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Relationship between Foreign Direct Investment Inflows and Covid-19 Pandemic in Pakistan: A Monthly Co-Integration Analysis

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Abstract

The global COVID-19 pandemic brought many challenges for the world including the downfall in foreign direct investment inflows (FDI). Although there are many other factors which cause a decline in FDI inflows in Pakistan but present study mainly focuses on COVID-19 pandemic as this resulted in closures of borders causing a sharp decline in FDI inflows. For this purpose, this study uses monthly data of Pakistan, starting from January 2020 (start of COVID-19 in Pakistan) till May 2022 (time period in which study has been conducted) to empirically analyze the relationship between FDI inflows and COVID-19. The results of ADF test statistic show that data is integrated of order (1). Johansen Co-integration approach is used to determine the relationship. Taking FDI inflows as a dependent variable and COVID-19 cases as an independent variable, the results suggest a linear co-integration relationship between these two variables with FDI inflows having a negative sign indicating a negative relationship between FDI inflows and COVID-19 cases.
This study is innovative in the sense that it concentrates on finding a proper empirical relationship between FDI inflows and COVID-19 and does not focus only in analyzing existing figures. Empirical results suggest that Pakistan must devise such policies that can be implemented immediately in such unforeseen conditions as more and new variants are coming to surface. The availability of data puts a limitation on application of empirical technique since COVID-19 started in 2020 in Pakistan and the pandemic is still not over. In coming years, a time series analysis would be possible to carry a long run investigation. The co-integration technique is the most useful at the moment as it not only mentions the relationship between the variables during pandemic but also makes a future forecast.

Keywords: COVID-19, Co-integration analysis, Unit root test, EViews, FDI inflows, Pakistan.

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1. INTRODUCTION

Foreign direct investment (FDI) inflows have always been recognized as an important driving force for stimulating economic growth of a country especially developing countries who are deficient in their domestic resources and rely heavily on FDI inflows for strengthening their economies both at micro and macro levels. Researchers all over the world, using both theoretical and empirical analysis, have established that FDI inflows benefit recipient countries by providing foreign exchange, bringing innovation, increasing employment, provision of technical know-how through technology transfer along-with strengthening exports of the host country (Shahzad et al, 2012). FDI inflows also lead to economic integration and globalization by improving international relations and cross border exchange.

In case of Pakistan which is an agrarian economy lacking technical know- how and modern technology for increasing industrialization, is highly dependent on investment inflows for removing dual gaps, i.e., saving-investment and export-import (Mohey-ud-Din, 2007).

Pakistan has been devising various polices to gain investors' confidence and got successful to some extent when suddenly the pandemic of COVID-19 jolted the whole world. Consequently, Supply chains and industries like tourism, travelling, hotels and hospitality, transportation and education were severely impacted resulting in low FDI inflows towards Pakistan. The health crises became unmanageable and the whole concentration inclined towards controlling the spread of disease. Since developing countries including Pakistan were already deficient in health care facilities, the years of 2020 and 2021 were a complete chaos resulting in a negative impact on all economic indicators and closing of borders hit in the worst way by and Pakistan experienced a sharp decline in FDI inflows.

According to Pakistan Board of Investment statistics, country witnessed high net FDI inflows during the period of 2015-16 till 2017-18 where FDI inflows fell during 2018-19 and rose again during 2019-20 but in preceding years after the outbreak of COVID-19, FDI started falling as evident from following statistical figures (see Tab. 1).

This study attempts to analyze the impact of COVID-19 on FDI inflows in case of Pakistan using monthly data and a proper empirical analysis. A simple X-Y analysis has been carried out since the main concentration is on finding out a long-term relationship between FDI inflows and COVID-19 pandemic. The main reason behind preferring FDI inflows over other economic indicators is based upon high reliance on foreign investment and economy of Pakistan got completed jolted after the outbreak of pandemic. Trade deficits increased and domestic investment reduced further causing a spillover to all economic indicators and GDP started falling since Pakistan was unable to manage the situation with its own resources. COVID-19 pandemic resulted in stoppage of international foreign projects especially the China-Pakistan Economic Corridor (CPEC) which was a great concern for economy. During the pandemic it was also observed that labor was not skilled enough to use distant technology and work in isolation. This situation demanded a strong policy which could take the country out of recession as during the pandemic even the developed countries were

traumatized making foreign investment in developing countries including Pakistan a least priority which jeopardized the major international foreign projects. The empirical results also suggest that International disasters negatively affect FDI inflows and to avoid such situation, timely policies must be devised in order to manage the situation.

Table 1: Net FDI Inflows (Million US dollars)

Fiscal year	**Net FDI inflows**
2010-11	1634.8
2011-12	820.7
2012-13	1456.5
2013-14	1698.6
2014-15	1033.8
2015-16	2392.9
2016-17	2406.6
2017-18	2780.3
2018-19	1362.4
2019-20	2597.5
2020-21	1820.5
July 21-April 22	1455.6

Note: Pakistan's fiscal year runs from 1st July till 30th June
Source: https://invest.gov.pk/statistics

The study is divided into six parts where part one explains the introduction along-with objective, significance and contribution of current research. Second part gives a comprehensive review of literature. Methodology, variables, data and empirical results are presented in section three. Fourth section discusses the output and empirical results. Section five explains conclusion and policy recommendations. Limitations and future directions are given in section six.

1.1 Objective, Significance and Contribution

The main objective of this paper is to quantify the impact of COVID-19 on FDI inflows in Pakistan. Although there are many studies discussing the relationship and impact but a proper empirical analysis has not been carried out yet to check the impact and relationship. This study uses monthly data of COVID-19 cases in Pakistan starting from January 2020 till May 2022 along-with monthly data of FDI inflows to check the existence and direction of relationship between these two variables. Since the time period is short, and COVID-19 is still affecting the functioning of economy, a time series analysis is not possible at the moment due to less number of readings. Moreover, a panel analysis cannot be conducted due to lack of cross sections

This also acts as a limitation to the study but the empirical analysis will add to the existing body of theoretical literature.

1.2 Rationale for methodology and variables

The study is restricted to using the relationship between FDI inflows and COVID-19. Although there are many other factors that affect FDI inflows, but in case of developing economy of Pakistan, the closure of borders along-with the pandemic multiplied the issues faced by the country. To add on, these two variables have been concentrated upon to study the impact of COVID-19 only as empirical research on this relationship related to Pakistan is very limited and has not been analyzed in detail. . Cointegration analysis has been used for conducting empirical analysis because since COVID-19 pandemic started in recent past and enough data is not available to carry out times series analysis as number of readings is too less. For panel data application, number of cross sections are not enough to conduct panel tests. Cointegration analysis is used to determine the X-Y since the main concentration is on finding out a long-term relationship between FDI inflows and COVID-19 pandemic. By using this technique, a future forecast has also been developed which can help in devising policies for managing global disasters/pandemic. The data fulfils the requirement of cointegraton analysis on the basis of non-stationary status. Monthly cointegration is preferred over quarterly as situation was changing so quickly after the outbreak and to capture the more reliable picture, monthly analysis has been conducted.

2. LITERATURE REVIEW

The existing literature discloses that although there exist few research studies concentrating on the relation between COVID-19 and FDI inflows in Pakistan, however, empirical studies in the context of developing country like Pakistan are still very limited. Moreover, not many studies are available on the specific topic under discussion. Therefore, the literature review first highlights the impact of FDI on economic growth and its importance taking both international and national level studies. In second phase, the COVID-19 situation has been discussed in depth. All relevant studies highlighting the relationship between these two variables in case of Pakistan are included in this section.

Emphasizing the international literature, Johnson (2006) conducted an empirical analysis by using cross-sectional and panel data of 90 countries and found that FDI inflows have a positive impact on economic growth of host countries but it is limited to developing countries and that this relationship could not be established for developed countries. Similarly, Mah (2010) examined the causality between FDI inflows and economic growth in case of China using a small sample co-integration test. The empirical results show a unidirectional relationship running from economic growth to FDI. No evidence was found that FDI leads to economic growth.

Bayar (2014), used a panel data of seven South Asian countries to test the relationship between FDI inflows and economic growth. By applying Padroni, kao and Johansen-Fisher panel co-integration test, the results suggested that the existence of a positive relationship between FDI inflows and economic growth. Bagli and Adhikary (2014), concentering on India, conducted a time series analysis for the period of 1991-2010. Their study revealed that FDI inflows do not serve as a determinant of economic growth in case of India. It may due to high population growth which is acting as a hurdle and the economy is unable to gain benefits from FDI inflows.

Numerous researchers have been testing this relationship for decades now and the empirical evidences differ across countries but it can be safely concluded that in case of developing economics, FDI inflows exert a positive impact on economic growth by bringing a complete package of technology, innovation, employment opportunities, globalization etc. Although the impact varies from economy to economy. The more fruitful results can be observed in case of emerging economies and even among those, which have more favorable environment for attracting and sustaining foreign investors. Liang *et al*, (2021) by using data of 113 emerging economies found that the fixed effect model suggested positive relationship between FDI inflows and economic growth.

Fadhil and Almsafir (2015), conducted and empirical analysis to find out the relationship between FDI inflows and economic growth of Malaysia. The researchers argue that Malaysia has been a known destination for foreign investors in Southeast Asia and it has been attracting high amounts of FDI inflows. Using times series data from 1975 till 2010, they concluded that FDI inflows have a positive impact on economic growth of Malaysia but for getting more favorable results from technology spillovers, human capital development is important to gain maximum benefits from FDI inflows.

Similarly, Omri and Sassi-Tmar (2015), examined the relationship between FDI inflows and economic growth of Tunisia, Morocco and Egypt using time period from 1985 till 2011. The results of generalized method of moments (GMM) suggested a bivariate positive relationship between FDI inflows and economic growth of three African economies. Using a panel data analysis Rjoub *et al*, (2017), tested for the same relationship using 234 panel observations from Sub-Saharan Africa (SSA) over the time period of 1995-291. The results revealed that by keeping the factors of trade openness, inflation rate, government expenditures, natural resources and human capital constant, FDI inflows have a positive and significant relationship with economic growth of landlocked SSA countries. Further, the authors found out that the foreign investment does not crowd out domestic investment.

Frimpong and Oteng-Abayie (2006), studied the impact of FDI inflows and economic growth in Ghana before and after the implementation of structural adjustment programs (SAPS) by using Toda-Yamamoto Granger test for the time period of 1970-2002, the study did not find any causality between the two variables in pre-SAPs time but a positive and significant univariate causality (from FDI to economic growth) was found in post-SAPs time period. The authors argue that this may be due to better political and economic functioning of the country after the implementation of SAPs.

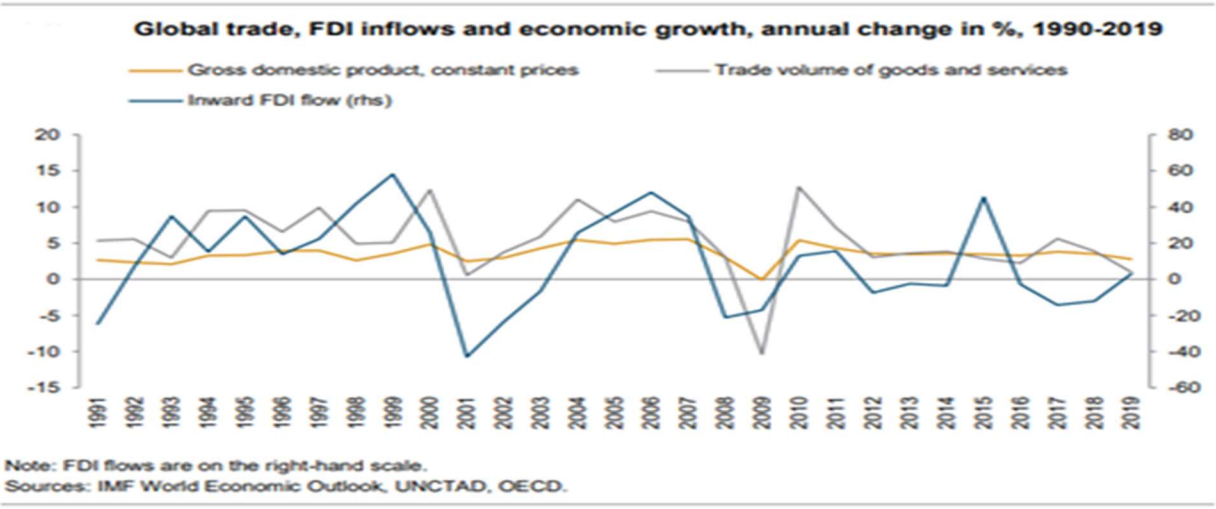
On the other hand, in case of Pakistan, Falki (2009), carried out an empirical analysis to check the relationship between economic growth and FDI inflows in Pakistan. Time series data from 1986-2006 was analyzed and study concluded that the impact of FDI inflows on economic growth of Pakistan is not that significant. It may be due to the lack of infrastructure or human resources at the time which in later studies showed that given appropriate and favorable environment to foreign investors accompanied by proper resources leads to multiple benefits and exert a positive impact on economic growth. This is evident from a comparatively new study conducted by Tahir *et al*, (2020). They used autoregressive distributed lag co-integration approach and found a positive and significant impact of FDI on economic growth of Pakistan.

As suggested by above mentioned studies that a favorable environment is a key determinant of FDI inflows. Security, political and economic stability, availability of infrastructure, human resource and relaxed situation at borders increase investor's confidence and recipient country not only attracts more FDI but also benefits more when the conditions are favorable. In recent past, this became more evident when the healthcare system got jolted after the spread of Corona Virus in 2019. World Health Organization (WHO) declared COVID-19 as public health emergency which resulted in closure of borders. The functioning of foreign investment got negatively affected due to lock down and developing countries suffered more. According to Ahmed and Sarkodie (2021), as COVID-19 was highly contagious and initially there was no idea of controlling it, the basic concentration was on survival and not getting infected which resulted in social distancing, travel restrictions, closure of borders and complete lock down. This situation resulted in severe fall in FDI inflows and global FDI was estimated to fall by 4000 basis points in the fiscal year of 2020 subsequently a downfall of one trillion dollars was observed as compared to 1.54 trillion dollars in 2019. FDI is expected to further fall by 50–100 bps in the 2021 fiscal year, representing 600 bps decline since 2005, from 2 trillion dollars to less than 900 billion dollars (United Nation Conference on Trade and Development [UNCTD], 2020).

Fang *et al,* (2021), while highlighting the impact of COVID-19 on FDI inflows state that the global COVID-19 pandemic has created severe challenges for the world economy, including cross-border foreign direct investment. Although it started from China but it did not remain limited to one country or nation but became a threat for all humans. The authors used quarterly data from 2014-20 to make an empirical analysis. It was found that as the positivity rates increase, a significant downfall in FDI inflows was observed. This situation was worst for European countries and USA who were the serious epicenters of the global pandemic. With a reduction in FDI inflows, the economic growth has been severely affected at global level.

According to Adarov and Hunya (2020), FDI inflows to Central, East and Southeast Europe dropped by 58% during first six months of 2020 as compared to first half of 2019. Although this is a huge set back but developing countries faced more severe consequences in the form of 75% decline in FDI inflows after the outbreak of global pandemic. The authors used data from reliable sources and conducted a descriptive analysis to study the impact of COVID on FDI Inflows as presented in following Fig. 1:

Figure 1



"Even prior to the COVID-19 pandemic, the FDI dynamics worldwide has been rather weak, with a continuous decline in aggregate FDI flows over the period 2015-2018, and only a minor increase of about 3% from 2018 to 2019 (Figure 1). It should be noted that, taking a longer historical perspective, continuously weak growth or a decline in international FDI activity has been observed since as far back as 2011, with the exception of 2015, when there was a brief spike that was attributed to large global merger and acquisition (M&A) deals in advanced countries". (Andorova/Hunya 2020: *14*)

Fu and Mu (2021), used panel data of 96 countries from January 2019 to June 2020 and investigated the impact of COVID-19 on FDI inflows. By using Heckman selection model, the authors found that although there is no doubt that the spread of COVID-19 negatively affected FDI inflows but the effects are not same for all countries. Investors were reluctant in investing in those countries where COVID-19 was spreading rapidly as they were concerned not about their investment but health as well. In such situation developing countries were not on priority list of investors since they lack health care facilities viz a viz shortage of capital and resources.

A similarly conclusion was derived by Chaudhary *et al*, (2020), who have discussed the impact of COVID-19 on FDI inflows in Nepal. Using descriptive analysis, their study concluded that COVID-19 has negatively affected FDI inflows but the pandemic does not act as the main barrier as for transiting economies many other factors are necessary which include a favorable business environment, good infrastructure, human resource, political stability, good governance and geographical benefit. Nepal was already dealing with these hurdles and situation got worse after the outbreak of global pandemic.

Romdhane *et al*, (2022), by using generalized method of moments (GMM) technique to study the relationship between economic growth, domestic investment and trade openness on FDI inflows in Asian region during pre and post COVID-19 situation. The pre COVID-19 time period is from 1996-2018 and post COVID comprises of time period from 2019 to 2020. The results suggested that in pre COVID-19 times, Asian countries were getting higher FDI inflows as compared to post COVID-19 time. In addition, the economic growth and FDI inflows showed a positive and significant relationship but this relationship got negatively affected due to lock down and closure of borders affecting trade openness. Asian countries would need some time to settle economic indicators as the COVID situation has badly hurt this region.

Talking specifically about Pakistan, not many studies are available relevant to the topic under discussion. A comparatively relevant study has been conducted by Khalid *et al*, (2020), who used time series data of Pakistan from 1970-2018 and concluded that FDI inflows and economic growth have a positive and significant relationship in case of Pakistan. They discussed that this relation got affected after the outbreak of COVID-19 and suggested that policy makers should concentrate on making strong industrial clusters to gain loyalty of investor. Authors added added that the project of Diamer Bhasha Dam is very much dependent on higher FDI inflows and attractive policies must be devised to increase FDI inflows in Pakistan.

Abbass *et al*, (2022), studied many macro-economic variables using Keynesian approach of aggregate demand and aggregate supply to assess the situation after COVID-19. Regarding

FDI inflows, authors' state that Pakistan was going into recovery phase during the first six months of fiscal year of 2019-2020 with FDI inflows being at 1.34 US billion dollars but the situation changed as COVID-19 hit the country. The authors have suggested that Pakistan should adopt the similar policy framework adopted by developing economies since they were the ones to get hit by pandemic but they managed to recover

According to Coulibaly *et al*, (2021), the Asia and Pacific region have always attracted high FDI inflows due to low labor cost and geographical location. But FDI inflows fell by 36% in this region and Pakistan received the least as compared to other Asian countries after the outbreak of pandemic. Lower inward FDI also resulted in unemployment, poverty and inflation. Moreover, due to lack of medical facilities, health sector was in dire need of foreign help which, unfortunately, could not be available on time.

Das (2022) states that since the outbreak of COVID-19, Pakistan faced lot of problems and was unable to manage through its own resources. FDI inflows fell sharply and economic growth started falling. But this situation got better when China offered much needed medical supplies when the pandemic situation got better. Also, Pakistan was the first country receiving testing kits from China which helped in lifting FDI inflows and other economic variables of the country.

Concluding the literature review of the present study, it is observed that numerous researches conclude FDI inflows are beneficial both for developed and developing countries but they are more important for emerging economies for lifting their countries to enter the list of developed countries. In addition, the time period in which study has been conducted is very important and results can vary. Moreover, many factors act as hurdle in attracting a decent amount of FDI inflows but the COVID-19 pandemic has acted as the biggest shock at global level. If developed countries were not able to cope up with the chaos caused by COVID-19 then developing economies especially Pakistan needs to go a long way to recover from the effects of pandemic. Lastly, the literature gap also conveys that although studies have been conducted to examine the relationship between FDI inflows and COVID-19 but there is a lack of studies related to Pakistan. Theoretical discussion and statistical figures are available but an in depth empirical analyses will add to the literature which would be contributed by the resent study.

3. METHODOLOGY

This paper uses monthly data of COVID-19 positive cases and FDI inflows towards Pakistan from January 2020 till May 2022.

The data for COVID-19 positive cases has been extracted from COVID statistics provided by Government of Pakistan from the official website https://covid.gov.pk/stats/pakistan

And data for FDI inflows has been extracted from archives of State Bank of Pakistan from official website https://www.sbp.org.pk/ecodata/nifp_arch/index.asp

The data of COVID is the total number of positive case and FDI inflows are in million US Dollars.

For initial analyses, Augmented Dickey Fuller (ADF) test has been applied both to determine the order of integration. Later Johansen Co-integration test has been applied to check the relationship between COVID cases and FDI inflows in Pakistan.

Using these tests, following hypothesis is to be tested:

Hypothesis: FDI inflows get negatively affected by COVID-19 in case of Pakistan.

Empirical model with equation:

$$FDI = \beta_0 + \beta_1 (COVID) + \mu_t \quad \text{where } \mu_t \text{ is a random error term} \qquad (1)$$

Where FDI inflows is a dependent variable and COVID-19 is an independent variable.
All these tests are applied using EVIEWS.

3.1 Augmented Dickey Fuller (ADF) test

ADF test is necessary for conducting empirical analysis. If data is not stationary and has trend, then it may lead to spurious results. Adjusting data is the first step. The ADF test is applied using three models where model 1 includes none, model 2 includes trend and model 3 includes trend and intercept. All three models are represented with the help of following equations:-

$$\text{Model 1: } \Delta y_t = \gamma y_{t-1} + v_t \qquad (2)$$

$$\text{Model 2: } \Delta y_t = \alpha + \gamma y_{t-1} + v_t \qquad (3)$$

$$\text{Model 3: } \Delta y_t = \alpha + \gamma y_{t-1} + \lambda_t + v_t \qquad (4)$$

Graphical Representation

The rationale behind graphical representation of data is to get firsthand information to check whether data is trend stationary or difference stationary. As mentioned by Serfraz (2017), visual representation in the form of graph gives a quick idea about integration level of data series. Therefore, data will be presented both in graphical and tabular form.

Series of FDI Inflows at Level and First Difference

Figure 2

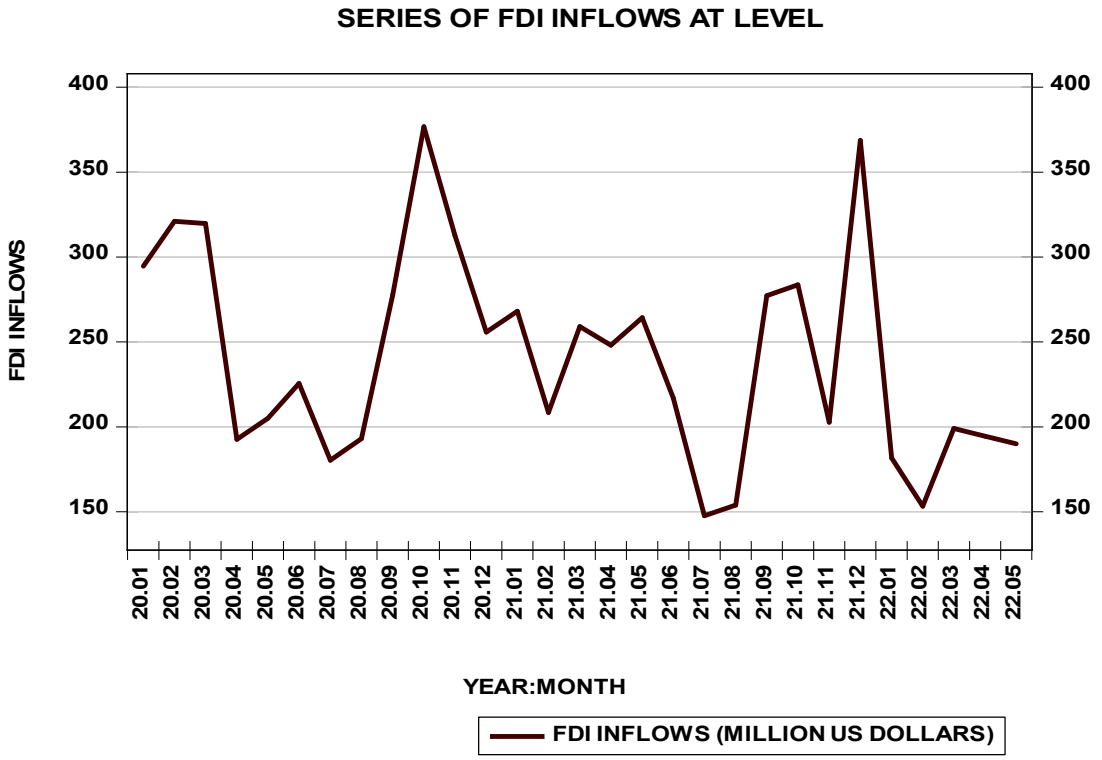
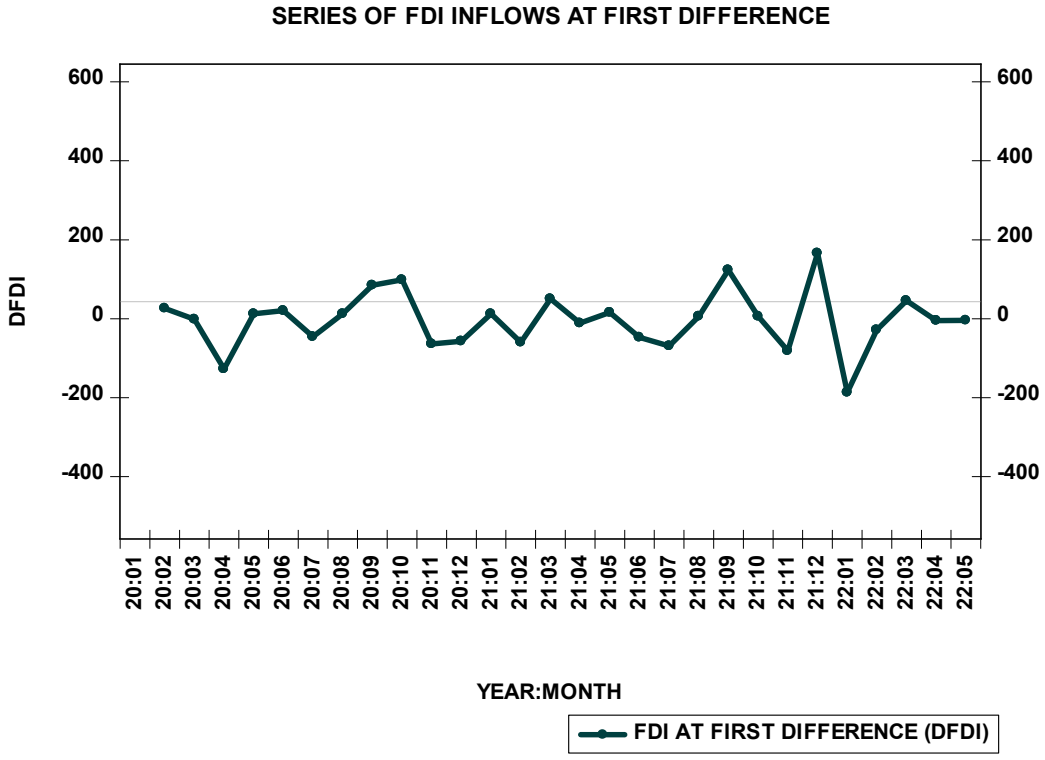


Figure 3



Series of COVID-19 Positive cases at Level and First Difference

Figure 4:

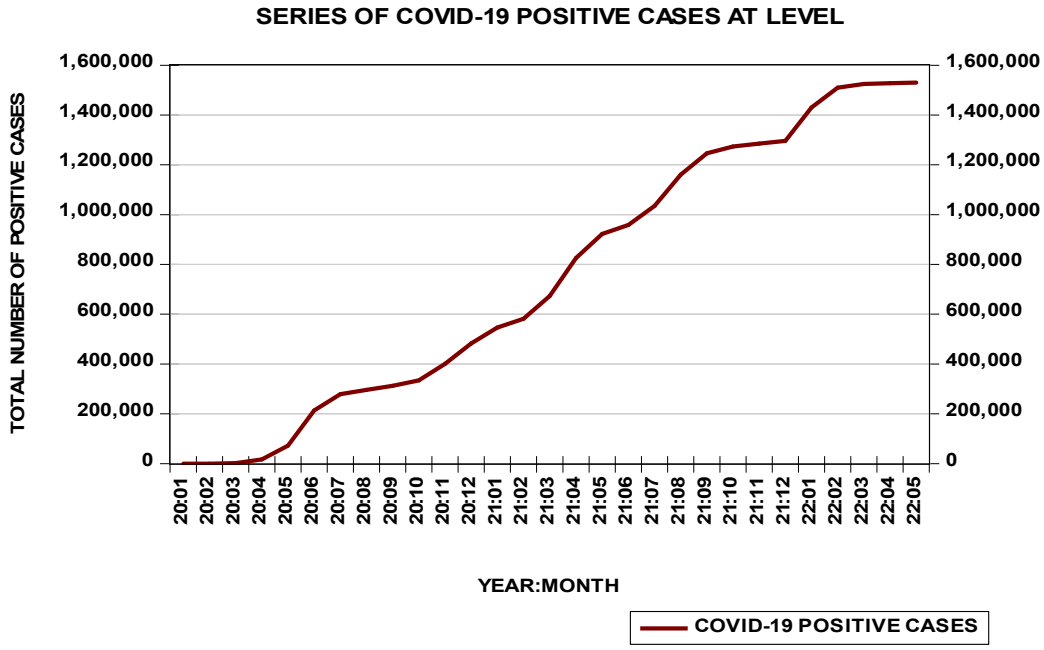
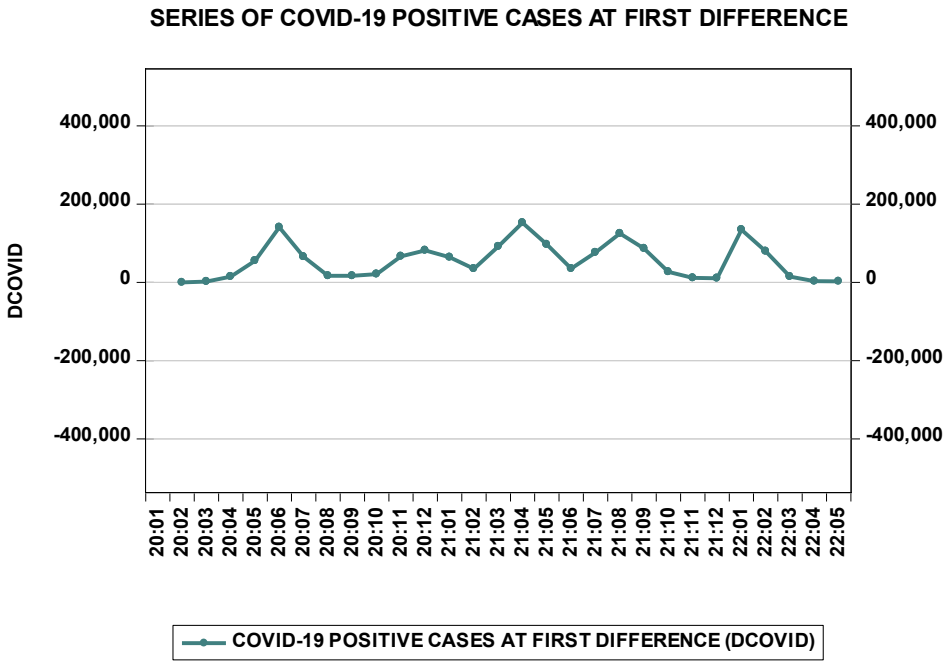


Figure 5:



At first glance the graphical representation shows that both series are not stationary at level but they become stationary at first difference and converge to a mean value. For exact values and significance level, ADF test is applied.

Table 2: Augmented Dickey Fuller Test (ADF)

Variables	**At level**			**At first difference**			Order of integration
Components of Equation	none	intercept	Trend and intercept	none	intercept	Trend and intercept	
FDI	-1.03 (0.267)	-3.68** (0.0102)	-3.89* (0.0264)	-6.72** (0.000)	-6.62** (0.000)	-6.49** (0.0001)	I(1)
COVID	-0.69 (0.4027)	-0.36 (0.9021)	-2.41 (0.3648)	-1.08 (0.2458)	-4.80** (0.0007)	-4.61** (0.0057)	I(1)

Notes: Values in Parenthesis represent Probability values.
significant at 10%, ** Significant at 5%, * Significant at 1%*
Source: Author's estimation from EVIEWS output

- *Null Hypothesis (H_0): Series has a Unit Root (non- stationary)*
- *If t-values (absolute or positive) are greater than critical values at 1%, 5% and 10%, Null hypothesis (H_0) is rejected i.e., series does not have unit root (it is stationary)*

According to ADF test statistics, both series have a trend and they become stationary at first difference. This step is sometimes ignored by researchers but determining the order of integration is the first footstep in getting a proper and stable statistical more. As Nyamwange (2012), explains that unit root testing is very important for determining whether series are stationary or not. Any empirical model without testing the stationarity status of series will result in variable's distribution to shift in time and space causing leading to unstable and false future predictions.

As established by Johansen (1988), when both series have same level of integration, Johansen co-integration test can be applied to establish a long-run relationship.

Murthy and Ukpolo (1994: 798) state,

> *Cointegration allows individual macroeconomic time-series to be non-stationary but requires a linear combination of such series to be stationary. The cointegrating regression. which provides consistent and efficient estimates of long-run equilibrium parameters, requires that all the time-series used in its estimation be integrated of an identical order. The order of integration of a series refers to the number of times the series must be differenced before it becomes a stationary series.*

According to EViews user guide, Hjalmarsson and Österholm (2007) are of the view that finding that many macro time series may contain a unit root has spurred the development of the theory of non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long-run equilibrium relationship among the variables.

Therefore, after determining the order of integration, the co-integration can be applied on level but not on differences. To account for the errors caused by non-stationarity of data, logarithms of series have been taken in this case as well. Same analyses has been given by Mayr and Ulbricht (2015), who argue that in case of forecasting macroeconomic series, the reason for using lag-transformation data is based on the assumption of linearity and limits the effect of heteroscedastcity and skewness in the level data. Table 3 shows the results of Johansen Co-integration tests

Table 3: Johansen Co-integration Test Results;

Unrestricted Cointegration Rank Test (**Trace**)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.470895	18.26622	15.49471	0.0186
At most 1	0.089790	2.352008	3.841466	0.1251

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (**Maximum Eigenvalue**)

Hypothesized No. of CE(s)	Eig envalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.470895	15.91421	14.26460	0.0272
At most 1	0.089790	2.352008	3.841466	0.1251

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Notes: Results are based on following hypothesis:
H_0: No cointegration H_1: Reject H_0
Source: EVIEWS OUTPUT

,
Both trace test and Max Eigen value test statistics are smaller than critical values at 5% (in case of at the most one), the null hypothesis is rejected and the test concludes that there is at-least on co-integration equation at 95% level of confidence. Therefore, there exists a long run relationship between COVID-19 and FDI inflows in case of Pakistan.

The same is indicated by the co-integrating equations which also indicate a negative sign with FDI inflows implying that due to rise in COVID-19 positive cases, FDI inflows started falling in case of Pakistan and this also projects for future than if such situation comes, FDI inflows will fall.

Table 4- Cointegrating Equations

1 Cointegrating Equation(s):	Log likelihood	24.46126

Normalized cointegrating coefficients (standard error in parentheses)

LFDI	LCOVID
1.000000	0.199788
	(0.08799)

Adjustment coefficients (standard error in parentheses)

D(LFDI)	-0.999518
	(0.23521)
D(LCOVID)	0.040715
	(0.12232)

Source: EVIEWS OUTPUT

4. DISCUSSION OF EMPIRICAL FINDINGS

Taking FDI inflows as a dependent variable and COVID-19 positive cases as an independent variable, an empirical analysis has been conducted using monthly data of Pakistan from January 2020 to May 2022. The first two months of COVID-19 data have no values since the first case was reported in March 2020. The empirical analysis indicates that the series of COVID-19 has more trend as compared to series of FDI inflows. To establish a significant long-run relationship, both series must be integrated of same order. The graphical representation as well as results of ADF test statistic show the same output. Since both series have same order of integration, a linear relationship is established leading to application of co-integration test. This study uses Johansen Co-integration test on log of both series. The results indicate that there exists a long run co-integration between the two variables. The sign is indicated by the co-integrating equation which shows that FDI inflows are negatively affected by the rise in COVID-19 cases.

5. CONCLUSION AND POLICY RECOMMENDATIONS

COVID-19 was identified at the end of 2019 in Wuhan, the capital city of Hubei province of China. Although China tried its best but the spread could not be controlled as the virus travels through air and is extremely contagious. Initially no one had any clue as to how the spread can be controlled and in no time it took the whole globe causing millions to lose their lives. The first solution adopted by the world was to go in complete lockdown and closing of borders. People had to stay at home and if anyone needs to come out, strict SOPs were to be followed. This unpredictable and extreme shock negatively affected many economic variables. Policy makers could not find a solution to fight the pandemic and a global level recession took the whole world. Because of borders closure, foreign direct investment got severely affected and it was another shock for developing countries like Pakistan. Pre COVID-19, the situation of FDI inflows was improving and foreign investors we showing confidence for investing in Pakistan but after the appearance of first positive COVID-19 case in March 2020 in Karachi, when a student coming from abroad was tested positive, the whole country went into a shock as Pakistan remained safe from pandemic for some time and was not expecting this unfortunate situation. When the spread went out of control, Pakistan went into lockdown in April 2020 and death rate became unmanageable. In those times of despair Pakistan needed foreign help for fighting the virus but borders were closed. FDI inflows started falling as many foreign investors who were already in Pakistan had caught the virus and further help could not be visible in near future. The dual gaps started increasing and there was no way to increase FDI inflows.

Initially many studies and analysis came on surface but proper research could not be conducted. This study managed to fill the gap by carrying out an empirical analysis to check the relationship between FDI inflows and COVID-19 in case of Pakistan. Some relevant studies have been discussed in literature review yet, this area need to be explored, especially empirically. By using monthly data of COVID-19 cases and FDI inflows, the results of Johansen co-integration test indicate a significant long-run relationship. The negative sign with FDI inflows indicate that with the rise in COVID-19 positive cases, FDI inflows in Pakistan started falling. The fiscal deficit started increasing and the Pakistani Rupee (PKR) faced a continuous downfall in its value.

Since COVID-19 is not over yet and world is moving towards biological war (see e.g. Lyon 2021), many new infections and variants of COVID-19 are still affecting, though humans have gained natural immunity and vaccination has helped reduce the effects of virus, it is still a threat. Therefore, it is recommended that Pakistan must devise such policies which could help in managing unforeseen and sudden shocks to economy. FDI inflows is the main engine of economic growth for Pakistan, policy makers must analyze the actions taken by developed countries to control the pandemic situation and try to implement those in time of need. Although the whole concept of globalization has taken a new shape where social distancing has become mandatory, Pakistan must stay prepared for any uncertain situation. The Government should ensure that people follow the guidelines so they can be kept safe from any upcoming pandemic.

6. LIMITATIONS AND FUTURE DIRECTIONS

Since COVID-19 took a shape of global pandemic in December 2019, enough data is not available to perform a time series analysis which act as a limitation to this study as it is being conducted in June 2022. Also, the pandemic is not over, the current results may vary if same technique is applied after few more months to check the relationship. Regarding future research, this area has a lot of potential owing to rapidly changing conditions and availability of more data.

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