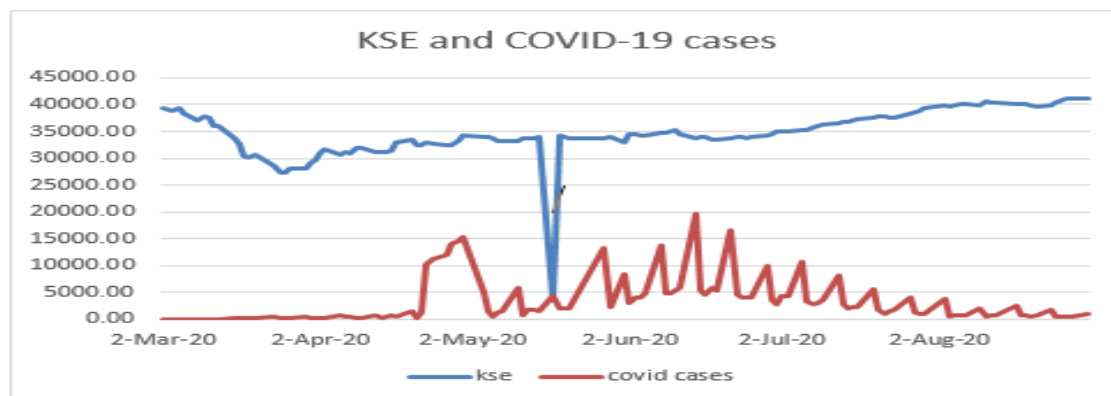


FIGURE 02- KSE AND EXCHANGE RATE

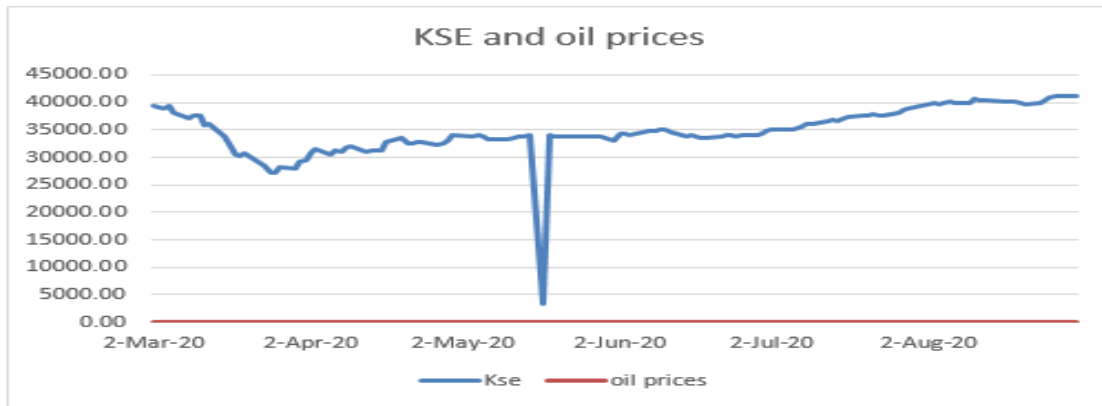
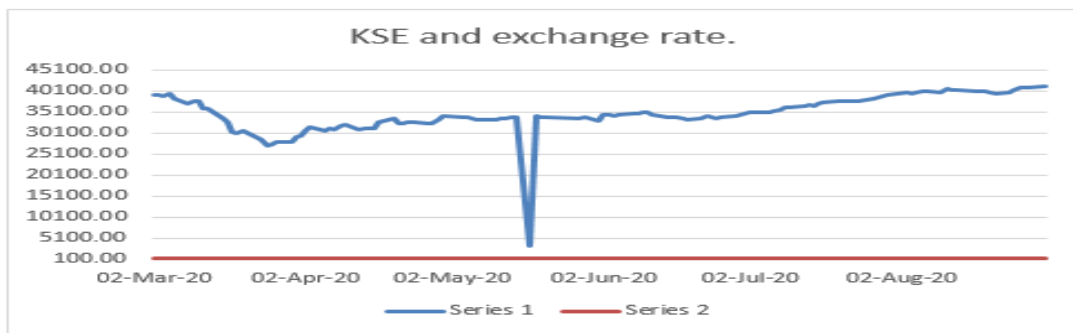


FIGURE 03- KSE AND CRUDE OIL PRICES



Above three figures show the relationship of dependent variable (KSE index rates) with its 3 independent variables (exchange rate, brent oil prices and daily COVID-19 cases). Figure 01 shows the ups and downs of COVID-19 cases in Pakistan and index rate of Karachi stock exchange. Similarly figure 02 and 03 shows the oil prices and exchange rates which didn't had a huge change over this time period of 6 months.

2. Literature Review

This study mentions three independent variables (fatal, positive, and recovered cases) of COVID-19. Data of pricing index is collected from psx and information of COVID-19 cases collected from official portal of COVID-19. They conclude that the recoveries of COVID-19 cases is only strongly significant variable of this study. Whereas, fatalities are considered as non-significant variable and has no relationship with stock markets. (Ahmed, S., 2020).

The goal of this study is to investigate the impact of COVID-19 on emerging stock markets throughout March 10 – April 30, 2020. There are three independent variables discussed in this paper (oil prices, exchange rate and COVID-19 case). The study includes stock markets of different countries and results indicates that there is negative impact of pandemic on stock markets. They found to have some temporary impact of COVID-19 on stock markets because this paper has divided the era of coronavirus into three sub periods for thoroughly analysis and found different results for each that is gradually fallen impact of COVID-19. (Topcu, M., & Gulal, O. S., 2020).

The study examine relationship between COVID-19 and KSE. They have examined the impact of COVID-19 on emerging economy which include the study of behavior of investors

and how the lockdown and govt intervention impacts on the stock market. They have collected data from world health organization and index data is taken from Karachi stock exchange. They used quantile on quantile approach and the results shows the significant relationship between COVID-19 and Karachi stock exchange according to this approach. (Waheed, et, al.,2020).

We have learned that this epidemic has a negative effect on the return of the stock market. In particular, the return of the stock is significantly negatively linked to the daily increase in the total number of deaths resulting from COVID-19 and the daily growth in overall confirmed cases. (Al-Awadhi, et, al., 2020).

In this article, they studied about the effects of the unexpected COVID-19 in the Chinese and Asian stock markets. The conclusion of the paper shows that the time series data of these selected stock markets suggests that the COVID-19 has been significantly impact on both stock markets. (He, Liu, Wang & Yu, 2020).

This article examines the fractal infectious effects of the COVID-19 epidemic in the stock markets. The results confirm the fractal infectious effects of the COVID-19 epidemic in the stock markets. The results show that COVID-19 has a significant but short-term effect on stock markets due to epidemics. Furthermore, for both return and volatility in the stock markets, this temporary effect flashes over time (in the medium and long term). (Okorie, & Lin, 2020).

This study reflects the effects of oil price variations and changes on stock returns in various sectors of the stock market. In recent years, China's cold seal, Iran's oil reserves, declining global demand, and the discovery of shale gas have led to a sharp drop in world oil prices. These changes have also affected Pakistan in many ways, especially the return to the stock markets due to changes in oil prices. (Atiq & Farhan. (2018)

The basic aim of their study was to evaluate and check the relationship between oil prices and stock markets of 6 countries of Gulf cooperation council (GCC). This research paper applied for co-integration test and ARDL model for long run and short run. The results shows that there is no long-run co-integration exist among all the stock markets of GCC countries and oil prices except one country i.e Oman. Oman's stock market has sensitive relationship with oil prices. (Alqattan, & Alhayky, (2016)

This article examines the relationship between exchange rate and stock market (KSE-100) index prices. They collected data from of 5 years from 2004-2009. The conclusion was that there is no significant relationship of exchange rate with stock prices during the particular time period. (Suriani, Kumar, Jamil& Muneer, 2015).

A country's growth and development are inextricably linked to its stock market. Two financial variables have been studied where exchange rate fluctuations are used as independent variables while the stock index is used as a dependent variable. Twelve-year monthly data from secondary sources is analyzed from January 31, 2003 to December 31, 2015. The study's findings demonstrated that exchange rate changes on Pakistan's stock index have a positive and statistically significant link. (Bagh et al., 2005) (2017).

3. Research Design

The goal of this research is to see how COVID-19, the currency rate, and oil prices affect the performance of the Pakistan stock exchange, for this purpose we will collect and analyze quantitative data and the data will be collected from different websites include PSX, price index, and COVID-19 cases information from registered websites.

3.1 Classification of Variables:

Following table shows details about how we are going to measure and classifying our document.

Table 1.

Name	Type	Measurement
KSE 100 index	Dependent variable	The index prices measured by the daily closing index prices taken from Pakistan stock exchange.
Exchange rate	Independent variable	US Dollar prices in exchange of Pakistani rupees.
Crude oil	Independent variable	Daily brent crude oil prices.
COVID-19	Independent variable	New confirmed cases data from official web sites.

3.2 Data and Data collection source

This study has covered the earliest era of COVID-19 i.e. started from Feb 01- August 31,2020. We have selected annual data for this investigation so we can get more proper results. The data of stock indices, daily exchange rates and brent crude oil prices has been taken from investing.com. (Investing data base 2020). Data of COVID-19 daily cases has been extracted from WHO's website.

Our study is limited only for Pakistan, its COVID-19 cases and KSE index rates has been selected for this investigation.

3.3 Hypothesis

H1: COVID-19 and Pakistan stock market have a significant relationship.

H2: Oil prices and the Pakistan stock market have a significant relationship.

H3: Exchange rate and Pakistan stock market have a significant relationship.

3.4 Model Specification

$$\text{KSE 100 Index} = \beta_0 + \beta_1(\text{ER}) + \beta_2(\text{OP}) + \beta_3(\text{COVID}) + \mu$$

In the above given designed research model, KSE 100 index indicate the closing index of Karachi stock exchange, ER refers to the prices of exchange rate in US dollar, OP indicates the price of Brent Crude oil and COVID-19 indicates the daily numbers of new confirmed cases of Pakistan and μ indicate the error term.

3.5. Data Analysis techniques

The results have been extracted from highly recommended tool of secondary data analysis (Eviews software 9) which is consider as best and appropriate tool for secondary data results and analysis have been explained in the following sections by using descriptive statistics, unit root test, autoregressive distributed-lagged (ARDL) model, bound test and ARDL model for long run.

3.5.1 Descriptive statistics

Descriptive statistics is basically a quantitative but detailed summary of our data which play a very important role for initiating testing any model. Descriptive statistics includes all the basic components of statistics like mean, variances, standard deviation, probability and other basic models. Descriptive statistics is representation of whole data.

3.5.2 Correlation Matrix

It is matrix that indicates relationship between two random variables. These matrices are very useful because it is able to predict relationships.

3.5.3 Unit Root Test

It is the test to check the stationarity of time series data at different levels. It is considered that the variable should have stationary at different levels. We will use the Augmented Dickey-fuller (ADF) test. In general, if a p-value is less than 5% you can reject null-hypothesis which means that there is a unit root.

The reason for trying to stationaries the time series data to check its ability to obtain a meaningful descriptive statistic such as means, variance and correlations with other variables

3.5.4 Autoregressive distributed-lagged (ARDL) model:

ARDL bounds testing approach is an integration method developed by Pesaran et al. (2001) to test presence of long-run and short run relationship between variables.

The decision of rejection and acceptance of null hypothesis based on F-test value, if the value of f-statistics is greater than upper critical bound, then reject H0.

$$\Delta KSE_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta KSE_{ti} + \sum_{i=1}^p \beta_{2i} \Delta ER_{ti} + \sum_{i=1}^p \beta_{3i} \Delta OP_{ti} + \sum_{i=1}^p \beta_{4i} \Delta COVID_{ti} + \alpha_1 ECT_{t-1} + e_t$$

4. DATA ANALYSIS AND FINDINGS:

4.1 DESCRIPTIVE Data:

The average price of the PSX 100 index is 34836.18, according to table 01 of descriptive statistics presented below. The mean of daily cases is 2420, the average price of exchange rate is 164.22, the average price of Brent crude oil is 37.13, and this analysis has been drawn from 03 march 2020 to 31 august 2020.

Table 2. Description statistic

Descriptive statistics						
Title	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
KSE 100 Index	34836.18	4441.524	-2.8207	21.59834	1935.834	0
Daily Cases	2420.057	3296.969	2.712271	11.91093	557.7555	0
Exchange Rate	164.2297	3.924689	-0.87262	2.610998	16.38558	0.000277
Brent Oil	37.13244	8.098871	-0.483979	2.123775	8.736657	0.012672

4.2 Correlation matrix

The correlation matrix indicates the strength of the variables' relationship. Table 3 shows that the KSE 100 index has a positive association with the currency rate and Brent crude oil, but a negative correlation with COVID-19 daily cases in Pakistan.

Table 3. Correlation matrix

Correlation matrix				
	KSE 100 index	Daily cases	Exchange rate	Brent oil
KSE 100 INDEX	1			
DAILY_CASES	-0.072306	1		
EXCHANGE_RATE	0.187288	0.175694	1	
BRENT OIL	0.625033	0.217757	0.328488	1

4.3 Unit root test

Table 4. unit root test

Variables	Augmented dickey-fuller test Statistics (At level)		Augmented dickey-fuller test Statistics (At 1 st difference)		Integration
	t- Statistics	Probability	t- Statistics	Probability	
KSE-INDEX	-9.105456	0.0000	-	-	I (0)
COVID-19 CASES	-3.486132	0.0101	-	-	I (0)
EXCHANGE RATE	-2.628078	0.0901	-10.74537	0.0000	I (1)
BRENT CRUDE OIL	-1.642834	0.4577	-9.281535	0.0000	I (1)

The table 4. shows the results of Augmented Dickey-fuller (ADF) test which identified unit root in the data.

KSE-index rates and daily COVID-19 cases found to be stationary at level. Whereas, exchange rate and Brent crude oil found to be stationary at first difference. This indicates that the null hypothesis is rejected at 1% level of significance at level the data series of exchange rate, and the null hypothesis is rejected at 1% level of significance at 1st difference in the KSE-index and COVID-19 instances.

4.2 Bound Test

Since the value of F-statistics (21.09418) is bigger than its upper bound, Table 5 reveals that there is co-integration between the variables (5 percent). The cointegration test is used to determine if variables in time series data are correlated.

Table 5.-Bound test

Equation	F-statistics Calculated	Upper Bound Critical value	Conclusion
KSE, exr. dc, bro	21.09418	2.79 (5%)	Co-integration exists

4.3 ARDL Model for Long run

There is an existence of long-run relationship among KSE-index rate and its given variables that is explored by ARDL model.

Table # 4 provides a positive and indicates insignificant relationship between exchange rate and KSE-index prob. 0.2432 i.e. more than 0.05 so, H0 will be accepted.

This table examine the significant relationship of Brent crude oil and KSE-index, its value is 0.0082 that is less than 0.05 so, H0 will be rejected.

Table 6. ARDL Model for Long Run

Model: ARDL Dependent variable: KSE-index rate Observations:123			
Variable	Coefficient	Standard error	Prob.
Exchange rate	1.398479	1.192105	0.2432
Brent crude oil	0.275602	0.102449	0.0082
COVID-19 cases	-0.017357	0.011170	0.1230
C	2.439115	5.886738	0.6794

4.4 Autoregressive distributed-lagged (ARDL) for Short Run

Table shows the results of short run changes and relationship among variables. The results help us to find out ECM (coefficient or error correction term) which measures the speed of adjustments towards long-run equilibrium. Having negative signs in coefficient of error term reflects that there is a stable long run relationship exist.

Furthermore, the ARDL model shows impartial estimates and valid t-statistics values, even when some of the regressors are endogenous (Harris and Sollis, 2003).

Table 05: ARDL Model

Model: ARDL	Dependent variable: KSE-index rate		Observations:123
COVID-19 cases	-0.016381	0.010596	0.1249
Lexr (-1)	5.619566	3.266917	0.0881
Exchange rate	-4.299707	3.373569	0.2051
Brent crude oil	0.260108	0.100228	0.0107
C	2.301992	5.570542	0.682

5. Conclusion

The aim of the study was to indicate the impact of this highly affected pandemic on Pakistan Stock market during the period of Feb-Aug 2020. For this purpose, in this study we have selected three variables i.e. exchange rate, oil prices and daily COVID-19 cases in Pakistan. Unit root test proposed that ARDL model is suitable for the data analysis. Through the ARDL results we found that there is no significant relationship exist between COVID-19 cases and stock market so we rejected our H1. On the other hand, we've found statistically significant relationship among oil prices and stock market which lead us to accept our H2. However, cointegration exist among the variables found with the results of bound test. ARDL model indicates that there is an existence of long-run relationship among variables.

The previous studies found to have some temporary impact of COVID-19 on stock markets (Saleem et, al., 2021) because they have divided their time period into further sub samples and found different results for each that is gradually fallen impact of COVID-19.

According to our study, COVID-19 doesn't consider as the significant variable of Karachi stock exchange and it seems have some temporary effects on stock market. Whereas, oil prices of Brent crude oil have impact on the stock market and known as the significant variable of the study.

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