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The Importance of Trade Openness and Inflation for Attracting Foreign Direct Investment in GCC Countries

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Abstract:

Purpose: *This paper examines the importance of trade openness for attracting foreign direct investment (FDI) inflows, for the GCC economies (Kingdom of Saudi Arabia, United Arab Emirates, Oman, Qatar, Kuwait and Bahrain) covering the period 1995–2018, using panel VAR model.*
Design/methodology/approach: *It provides a direct test of causality between FDI inflows, trade openness, GDP per capita, and inflation.*
Findings: *The main empirical findings of the panel analysis reveal that in the long run, trade openness contributes positively to the inflow of FDI in the GCC economies. The panel causality analysis shows that there is a unidirectional causal relationship running from trade openness and inflation to FDI, whereas no causality was traced with other variables.*
Practical Implications: *The panel long-run estimation suggests that trade openness, have positive impact on FDI inflow confirming the results.*
Originality value: *The paper investigates the effect of trade openness, and inflation on FDI inflows in GCC economies by using panel data for the period 1995-2018.*

Keywords: *FDI, Openness, Panel VAR, GCC.*

Paper Type: *Research article.*

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1. Introduction

Foreign direct investment (FDI) is very crucial for the economic development of any country, and it has been a subject of interest in the Gulf Cooperation Council (GCC) countries, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. These countries are heavily dependent on oil and recently started to diversify their economies to attract more FDI in various economic sectors.

According to the IMF (2018) the diversification of the GCC economies, should be supported by greater trade openness and higher FDI. Such factors can support higher, sustained inclusive growth by improving the allocation of resources across sectors and producers, creating jobs, triggering technology spillovers, promoting knowledge, creating a more competitive business environment, and enhancing productivity (IMF, 2018; World Bank, 2019).

The GCC countries are open to trade, but much less to FDI. The GCC external trade has been expanding robustly, while FDI inflows have stalled in recent years despite policy and regulations efforts taken to reduce administrative barriers and provide incentives to attract more FDI.

Boosting economic diversity and attracting more FDI requires a supportive business environment. Policy priorities are to upgrade human capital, increase productivity and competitiveness, improve the business climate, and reduce remaining barriers to foreign trade and investment. Specifically, continued reforms in the following areas will be important: Human capital development, labor market reforms, legal frameworks, and business climate reforms focus on further liberalizing foreign ownership regulations and strengthening corporate governance; and on further reducing non-tariff trade barriers by streamlining and automating border procedures and streamlining administrative processes for issuing permits (World Bank, 2019; UNCTAD, 2019).

Worldwide, FDI dropped by up to 40 percent in 2020 from $1.54 trillion during 2019 and expected to decrease from 5 to 10 percent in 2021. However, the investment inflows to the developing countries rose by 2 percent with a record increase of 54 percent in the share of global FDI according to 2019 world investment report (UNCTAD, 2019). Among the gulf countries, Saudi Arabia was the top rankers in the list of FDI during 2018 with FDI inflows of US$3.2 billion, the reason for the increase of FDI inflows in Saudi Arabia from $1.4 billion in 2017 to $3.2 billion in 2018 is solely due to the economic diversification prioritizing FDI (UNCTAD, 2019).

The FDI inflow to any country will benefit both the investing entity and hosting country government enhancing its economic growth (Kizilkaya, Ay, and Akar, 2016; Salahuddin, Gow, and Ozturk, 2015). In the recent years, FDI inflows in the GCC have been hindered, despite reduction in the administrative barriers (GCC-STAT, 2018). Reducing these barriers, broaden and improve their export bases leading them

to well integrate into global value chains and make their economies more productive (IMF, 2017b).

These countries have implemented reforms in its capital market for aligning financial liberalization requirements in the respective countries and actively promoted their image as an attractive business destination increasing the flow of foreign direct investment in GCC countries (Hassan Khayat, 2020). Majority of studies have integrated trade openness to higher per capita income (Feyrer, 2009; Cerdeiro and Komaromi, 2017) and FDI can enhance economic growth by activating technology spillovers, promoting knowledge, generating a competitive business environment, and strengthening productivity (OECD, 2002; WEF, 2013).

Although some of the GCC countries like the United Arab Emirates (UAE) have created special economic zones with liberalized regulations and well-established infrastructure, outside these zones openness to foreign entry varies. Among the GCC members, UAE and Bahrain are the most liberal and Kuwait and Saudi Arabia the most restricted (GCC-STAT, 2018). Studies have proved that Sultanate of Oman have promoted foreign direct investments by introducing favorable government policies and laws, reduced tax rates, creating free zones, business incubators etc., (Pauceanu, 2016).

The study conducted by Hassan Khayat (2020) reported that trade openness, GDP constant as a proxy for market size, high inflation, and investment profile as a measure of institutional quality, are the main determinants of FDI inflows into the MENA economies. However a study conducted by (Alshamsi, Hussin, and Azam, 2015) indicates that inflation has no significant effect on FDI inflows whereas GDP per capita proxy used for market size has a significant influence on FDI inflows.

Eissa and Elgammal (2020) in their research based on the panel data of the six countries of the GCC concluded the existence of the strong nexus between market growth, trade openness, inflation, infrastructure, oil price and FDI.

The implementation of new strategies by GCC countries increases FDI flows which in turn has estimated the economic growth to 2.2 percent in 2020 and 2.6 percent in 2021. Due to the implementation of policy reforms, the business environment in the GCC has improved immensely as reflected in doing business indicators (World Bank Group, 2020).

The relationship between FDI and economic growth is a well-studied subject in the development economics literature, shown in terms of both theoretical and empirical approach. Recently, renewed interest in growth determinants and the considerable research on externality-led growth, with the advent of endogenous growth theories (Barro, 1991; Barro and Sala-i-Martin, 1995), made it more plausible to conclude FDI as one of the determinants of long run economic growth (Fetahi-Vehapi *et al.*, 2015; Owusu-Nantwi and Erickson, 2019; Zezethu and Andrew, 2019).

There are debates among the researchers, whether FDI encourages economic growth or not. FDI is being vital component of elucidation to the problem of scarce local capital and overall low productivity in many developing countries (De Mello, 1999). Hence, the flow of foreign direct investment is argued to be a potential growth-enhancing variable in the host country.

Carkovic and Levine (2002) shows that there is no robust impact from FDI on growth if country-specific level differences, endogeneity of FDI inflows and convergence effects are taken into account. This is also supported by Akinlo (2004), who finds both private capital and foreign capital have no considerable impact on economic growth.

The economic situation in GCC countries are now under pressure to promptness up their productivity in order to compete in the global market. The process of initiation has been started after economic reforms in the region during the 2000s; in order to make an attempt for a systematic shift towards an open economy along with privatization of a large segment of the economy. The removals of quantitative barriers in a phased manner, applying the suitable development policies, have opened up the GCC economy to international market forces which has led to the rapid emergence of a highly competitive environment; especially in the industrial and services sector.

This has emphasized the role of continuous improvement in productivity, efficiency and technology of the different sectors in the GCC countries. The effects of FDI although are confirmed as positive for most of the countries, but the degree of such impact depends on the absorptive capacity of host country, which includes the level of human capital, infrastructure, financial and institutional development and trade policies (Makki and Somwaru, 2004).

The objective of this paper is to revisit the determinants of FDI in the GCC countries; examines the importance of trade openness for attracting (FDI) inflows, using GCC economies for the period 1995-2018.

The rest of the paper is organized as follows: section two describes literature review, section three provides data sources and methodology, section four analyses the results, and final section provides conclusion.

2. Literature Review

There exists a myriad of literature on FDI inflows and it is considered to be one of the most important indicators for the realization of diversification of economy as it plays an important role in the economic growth, especially in developing countries (Zekarias, 2016; Pegkas, 2015; and Tang, 2015).

Several literatures discuss the various determinants of FDI. The approach towards the identification and empirical analysis of the determinants of FDI can be classified into two parts: production function approach and time series approach. The production

function approach focuses on the supply potential of an economy and has the advantage of giving a more direct link to economic theory. However, the disadvantage is that it requires assumptions on the functional form of the production technology, returns to scale, trend technical progress and the representative utilization of production factors. The time series approach is popular for estimating the process that underlies some output, or for forecasting from some observed behavior over time.

Time series analysis comprises methods for analyzing time series data in order to extract meaningful statistics and other characteristics of the data. This paper intends to concentrate on the time series approach for identification and empirical analysis of the determinants of foreign direct investment. There have been several research works on the time series analysis approach regarding the determinants of FDI. Some of the major literatures are discussed here as follows.

De Vita and Kyaw (2008), having study on 32 developing countries, indicated that while for FDI flows to developing countries domestic productivity growth is the dominant determinant, for portfolio flows, domestic money growth is the major 'pull factor'. Behera and Parida (2010) analyzed the spillover effect of FDI and determinants of FDI across Indian manufacturing industries. By using Pedroni cointegration tests, they found the long-run relationship between endogenous variables and explanatory variables, which further added to technology spillovers across Indian manufacturing industries. The study found that labor productivity and market size were the major determinants for the FDI inflows into the Indian manufacturing industries.

This is also supported by the study of Asiedu (2005), who found natural resources and large markets were mainly promote the FDI inflows in the economy. Moreover, the other factors that have substantial impact on FDI inflows were inflation, infrastructure, skilled labor, trade openness, corruption, political stability and reliable legal system.

Ouattara (2005) investigated the determinants of private investments in Senegal and found that public investment and real income positively affect the private investments while the impact of credit to private sector and terms of trade was negative. Carstensen and Toubal (2004) examined the determinants of FDI in Central and European countries and found that traditional determinants like market potential, low relative unit labor costs, skilled workforce and relative endowments had significant and plausible effect. In addition, transition-specific factors like the level and method of privatization and country risk play important roles in determining the flows of FDI.

Anop (2010) have examined the determinants of FDI in real estate in European countries through panel data analysis. The study found that the size of the GDP, human capital and road infrastructure appear to be robust under different specifications. Kok and Ersoy (2009), having an attempt to study the best determinants of FDI in developing countries, found that FDI had strong positive effect on economic progress in the developing countries while the interaction of FDI with the total debt

service/ GDP and inflation had a negative impact. Alba *et al.* (2009) found the evidence that FDI is interdependent over time and under a favorable FDI environment, the exchange rate has a positive and significant effect on the average rate of FDI inflows. This study is somewhat similar to Tang *et al.* (2008), who found that FDI had a complementary relationship with domestic investment.

Jaumotte (2004) found that the market size of a regional trade agreement (RTA) is a determinant of FDI received by countries participating in RTA. A partial negative correlation between the FDI received by RTA countries and that received by non-RTA countries was found that reflects a diversification of FDI from non- RTA to RTA countries. The paper also cited example of FDI benefits that are stimulated from the creation of a regional trade agreement between Algeria, Morocco and Tunisia.

Sahoo (2006) did panel cointegration test on the determinants of FDI in the South Asia. The study found that FDI and its determinants have long run equilibrium relationship. The major determinants of FDI in South Asia are market size, labor force growth, infrastructure index and trade openness. The results of FDI impact on growth show that FDI has a positive and significant impact on growth for four south Asian countries. Other significant factors that contribute to growth are exports, gross domestic capital formation and infrastructure.

Vijayakumar *et al.* (2010) examined the factors determining the FDI inflows in BRICS countries and found that market size, labor cost, infrastructure, currency value and gross capital formation are the potential determinants of FDI. The economic stability and growth prospects (measured by inflation rate and Industrial production respectively), trade openness (measured by the ratio of total trade to GDP) are seems to be the insignificant determinant of FDI inflows of the BRICS countries.

Faeth (2005) examined the determinants of FDI in Australia. FDI inflows are explained using market size, factor costs, transport costs and protection, risk factors, policy variables and other factors, i.e. variables based on a number of different theoretical models. It was found that Australian FDI is driven by longer term considerations and its determinants could not be fully explained by any single theoretical model. Exchange rate appreciation discouraged FDI in the medium-term, but had a positive longer term effect, indicating that FDI is encouraged by a sound economic environment.

There was, however, no evidence that lower corporate tax rates increased FDI inflows. Tsen (2005) examined the determinants of FDI in the manufacturing sector of Malaysia. The results of the cointegration test found that education, infrastructure, market size or current account balance are the determinants of FDI. Increase in inflation and exchange rate decreases the FDI inflow. Sowkut *et al.* (2008) studied the FDI flows in Africa and found that the abundance of natural resources is reported to be positive and significant (supporting the presence of resource-seeking FDI) and is line with Aseidu (2002).

Openness had a positive impact on FDI as well and is in line with the fact that an efficient environment that comes with more openness to trade is likely to attract foreign firms.

The size of the domestic market, stock of human capital, though to a large extent as witnessed by the size of their respective coefficients, played a positive role while political instability and labor cost a negative role in attracting FDI in the markets and the results are consistent with empirical works in the field.

Other empirical studies have used different econometric techniques to estimate the determinants of FDI inflows on different countries (Alharthi, 2018). A study conducted by Asongu *et al.* (2018) on and MINT (Mexico, Indonesia, Nigeria, and Turkey) countries demonstrated that market size, infrastructure availability, and trade openness play significant roles in attracting FDI. Koojaroenprasit (2012) while exploring, the direction of relationship between FDI and growth in South Korea, found that a strong positive role exists between foreign direct investment in the economic growth.

In case of any developing country, employment generation and reduction of balance of payment disequilibrium, improves the standard of living in the host country (Akhtar and Yasin; 2015) and growing economies have attracted more FDI compared to developed nations post world financial crises in 2009 (Shah and Khan, 2016). Another study conducted on South Asian Economies proved that FDI positively and significantly influence the GDP indicating a long as well as short significant causal relationship (Behname, 2012). According to the study conducted by (Teka, 2014), lack of clear policies and regulatory impediments were identified as one of the main factors that have the potential to deter foreign investment in Ethiopia.

Many policy makers and academics claim that FDI has positive effects on the economic growth of the host country, as it is largely ascertained to be a provider of capital, generator of employment and the supplier of foreign currency (Gammoudi *et al.*, 2016). Further it contributes on transfer of capital, advanced technological skills, improvement in the balance of payments, expansion of the tax base, foreign exchange earnings through FDI exports, infrastructural development and integration of the host economy into international markets (Toone, 2013; Akhtar and Yasin, 2015). All these factors have lead the GCC countries to recognize the importance of attracting FDI while adopting new measures aimed at attracting foreign capital and foreign investment.

Trade openness plays a vital role in the economic growth of a country. Its influence in the inflow of foreign direct investment is widely discussed in various research works. Sometimes restrictions on foreign ownership of land can be an encumbrance to FDI. The reasons for this could be because the ownership are limited to areas designated by the government in the case of Bahrain, tourist areas in Oman or areas for housing purposes in Qatar (GCC-STAT, 2018).

According to Jabri (2013), the determinants of FDI inflows to Middle East and North Africa (MENA) region covering the period of 1970-2010 found that trade openness and economic growth had a positive influence on FDI inflows. Although another study (Azad and Khatabi, 2017) inferred that with the exception of Kuwait, the other countries of the GCC supported a positive relationship between trade openness and FDI. However, the countries of the GCC region have liberalized their trade regime and attempted to create an investment friendly environment to benefit from the FDI inflows.

In 2019, economic growth in the GCC weakened with an overall real GDP dropping to 0.8 percent from 2 percent in 2018 (World Bank Group, 2019). The study conducted by (Khan, 2019), to determine the factors contributing FDI in countries of the GCC using a panel data from 1996-2016 found that GDP has a significant and positive impact on FDI, which was already confirmed by Khondoker and Kalirajan (2010).

It further inferred that the Arab Spring affected the FDI negatively and significantly through the period of the study. On average, the GCC countries are estimated to have the potential to attract additional of around 2 percent of GDP (GCC-STAT, 2018). Another study conducted by (Habibi and Karimi, 2017) has proved that higher GDP growth of the countries of the GCC were responsible for the surge in FDI inflows. Javed *et al.* (2012), while investigating the key determinants of FDI in Pakistan over the period of 1973 to 2011 choosing Co-integration and ECM confirmed that GDP, have significant impact on the inflow of FDI in Pakistan.

Studies have considered Inflation as core independent variable to investigate if it has an effect in determining FDI Kiat (2008) explored the effect of inflation on foreign direct investment and its relationship with economic growth in South Africa and the results proved that inflation has affected the FDI which was also confirmed by Javed et al (2012).The study conducted by (Ibrahim and Abdel-Gadir, 2015) identified that inflation rate is a key determinant of FDI. However, another study by Omankhanlen (2011) proved that inflation rate does not have much impact on FDI and Ullah (2012) confirmed that Inflation has positive, but highly insignificant impact on FDI.

Hussein (2009) examined the interaction between foreign direct investment FDI and economic growth in the six GCC countries during the period 1996-2007. The econometric method used in this study is the Ordinary Least Square (OLS). Major findings indicate a weak relationship between FDI and growth for the sample of the GCC.

Almfraji and Almsafir (2014) tested the FDI-growth association in an oil production country. For this end they collected dataset from 1990 to 2010 and they performed VAR Impulse Responses and the Granger Causality test. The result indicates that there a long-run relationship between FDI inflows and the economic growth in Qatar. The main objective of the study of Al Khathlan (2013) is to empirically analyze the role of FDI in the economic growth of Saudi Arabia from 1980 to 2010.

By using the famous Cobb–Douglas production function and performing a co-integration analysis finding indicates that FDI has a positive but insignificant role in economic growth in the country over the long term. However, the Granger causality test implies that domestic capital and government expenditure drive output growth in the economy. This result is also consistent with the IRFs over a time horizon of 10 years.

Hichem Dkhili and Lassad Ben Dhiab (2018) indicated that their study aims to explain the role of economic freedom in attracting foreign investments and thus raising the level of economic growth. Through a study based on a sample composed of GCC countries. A standard model consisting of GCC countries (Saudi Arabia, United Arab Emirates, Qatar, Kuwait, and Oman) was used during the period from 1995 to 2017.

We based on the analytical descriptive and secondly, we used a multivariate analysis based on the panel unit root test, the cointegration and finally the regression fully modified ordinary least squares and dynamic ordinary least squares following the existence of a long-term integration, which includes the modern standard methods to determine the role of economic freedom in raising foreign direct investment and thus economic growth in the second stage. The research findings from GCC countries support the literature, suggesting that there are indeed some indications that greater levels of economic freedom support higher rates of economic growth in a country.

3. Data and Methodology

Using annual data set of 6 GCC countries from 1995-2018, the variables that used in this study are FDI, GDP Per capita (indicates market size), Inflation (GDP deflator), and Trade Openness, the data are obtained from IMF's International Financial Statistics database and World databank statistics, the variables are expressed in natural logarithms.

To examine the determinants of FDI and the role of trade openness in GCCC countries, we follow the standard methods of Granger causality test (as in, for example, Granger (1988) and Granger (1981)). But the precondition to Granger causality test is integration and cointegration properties of the relevant time series variables (Johansen, 1988). That means there are three tests through which we can study the determinants of FDI: first, test for order of integration; second, test for cointegration; third, test for Granger causality. We apply all these three tests at the panel level. These techniques are described below.

3.1 Unit Root Test

The Augmented Dickey Fuller (Dickey *et al.,* 1981) unit root test is generally used to detect the order of integration of time series variables at the individual country analysis. But the traditional Augmented Dickey Fuller (ADF) unit root test suffers the problem of low power in rejecting the null hypothesis of stationarity of the time series,

particularly for small size of data. To resolve this issue, we use LLC (Levin *et al.*, 2002) and IPS (Im *et al.*, 2003) panel unit root tests. These two tests have higher power than the unit root test based on individual time series. Both LLC and IPS are very popular and both are based on the lines of ADF principles.

The LLC assumes homogeneity in the dynamics of the autoregressive coefficients for all panel numbers, while IPS assumes heterogeneity in these dynamics. LLC proposes a panel-base augmented Dickey-Fuller (ADF) test with a panel setting and restricts γ to keep it identical across cross- sectional regions. The test imposes homogeneity on the autoregressive coefficient that indicates the presence or absence of a unit root whereas the intercept and trend may vary across individual series. The model allows heterogeneity only in the intercept and is given by

$$\Delta Y_{i,t} = \alpha_i + \gamma Y_{i,t-i} + \sum_{j=1}^{p_i} \beta_j \Delta Y_{i,t-j} + \varepsilon_{i,t} \tag{1}$$

where $Y_{i,t}$ is a series for panel member (country) i (i = 1, 2,..N) over period t (t = 1, 2, …T), and pi is the number of lags in the ADF regression. The error term ($\varepsilon_{i,t}$) are assumed to be IID (0, σ^2) and to be independent across the units of the sample. The model allows for fixed effects, unit specific time trends, and common time effects.

The coefficient of the lagged dependent variable is restricted to be homogenous across all units of the panel. Hence, the null hypothesis of non-stationary is stated as:

H_0: $\gamma_i = 0$, is tested against the alternative,
H_A: $\gamma_i = \gamma < 0$ for all i

The fixed effect model in equation (1) is based on the usual t-statistic.

$$t_\gamma = \frac{\hat{\gamma}}{s.e(\hat{\gamma})} \tag{2}$$

where, γ is restricted by being kept identical across members of the panel under both the null and alternative hypothesis.

The IPS test begins by specifying a separate ADF regression for each cross section (country):

$$\Delta Y_{i,t} = \alpha_i + \gamma_i Y_{i,t-i} + \sum_{j=1}^{p_i} \beta_{i,j} \Delta Y_{i,t-j} + \varepsilon_{i,t} \tag{3}$$

Where series y_{it} (i = 1, 2,…,N; t = 1, 2, …, T) is the series for panel member (country) i over period, pi is the number of lags in the ADF regression and the error terms εi, t are assumed to be IID (0, σ_i^2) for all i and t. Both γ_i and the lag order β in equation (4) are allowed to vary across sections (countries). IPS relaxes the assumption of homogeneity of the coefficients of the lagged dependent variable. It tests the null hypothesis that each series in the panel has a unit root for all cross-section units against the alternative that at least one of the series is stationary.

H_0: $\gamma_i = 0$ for all i, is tested against the alternative,
H_A: $\gamma_i = \gamma_i < 0$ for i = 1, 2, …., N_1, $\gamma_i = 0$,
i = N_1 +1, N_1 +2, …, N

The alternative hypothesis simply implies that some or all of the individual series are stationary. IPS developed two test statistics and called them the LM-bar and the t-bar tests. The IPS t-bar statistic is calculated using the average of the individual Dickey-Fuller τ statics shown below.

$$\bar{t} = \frac{1}{N}\sum_{i=1}^{N}\tau_i \tag{4}$$

Assuming that the cross sections are independent, IPS proposes the use of the standardized t-bar statistic.

$$\bar{Z} = \frac{\sqrt{N}(\bar{t} - E(\bar{t}))}{\sqrt{Var(\bar{t})}} \tag{5}$$

The term $E(\bar{t})$ and $Var(\bar{t})$ here are the mean and variance of τ statistic.

$$\tau_i = \frac{\hat{\gamma}_i}{s.e(\hat{\gamma}_i)} \tag{6}$$

3.2 Cointegration Test

Once the order of stationarity has been defined, our next step is to apply panel cointegration test. Granger (1988) showed that when the time series become stationary only after being differenced once, they might have linear combinations that are stationary without differencing. Such series are usually called cointegrated. If integration of order one is implied, the next step is to use cointegartion analysis in order to establish whether there exists a long run relationship among the set of the integrated variables. In this investigation, the Johansen (Johansen, 1988) cointegration test is deployed first to test the existence of

long run equilibrium relationship between health expenditure and economic growth at the individual state level. The test follows the estimation of following equation:

$$Y_{it} = \beta_{i0} + \beta_{i1} X_{i1t} + \beta_{i2} X_{i2t} + \ldots + \beta_{ik} X_{ikt} + \varepsilon_{it} \quad (7)$$

But we note that the above test could not deal with panel settings. So, Pedroni (2004) panel cointegration has been used for the same. The test starts with the estimation of parameters of the following panel regression, and

$$Y_{i,t} = \alpha_i + \sum_{j=1}^{P_i} \beta_{ji} X_{jit} + \varepsilon_{it}$$

With:

$$\varepsilon_{it} = \rho_i \varepsilon_{i(t-1)} + w_{it} \quad (8)$$

where Y_{it} and X_{jit} are the observable variables with dimension of (N* T)) x 1 and (N* T) x m respectively; ε_{it} represents the disturbance term from the panel regression; αi would allow for the possibility of country- specific fixed effects and the coefficients of βji would allow for the variation across individual countries.

The null hypothesis of no cointegration of the pooled (within-dimension) estimation is H_0: $\rho_i = 1$ for all i against H_0: $\rho_i = \rho < 1$ for some i.

The null hypothesis of no-cointegration of the pooled (between-dimension) estimation is H_0: $\rho_i = 1$ for all i against H_0: $\rho_i < 1$.

Pedroni suggested two types of tests to determine the existence of heterogeneity of the cointegration vector. First, the test uses within- dimension approach (i.e., panel test). It includes four statistics that are panel v- statistic, panel ρ- statistic, panel PP-statistic and panel ADF- statistic (Pedroni, 1999).

These statistics pool the autoregressive coefficients across different members for the unit root tests to be performed on the estimated residuals. Second, the test based on between-dimensional approaches (group test) includes three statistics that are group ρ-statistic, group PP-statistic and group ADF-statistic (Pedroni, 2004). These statistics are calculated as follows:

Panel v- statistic

$$Z_v = \left[\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{\varepsilon}_{it-1}^{2} \right]^{-1} \quad (9)$$

Panel ρ- statistic

$$Z_{\rho} = \left[\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{\varepsilon}_{it-1}^{2} \right]^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^{-2} \left(\hat{\varepsilon}_{it-1} \Delta \hat{\varepsilon}_{it} - \hat{\lambda}_{i} \right) \tag{10}$$

Panel PP- statistic

$$Z_{t} = \left[\hat{\sigma}^{2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{\varepsilon}_{it-1}^{2} \right]^{-0.5} \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^{-2} \left(\hat{\varepsilon}_{it-1} \Delta \hat{\varepsilon}_{it} - \hat{\lambda}_{i} \right) \tag{11}$$

Panel ADF- statistic

$$Z_{t}^{*} = \left[\hat{s}^{*2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{\varepsilon}_{it-1}^{*2} \right]^{-0.5} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{\varepsilon}_{it-1}^{*} \Delta \hat{\varepsilon}_{it}^{*} \tag{12}$$

Group ρ- statistic

$$\tilde{Z}_{\rho} = \sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{\varepsilon}_{it-1}^{2} \right)^{-1} \sum_{t=1}^{T} \left(\hat{\varepsilon}_{it-1} \Delta \hat{\varepsilon}_{it} - \hat{\lambda}_{i} \right) \tag{13}$$

Group PP- statistic

$$\tilde{Z}_{t} = \sum_{i=1}^{N} \left(\hat{\sigma}^{2} \sum_{t=1}^{T} \hat{\varepsilon}_{it-1}^{2} \right)^{-0.5} \sum_{t=1}^{T} \left(\hat{\varepsilon}_{it-1} \Delta \hat{\varepsilon}_{it} - \hat{\lambda}_{i} \right) \tag{14}$$

Group ADF- statistic

$$\tilde{Z}_{t}^{*} = \sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{s}_{i}^{2} \hat{\varepsilon}_{it-1}^{*2} \right)^{-0.5} \sum_{t=1}^{T} \left(\hat{\varepsilon}_{it-1}^{*} \Delta \hat{\varepsilon}_{it}^{*} \right) \tag{15}$$

where, $\hat{\varepsilon}_{it}$ it is the estimated residual from equation (10) and $\hat{L}_{11i}^{-2}$ is the estimated long run covariance matrix are the long run and contemporaneous variances for individual i. All seven tests are based asymptotically standard normal distributions given by the respective panel/ group cointegration statistic.

The panel v is a one sided test where large positive values reject the null hypothesis of no cointegration. The other remaining statistics diverge to negative infinite, which means that large negative values reject the null hypothesis.

Each of these tests is able to accommodate individual specific short-run dynamics, individual specific fixed effects and deterministic trends as well as individual specific slope coefficients (Pedroni, 2004).

3.3 Granger Causality Test

The following panel VAR (Holtz- Eakin *et al.*, 1988) is considered:

Model 1: If the time series variables are I(1) and not cointegrated, we can use the following causality model:

$$\Delta fdi_{it} = \eta_i + \sum_{k=1}^{n} \alpha_{1ik} \Delta fdi_{it-k} + \sum_{k=1}^{n} \alpha_{1ik} \Delta opp_{it-k} + \sum_{k=1}^{n} \alpha_{1ik} \Delta gdppc_{it-k} + \sum_{k=1}^{n} \alpha_{1ik} \Delta inf_{it-k} + \Delta \varepsilon_{it} \quad (16)$$

where, *fdi* is Foreign Direct Investment; *opp* is Trade Openness; *inf* is Inflation rate, *gdppc* is Per Capita Gross Domestic Product.

Model 2: If the time series variables are I(1) and cointegrated, then the causality is tested by using error correction model. This is represented as follows:

$$\Delta fdi_{it} = \eta_i + \sum_{k=1}^{n} \alpha_{1ik} \Delta fdi_{it-k} + \sum_{k=1}^{n} \alpha_{1ik} \Delta opp_{it-k} + \sum_{k=1}^{n} \alpha_{1ik} \Delta gdppc_{it-k} + \sum_{k=1}^{n} \alpha_{1ik} \Delta inf_{it-k} + \Gamma_i \, EC_{1it-k} + \Delta \varepsilon_{it} \quad (17)$$

where EC is the error correction term, obtained from the cointegrating equation.

4. Results and Discussion

In this section we study the Granger causality among *fdi, opp, inf* and *gdppc*. The analysis starts with the stationarity properties of the data series. This is the prime requirement for cointegration and causality test. The FDI inflow and high rate of variation between the GCC countries during the period under study Saudi Arabia is leading FDI inflow compare with other GCC countries.

Table 1 presents descriptive statistics of the variables, Table 2 presents the results of unit root tests. The results find that time series variables, such as *fdi, opp, inf,* per capita gross domestic product, are having unit roots at the level data. This is because the estimated unit root test statistics cannot reject the null hypothesis of non-stationarity at 5% level of significance. However, they are stationary at the first difference level, as the null hypothesis of non-stationarity is rejected at 5% level of significance (Table 2). This confirms that the variables are integrated of order one, I(1).

The results of the LLC and IPS panel unit root tests at levels and first differences are shown in Table 2, which confirms that all the variables in the study are non-stationary at the level but stationary at first difference.

Table 1. *Descriptive Statistics of all the variables*

Statistic	***Fdi***	***gdppc***	***Inf***	***opp***
Mean	3250.287	27652.68	2.599391	104.6598
Median	823.0000	22331.32	2.195363	94.01365
Maximum	39455.86	85076.15	15.05015	191.8721
Minimum	-2186.264	6254.984	-4.863278	56.08838
Std. Dev.	6367.429	18028.90	3.095524	30.98449
Skewness	3.287542	1.334128	1.619161	0.984464
Kurtosis	16.01192	4.520847	6.746358	3.072916
Jarque-Bera	1275.250	56.59538	147.1315	23.29196

Source: *Own study.*

This reveals that all the variables are first difference stationary. Having established that all variables are integrated at an order one, the next step is to apply cointegration test. The Pedroni's panel cointegration technique is applied to examine the cointegration among the variables. The results of the panel cointegration using seven-test statistics are presented in table 3. The results confirmed that there is long run relationship among inward FDI, trade openness, inflation, and GDP per capita in both the model.

Table 2. *Unit Root Test*

Variable	**Test**	**Level**		**First Difference**	
		Statistic	Prob.**	Statistic	Prob.**
Fdi	Levin, Lin & Chu t*	-0.49848	0.3091	-2.68094	0.0037
	Im, Pesaran and Shin W-stat	-1.06144	0.1442	-3.83061	0.0001
	ADF - Fisher Chi-square	16.0193	0.1904	36.4338	0.0003
	PP - Fisher Chi-square	15.3998	0.2203	71.2433	0.0000
Opp	Levin, Lin & Chu t*	-1.33217	0.0914	-6.12485	0.0000
	Im, Pesaran and Shin W-stat	-1.23847	0.1078	-5.33370	0.0000
	ADF - Fisher Chi-square	19.0644	0.0870	50.2051	0.0000
	PP - Fisher Chi-square	11.4027	0.4948	62.7061	0.0000
Gdppc	Levin, Lin & Chu t*	-1.03217	0.1510	-6.10399	0.0000
	Im, Pesaran and Shin W-stat	0.61887	0.7320	-4.89846	0.0000
	ADF - Fisher Chi-square	6.22640	0.9042	46.0431	0.0000
	PP - Fisher Chi-square	5.86537	0.9227	80.5656	0.0000
Inf	Levin, Lin & Chu t*	-0.54411	0.2932	-6.48643	0.0000
	Im, Pesaran and Shin W-stat	-1.27804	0.1006	-5.93656	0.0000

	ADF - Fisher Chi-square	15.7978	0.2007	56.2721	0.0000
	PP - Fisher Chi-square	22.7077	0.0303	110.896	0.0000

Note: *** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.*
Source: *Own study.*

Having established that all variables are integrated at an order one, the next step is to apply cointegration test. The Pedroni's panel cointegration technique is applied to examine the cointegration among the variables. The results of the panel cointegration using seven-test statistics are presented in Table (3).

Table 3. *Pedroni Residual Cointegration Test*

	Statistic	**Prob.**	**Statistic**	**Prob.**
Panel v-Statistic	0.318244	0.3752	-0.489992	0.6879
Panel rho-Statistic	0.272691	0.6075	-0.912142	0.1808
Panel PP-Statistic	-2.208491	0.0136	-3.893307	0.0000
Panel ADF-Statistic	-2.905305	0.0018	-0.737435	0.2304
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic		Prob.	
Group rho-Statistic	-0.003762		0.4985	
Group PP-Statistic	-3.522539		0.0002	
Group ADF-Statistic	-0.486129		0.3134	

Source: *Own study.*

Using ARDL methods to investigate the degree of long-run coefficient. The results of ARDL is presented in Table 4. The coefficient of ARDL suggests that the coefficient of the long run of trade openness is positively associated with FDI at 5 percent level of significant inflation and *gdp* per capita which are negatively influencing FDI.

Table 4. *ARDL Model Long Run and Short Run Equation, ARDL(4, 4, 4, 4)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long Run Equation				
opn	0.056672	0.001704	33.26328	0.0000
gpercapt	-1.303689	0.295453	-4.412511	0.0001
inf	0.357779	0.036099	9.911062	0.0000
Short Run Equation				
Cointeq01	-0.324633	0.190379	-1.705193	0.0961
d(fdi(-1))	-0.370418	0.148083	-2.501425	0.0167
d(fdi(-2))	0.114027	0.364102	0.313173	0.7558
d(fdi(-3))	0.214829	0.337382	0.636752	0.5280
d(opn)	0.027122	0.022074	1.228698	0.2265
d(opn(-1))	0.009631	0.015720	0.612636	0.5437
d(opn(-2))	0.069733	0.040862	1.706533	0.0959
d(opn(-3))	0.061502	0.034534	1.780917	0.0827

d(gdppc)	-0.718178	1.054458	-0.681088	0.4998
d(gdppc t(-1))	-0.067243	0.361209	-0.186162	0.8533
d(gdppc (-2))	0.316836	0.370690	0.854722	0.3979
d(l gdppc (-3))	-1.637532	1.137972	-1.438991	0.1581
d(inf)	-0.057805	0.041779	-1.383578	0.1744
d(inf(-1))	-0.090319	0.046411	-1.946063	0.0589
d(inf(-2))	-0.122026	0.070236	-1.737369	0.0902
d(inf(-3))	-0.005626	0.058515	-0.096139	0.9239
c	2.655402	1.537973	1.726559	0.0922
Mean dependent var	0.149684	S.D. dependent var		0.364348
S.E. of regression	0.146913	Akaike info criterion		-1.117779
Sum squared resid	0.841752	Schwarz criterion		1.047709
Log likelihood	185.4801	Hannan-Quinn criter.		-0.237847

Note: **p-values and any subsequent tests do not account for model selection.*
Source: *Own study.*

According to the results shown in Table 5 for Dumitrescu Hurlin Panel Causality Tests, a unidirectional causal relationship was found from FDI flow to GDP per capita, and from FDI to inflation between the years of 1995 and 2018 in 6 GCC countries. No causal relationships were found between FDI and GDP per Capita or Inflation and openness for the same period. A relationship of unidirectional causality was found from FDI to Inflation. Finally, unidirectional causal relationships were found from FDI to Inflation.

Table 5. *Pairwise Dumitrescu Hurlin Panel Causality Tests*

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
d(opn) does not homogeneously cause d(fdiflow)	5.92772	3.38006	0.0007
d(fdiflow) does not homogeneously cause d(opn)	1.25688	-0.95484	0.3397
d(inf) does not homogeneously cause d(fdiflow)	5.21786	2.72126	0.0065
d(fdiflow) does not homogeneously cause d(inflation)	9.31528	6.52398	7.E-11
d(gdppc) does not homogeneously cause d(fdiflow)	2.65089	0.33891	0.7347
d(fdiflow) does not homogeneously cause d(gdppc)	6.66021	4.05987	5.E-05
d(inflation) does not homogeneously cause d(opn)	2.62302	0.31304	0.7542
d(opn) does not homogeneously cause d(inf)	3.27915	0.92198	0.3565
d(gdppc) does not homogeneously cause d(opn)	1.36354	-0.85585	0.3921
d(opn) does not homogeneously cause d(gdppc)	1.96216	-0.30028	0.7640
d(gdppc) does not homogeneously cause d(inflation)	2.16962	-0.10774	0.9142
d(inflation) does not homogeneously cause d(gdppc)	1.77886	-0.47040	0.6381

Source: *Own study.*

5. Conclusions

The objective of this paper is to investigate the effect of trade openness, inflation on FDI inflows in GCC economies by using panel data for the period 1995-2018. The panel long-run estimation suggests that trade openness, have positive impact on FDI

inflow confirming the results of Eissa and Elagammal (2020).

Results obtained from data analysis indicate a negative relationship between FDI inflow and economic growth in the panel of the GCC, contradicting and there is No causal relationships were found between FDI and economic growth or inflation and openness for the same period. A relationship of unidirectional causality was found from FDI to Inflation. Finally, unidirectional causal relationships were found from FDI to Inflation.

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Annexes:

Short Run Coefficients by GCC countries:

Short Run Coefficients Bahrain

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.125363	0.001501	-83.49637	0.0000
D(FDIFLOW(-1))	-0.026788	0.197455	-0.135667	0.9007
D(FDIFLOW(-2))	-0.436434	0.219728	-1.986250	0.1412
D(FDIFLOW(-3))	0.122023	0.198964	0.613293	0.5830
D(OPN)	2.825768	135.8139	0.020806	0.9847
D(OPN(-1))	-35.82701	254.6945	-0.140667	0.8970
D(OPN(-2))	-14.46951	599.8536	-0.024122	0.9823
D(OPN(-3))	-78.07587	1157.455	-0.067455	0.9505
D(INFLATION)	30.96740	52921.38	0.000585	0.9996
D(INFLATION(-1))	145.9476	13308.11	0.010967	0.9919
D(INFLATION(-2))	196.8062	15200.95	0.012947	0.9905
D(INFLATION(-3))	28.09259	12706.73	0.002211	0.9984
D(GDPPC)	0.291839	0.013563	21.51743	0.0002
D(GDPPC(-1))	0.214978	0.085580	2.512013	0.0868
D(GDPPC(-2))	0.515168	0.029029	17.74644	0.0004
D(GDPPC(-3))	0.373696	0.024165	15.46443	0.0006
C	-9759.738	7245529.	-0.001347	0.9990

Short Run Coefficients Kuwait

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.746673	0.004004	-186.4742	0.0000
D(FDIFLOW(-1))	1.791031	0.019629	91.24495	0.0000
D(FDIFLOW(-2))	0.325754	0.005005	65.08846	0.0000
D(FDIFLOW(-3))	-0.702470	0.004218	-166.5360	0.0000
D(OPN)	-269.4075	400.9817	-0.671870	0.5498
D(OPN(-1))	-214.7266	351.6404	-0.610642	0.5846
D(OPN(-2))	-322.4517	475.6413	-0.677930	0.5464
D(OPN(-3))	-294.0263	282.5079	-1.040772	0.3745
D(INFLATION)	-237.6967	2090.559	-0.113700	0.9167
D(INFLATION(-1))	-236.2516	1745.593	-0.135342	0.9009
D(INFLATION(-2))	-124.0369	347.2792	-0.357168	0.7446
D(INFLATION(-3))	-414.4214	1059.316	-0.391216	0.7218
D(GDPPC)	0.119751	0.000187	639.8701	0.0000
D(GDPPC(-1))	0.109009	0.000110	991.1377	0.0000
D(GDPPC(-2))	0.084613	9.52E-05	889.0622	0.0000
D(GDPPC(-3))	0.308727	0.000320	964.1010	0.0000
C	-32765.10	5425265.	-0.006039	0.9956

Short Run Coefficients Oman

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.031202	0.001439	-21.67818	0.0002
D(FDIFLOW(-1))	-1.280667	0.036896	-34.70999	0.0001
D(FDIFLOW(-2))	-2.336257	0.155606	-15.01395	0.0006
D(FDIFLOW(-3))	-4.459170	0.640303	-6.964153	0.0061
D(OPN)	-98.01850	903.1423	-0.108531	0.9204
D(OPN(-1))	1.648169	1060.013	0.001555	0.9989
D(OPN(-2))	-109.9871	520.2934	-0.211394	0.8461
D(OPN(-3))	23.98106	562.6946	0.042618	0.9687
D(INFLATION)	490.1668	19366.20	0.025310	0.9814
D(INFLATION(-1))	308.6552	10917.62	0.028271	0.9792
D(INFLATION(-2))	1047.717	41223.92	0.025415	0.9813
D(INFLATION(-3))	247.9881	14849.11	0.016701	0.9877
D(GDPPC)	0.134693	0.021903	6.149579	0.0087
D(GDPPC(-1))	0.253806	0.015970	15.89253	0.0005
D(GDPPC(-2))	0.399986	0.025541	15.66080	0.0006
D(GDPPC(-3))	0.550646	0.038878	14.16346	0.0008
C	-1804.155	3091784.	-0.000584	0.9996

Short Run Coefficients Qatar

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-1.058977	0.009448	-112.0851	0.0000
D(FDIFLOW(-1))	-1.107343	0.018224	-60.76358	0.0000
D(FDIFLOW(-2))	0.035969	0.011076	3.247442	0.0476
D(FDIFLOW(-3))	1.486073	0.018960	78.38047	0.0000
D(OPN)	-262.7314	1246.613	-0.210756	0.8466
D(OPN(-1))	-447.9057	1188.469	-0.376876	0.7313
D(OPN(-2))	-360.9973	788.0139	-0.458110	0.6780
D(OPN(-3))	-198.6020	731.4762	-0.271509	0.8036
D(INFLATION)	-12.30903	2018.637	-0.006098	0.9955
D(INFLATION(-1))	-32.18681	3532.295	-0.009112	0.9933
D(INFLATION(-2))	123.7955	1592.023	0.077760	0.9429
D(INFLATION(-3))	538.8620	2724.239	0.197803	0.8558
D(GDPPC)	0.059915	0.000206	290.4179	0.0000
D(GDPPC(-1))	0.096878	0.000340	285.2367	0.0000
D(GDPPC(-2))	0.251370	0.000484	518.8841	0.0000
D(GDPPC(-3))	0.116510	0.000183	637.7758	0.0000
C	-45098.67	12403545	-0.003636	0.9973

Short Run Coefficients Saudi Arabia

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.981380	0.126257	-7.772900	0.0044
D(FDIFLOW(-1))	0.584004	0.051068	11.43582	0.0014
D(FDIFLOW(-2))	0.496394	0.091446	5.428293	0.0123
D(FDIFLOW(-3))	0.046946	0.058359	0.804440	0.4800
D(OPN)	-1335.297	175643.6	-0.007602	0.9944
D(OPN(-1))	-262.6996	181249.5	-0.001449	0.9989
D(OPN(-2))	-317.5619	77708.75	-0.004087	0.9970
D(OPN(-3))	-6.529100	79992.91	-8.16E-05	0.9999
D(INFLATION)	682.0338	219780.2	0.003103	0.9977
D(INFLATION(-1))	133.3374	442768.2	0.000301	0.9998
D(INFLATION(-2))	1118.913	264844.7	0.004225	0.9969
D(INFLATION(-3))	-326.5918	265681.1	-0.001229	0.9991
D(GDPPC)	2.274635	0.613430	3.708062	0.0341
D(GDPPC(-1))	1.911063	1.198768	1.594189	0.2092
D(GDPPC(-2))	0.429980	0.832826	0.516291	0.6413
D(GDPPC(-3))	0.938390	0.365866	2.564844	0.0829
C	-28776.78	1.22E+08	-0.000236	0.9998

Short Run Coefficients UAE

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	0.009019	0.002195	4.109064	0.0261
D(FDIFLOW(-1))	-0.234080	0.433087	-0.540492	0.6264
D(FDIFLOW(-2))	-0.131213	1.483631	-0.088441	0.9351
D(FDIFLOW(-3))	0.109049	0.100231	1.087981	0.3562
D(OPN)	242.5841	24020.80	0.010099	0.9926
D(OPN(-1))	-351.5161	68713.37	-0.005116	0.9962
D(OPN(-2))	543.0072	155139.0	0.003500	0.9974
D(OPN(-3))	-176.3557	56589.62	-0.003116	0.9977
D(INFLATION)	604.7472	937020.3	0.000645	0.9995
D(INFLATION(-1))	66.09572	2694254.	2.45E-05	1.0000
D(INFLATION(-2))	179.4539	595802.3	0.000301	0.9998
D(INFLATION(-3))	-47.32360	1281683.	-3.69E-05	1.0000
D(GDPPC)	0.187563	0.135307	1.386200	0.2597
D(GDPPC(-1))	-0.484047	0.152384	-3.176501	0.0502
D(GDPPC(-2))	-0.010662	0.185041	-0.057621	0.9577
D(GDPPC(-3))	-0.931756	0.121470	-7.670669	0.0046
C	725.6147	9775746.	7.42E-05	0.9999