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Foreign Direct Investment and Economic Growth in the GCC Countries: A Causality Investigation Using Heterogeneous Panel Analysis

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Abstract

This paper uses recent growth theories and econometric techniques to empirically test for the association between foreign direct investment and economic growth in the six countries comprising the Gulf Cooperation Council (GCC). Theoretically, recent endogenous growth models identify FDI as one of the determinants of growth through its role in technological diffusion. However, the endogeneity of FDI makes it possible that economic growth affects the flow of FDI. Results obtained from a heterogeneous panel analysis indicate a bi-directional causality between FDI and GDP in the panel of the GCC. This result supports the endogenous growth hypothesis, at least for this group of countries.

Key words :FDI; Economic Growth; Panel cointegration; Panel causality

JEL classifications :F21; F23; C23; C33

1. Introduction

The relationship between foreign direct investment (FDI) and economic growth is a well-studied subject in the development economics literature, both theoretically and empirically. 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 include FDI as one of the determinants of long run economic growth. The interest in the subject has also grown out of the substantial increase in FDI flow that started in the late 1990's, and led to a wave of research regarding its determinants.

Despite the considerable volume of research on the subject, there is conflicting evidence in the literature regarding the question as to how FDI relates to economic growth. In particular, a two-way interaction has been discussed in the literature of FDI-growth relationship. On one hand, FDI is being seen, by many, as an important element in the solution to the problem of scarce local capital and overall low productivity in many developing countries (De Mello, 1999; Eller, et. al, 2005). Hence, the flow of foreign direct capital is argued to be a potential growth-enhancing player in the receiving country. This view is challenged by many authors. For example, Carkovic and Levine (2002) show 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. In addition, Akinlo (2004) shows that both private capital and lagged foreign capital have no statistically significant effect on the economic growth. He concluded that the results seem to support the argument that extractive FDI might not be growth enhancing as much as manufacturing FDI.

On the other hand, recognizing the importance of FDI to growth, economic growth itself has been identified frequently as an important determinant, from among the various determinants, of FDI inflow into the host countries. Rapid growth of an economy might attract more FDI by multi-national companies (MNCs), as they locate new profit opportunities (Hansen and Rand, 2006).

Therefore, two strands of research have emerged: one that discusses the effects of FDI on economic growth, and the other recognizes these effects and subsequently tries to

identify the determinants of FDI flow to the receiving countries. The possibility of a two-way causality between the two variables identifies a third line of research in the FDI literature, but of a lesser magnitude (Choe, 2003).

Existing empirical evidence, in contrast with more settled theoretical evidence, shows mixed results about the relationship between FDI and economic growth of the host countries, and the determinants of FDI. Several reasons may be advanced to explain such disparity of empirical results. To mention a few, first, tests are traditionally conducted using data sets usually belong to heterogeneous groups of countries. Second, previous studies have used a variety of theoretical models. Third, empirical studies have usually implemented a number of different econometric techniques in testing and estimation. However, this disparity in results does not preclude the need for further investigation of the subject as long as it is clearly indicated that the analysis and the obtained results are not necessarily generalized to other cases.

In this paper, we do not intend to presume how each of the two variables affect the other. Rather, our purpose is to test for the causal relationship between FDI flow to the GCC countries and their economic growth. This study is different from the previous literature on many grounds. First, to the best of our knowledge, a part from the study by Sadik and Bolbol (2001), this is the first attempt to investigate the causal FDI-growth relationship in this part of the world. Sadik and Bolbol (2001) investigate the effect of FDI through technology spillovers on overall total factor productivity for Egypt, Jordan, Morocco, Oman, Saudi Arabia and Tunisia over a 20-year period. They find that FDI has not had any manifest positive spillovers on technology and productivity over and above those of other types of capital formation. On the contrary, there are some indications that the effect of FDI on total factor productivity has been lower than domestic investments in some of the countries over the period studied, indicating a possibly dominating negative crowding out effect. Second, we employ a different econometric approach from previous studies, namely the heterogeneous panel analysis, where we allow for heterogeneity of dynamics in the GCC country panel. For instance, Nair-Reichert and Weinhold (2001) indicate that imposing homogeneity of countries in the group, when countries are in fact heterogeneous, might lead to misleading results. In that direction, we initially test for cointegration between our variables using the heterogeneous panel cointegration test developed by

Pedroni (1997,1999), which allows for cross-sectional interdependency among different individual effects. Next, rather than adopting one point of view or another, regarding the direction of causality, we assume that the relationship between FDI and growth may run in either or both directions. Therefore, we use the heterogeneous panel causality test to detect the direction of causality between the two variables.

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2. Literature Review

There is conflicting evidence in the literature regarding the question as to how, and to what extent, FDI affects economic growth. FDI may affect economic growth directly because it contributes to capital accumulation, and the transfer of new technologies to the recipient country. In addition, FDI enhances economic growth indirectly where the direct transfer of technology augments the stock of knowledge in the recipient country through labor training and skill acquisition, new management practices and organizational arrangements (De Mello, 1999). Theoretically, however, in the context of either neo-classical or endogenous growth models, the effects of FDI on the economic growth of the receiving country, differ in the recent growth models from their conventional counterparts. The conventional economic growth theories are being augmented by discussing growth in the context of an open rather than a closed economy, and the emergence of externality-based growth models. Even with the inclusion of FDI in the model of economic growth, traditional growth theories confine the possible impact of FDI to the short-run level of income, when actually recent research has increasingly uncovered an endogenous long-run role of FDI in economic growth determination.[1] According to the neo-classical models, FDI can only affect growth in the short run because of diminishing returns of capital in the long run.

In contrast with the conventional neo-classical model, which postulates that long run growth can only happen from the both exogenous labor force growth and technological progress, the rise of endogenous growth models (Barrow and Sala-i-Martin, 1995) made it possible to model FDI as promoting economic growth even in the long run through the permanent knowledge transfer that accompanies FDI. As an externality, this knowledge transfer, with other externalities, will account for the non-

[1] For an excellent survey of such research, see De Mello (1997).

diminishing returns that result in long run growth (De Mello, 1997). Hence, if growth determinants, including FDI, are made endogenous in the model, long run effects of FDI will follow. Therefore, a particular channel whereby technology spills over from advanced to lagging countries is the flow of FDI (Bengoa and Sanchez-Robles, 2003).

Nevertheless, most studies generally indicate that the effect of FDI on growth depends on other factors such as the degree of complementarity and substitution between domestic investment and FDI, and other country-specific characteristics. Buckley et. al, (2002) argue that the extent to which FDI contributes to growth depends on the economic and social conditions in the recipient country. Countries with high rate of savings, open trade regime and high technological levels would benefit from increase FDI to their economies. However, FDI may have negative effect on the growth prospects of the recipient economy if they result in a substantial reverse flows in the form of remittances of profits, and dividends and/or if the multinational corporations (MNCs) obtain substantial or other concessions from the host country. Bengoa and Sanchez-Robles (2003) argue that in order to benefit from long-term capital flows, the host country requires adequate human capital, sufficient infrastructure, economic stability and liberalized markets. The view that FDI fosters economic growth in the host country, provided that the host country is able to take advantage of its spillovers is supported by empirical findings in De Mello (1999) and Obwona (2001). Borensztein et al., 1998 go further to suggest that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic investment. They use a model of endogenous growth, in which the rate of technological progress is the main determinant of the long-term growth rate of income.

The other theme of empirical research of FDI-growth relationship concentrated on identifying determinants of FDI flow and analyzing the effects of these determinants on the attractiveness of the host country to, and the volume and type, of such flows. Two sets of factors are frequently cited. The first set includes the size of the recipient market, relative factor prices, and balance of payments constraints (Bhasin et al., 1994; Love and Lage-Hidalgo, 2000; Lipsey, 2000). The second set includes institutional factors such as degree of openness and trade policies, legislative environment and law enforcement (Lee and Mansfield, 1996), and the degree of

economic and political stability (Bajorubio and Sosvilla-Rivero, 1994; Lipsey, 1999). Recognizing the importance of FDI to their growth, many countries are using specific incentives to attract FDI to flow in. Tax breaks and rebates are examples of such incentives (Tung and Cho, 2001). Nevertheless, the effectiveness of such incentives has been questioned (Guisinger, 1992).

We take a somewhat different route. Rather than presuming the direction of interaction between FDI and economic growth, our research tries to test for the causal relationship between economic growth and FDI. We examine the existence of such interaction using econometric techniques that are suitable for panel data analyses. We follow Choe (2003) in using panel data causality testing method developed by Holtz-Eakin, Newey and Rosen (1988). His results point towards bi-directional causality between FDI and growth, although he finds the causal impact from FDI to growth to be weak. The purpose of this paper is as follows. First, we consider and test for the relationship between FDI and economic growth , i.e. growth of gross domestic product (GDP) in the six GCC countries studied as one heterogeneous panel. The study is based on a theoretical model that builds on a production function which allows for FDI to appear as one of its factor inputs. Second, we consider both FDI and GDP, and attempt to jointly analyze the FDI-growth hypothesis. Third, we attempt to overcome the shortage of data in the fairly new block of GCC countries by employing panel data techniques, which combines both the time dimension and the cross-section dimension of the data. The advantage of this approach is that it leads to produces more observations and, hence, more degrees of freedom in estimation. This is particularly important when estimation involves the use of lagged independent variables. This results in a more efficient econometric estimation. Forth, as panel countries may have unobservable differences, we use heterogeneous panel estimation that have been evolving recently in the panel data literature, to account for country-specific effects. To achieve that goal we employ the heterogeneous panel unit root tests developed by Im, Pesaran and Shin (IPS) (2003), and cointegration test developed by Pedroni (1997, 1999), which allows for cross-sectional interdependency among different individual effects. Fifth, since the causality relationship between FDI and economic growth may, theoretically, run in either or both directions, we will empirically test for the direction of causality in the case of GCC countries using heterogeneous panel causality tests. Understanding causal relations between FDI and

economic growth should help policy makers plan their FDI policies in a way that enhances growth and development of their economies.

The remainder of the paper proceeds as follows: Section 3 summarizes trends in global and GCC's FDI flows. Section 4 outlines the methodology used in this study. First, a test of the order of integration is discussed to assess the time series properties of the variables used. Then, a heterogeneous panel test for the existence of a long-run relationship among the time series is outlined. Having established such a relationship exists, General Method of Moments (GMM) estimation techniques is used to examine the causality direction between FDI and economic growth. Section 5 describes the data used in the analysis, and presents empirical results and their implications. Finally, section 6 concludes by some policy recommendations based on the empirical findings in the main analysis

3. Trends in Global FDI

In a broad sense, Foreign Direct Investment (FDI) is composed of a flow of capital, expertise, and technology into the host country. Formally, it is defined as "an investment made to acquire lasting interest in enterprises operating outside of the economy of the investor" (IMF, 1993). Interested researchers, countries, and international organizations have increasingly recognized the importance of foreign capital to growth. In our dynamic age of privatization, liberalization, and globalization, FDI has emerged as an important form of international capital flow. Recognizing the importance of investment with no borders, the World Bank has devoted its 2005 issue of "World Development Report" to the issue of trade and investment, discussing in detail the importance of foreign capital flow to the economies of the host countries. According to the World Bank, "few countries have grown without being open to trade"[2].

Generally, there is a wide agreement on the importance of openness that leads to FDI flows. However, there is an ongoing debate about the merits of openness. The debate

[2] World Bank (2005), pp. 64

has been motivated by the recent economic crises in a number of countries of Southeast Asia. Quick and massive movements of short-term portfolio investment that took place in these countries were largely blamed for the crises. Nonetheless, most observers agree to distinguish FDI from short-term portfolio investment because FDI is a long-run investment and therefore is difficult to reverse. Hence, recognizing the importance of openness to economic growth, an increasing number of countries have adopted more liberal policies towards the flow of foreign capital. As a result, FDI inflow to developing countries increased from 0.1 percent of global GDP in 1970 to 3 percent in 2001 (World Bank, 2005).

On the global level, after a period of declining trends, global FDI inflow reached $648 billion in 2004, increasing by 2% over its level in 2003, raising the stock of FDI in 2004 to an estimated level of $9 trillion. Furthermore, there was a large increase in the share of developing countries in FDI inflow. Inflows to developing countries surged by 40%, to $233 billion, while those to the group of developed countries declined by 14%. As a result, the share of developing countries in world FDI inflows has increased to 36% of global FDI, the highest level since 1997 (UNCTAD, 2005). The observed uptrend in FDI was not evenly distributed among different countries of the developing world. While FDI flow into Africa remained stable at $18 billion between 2003 and 2004, Asia and Oceania witnessed a significant upsurge during the same period. A similar significant uptrend in FDI inflow was recorded in Latin America and Southeast Europe.

Factors advanced to explain this increase in FDI flow into the developing countries include intense competitive pressures in many industries of the source countries, higher prices for many commodities, which stimulated FDI to countries that are rich in natural resources, and higher expectations for economic growth. UNCTAD (1996) identifies some of the most important factors leading so such a surge in global FDI flows. They include the increasing trend in privatization and the resulting foreign firm's acquisition of domestic firms, production globalization, and global financial integration.

Among developing countries, Asia and Oceania region were the largest recipient as well as source of FDI. In 2004 FDI inflow to both regions amounted to $148 billion, $46 billion more than in 2003. This marked the largest increase ever to these regions,

with China and India getting the lion share of the increase. China continued to be the largest developing country recipient with $61 billion in FDI inflows. Furthermore, a new destination of FDI has strongly emerged in West Asia with inflows rising from $6.5 billion to $9.8 billion between 2003 and 2004. Countries like Saudi Arabia, Syria and Turkey were identified as the major recipients in that region, receiving more than half of the total inflow to that region. In addition, Latin America and the Caribbean registered a significant upsurge of FDI inflows in 2004, reaching $68 billion – 44% more than its level in 2003. FDI inflows to South-East Europe and the CIS, a new group of economies under the United Nations reclassification, grew at an all-time high rate of more than 40% in 2004, reaching $35 billion.

According to UNCTAD (2005), FDI further increases in FDI to developing countries are expected in the near future due to expected favorable economic growth wide spread consolidation, corporate restructuring, profit growth persistence and the continuation of the pursuit of new markets by industries in the source countries.

3.1. FDI in the GCC countries

GCC (Gulf Co-operation Council) countries have recognized the importance of attracting FDI and hence have adopted new measures aiming at attracting foreign capital and encouraging foreign investment. The development priorities of GCC countries include achieving sustained economic growth away from oil by raising private investment rates; strengthening local technological capacities and skills; and improving the competitiveness of their exports in world markets, creating more and better employment opportunities away from government sector. Openness to foreign capital and inflow of FDI has been inspired by an expectation that they will bring in invisible financial resources, attracting modern technology and raising the efficiency with which existing technologies are used. In addition, FDI may provide access to export markets and raise marketing capabilities of local firms. It can also upgrade skills and management techniques and set up state-of-the art training facilities.

The recent profile of the FDI flow into GCC countries is summarized in tables 1 and 2. which show that FDI flow has been an important form of investment in most of GCC countries. As a percentage of gross capital formation, FDI flow has accounted

for more than the world average in two of the six GCC countries (Qatar and Baharain), while reporting a high share in the other GCC countries in most of the years presented. On the other hand, except for the United Arab Emirates, FDI stock has accounted for an important share compared to the value of GDP in these countries, and that was apparent in the case of Bahrain, in which FDI stock reached more than 74% and 70%, in 2000 and 2004 of the level of GDP respectively.

Table 1. GCC and world FDI flows and FDI stocks, selected years**.**

FDI flows as a percentage of Gross Fixed Capital formation				FDI stocks as a percentage of GDP		
Region/economy	2002	2003	2004	1990	2000	2004
Bahrain	14.9	27.8	41.1	13.0	74.1	70.5
Kuwait	0.2	- 1.9	- 0.5	0.2	1.7	0.7
Oman	1.0	15.5	- 0.5	16.2	12.6	14.0
Qatar	15.5	13.9	13.4	1.0	10.8	14.6
Saudi Arabia	1.3	2.0	4.3	13.8	8.9	8.2
United Arab Emirates	9.0	0.2	4.6	2.2	2.0	4.6
World	10.6	8.3	7.5	8.4	18.3	21.7
Developed economies	10.9	7.9	6.1	8.2	16.3	20.5
Developing economies	9.5	8.8	10.5	9.8	26.2	26.4

Source: constructed from UNCTAD (2005), Annex table B.3.

Table 2. Rankings by the Inward FDI Performance Index, 2004 (Min:1 , Max 140)[3]

Bahrain	27
Qatar	63
UAE	104
Oman	110
Saudi Arabia	121
Kuwait	138

Source: constructed from UNCTAD (2005), Table I 10.

Using the Inward FDI Performance Index proposed by UNCTAD, and presented in table 2, four of the six GCC countries have received a share of the global FDI flows that surpass their global relative economy size. In general, FDI has been strongly present in the economies of the GCC countries and, therefore, the relationship between FDI and economic growth in these courtiers warrants careful analysis, as this relationship has not been studied, to the best of our knowledge.

4. Methodology

The test for causality between FDI and economic (GDP) growth in the GCC will be performed in three steps. First, we test for the order of integration in the GDP and FDI time series. Since the time span of the individual series is relatively short, recently developed panel unit root techniques will be utilized in order to increase the power of such tests. Second, having established the order of integration in the series, we use

[3] The UNCTAD Inward FDI Performance Index is a measure of the extent to which a host country receives inward FDI relative to its economic size. It is calculated as the ratio of a country's share in global FDI inflows to its share in global GDP.

heterogeneous panel cointegration test for the long run relationships between the variables in question. Finally, dynamic heterogeneous panel causality will be used to assess the short run cointegration. The direction of causality between the two variables is then inspected using heterogeneous panel causality tests .

4.1. Heterogeneous Panel Unit Root Test

Panel unit root tests are traditionally used to test for the order of integration (stationarity) in the variables of the data set. It has become well-known that the traditional Augmented Dickey-Fuller (ADF)-type to tests of unit root suffer from the problem of low power in rejecting the null of stationarity of the series, especially for short-spanned data. Recent literature suggests that panel-based unit root tests have higher power than unit root tests based on individual time series. A number of such tests have appeared in the literature. Recent developments in the panel unit root tests include: Levin, Lin and Chu (LLC) (2002), Im, Pesaran and Shin (IPS) (2003), Maddala and Wu (1999), Choi (2001), and Hadri (2000).

From among different panel unit root tests developed in the literature, LLC and IPS are the most popular. Both of the tests are based on the ADF principle. However, LLC assumes homogeneity in the dynamics of the autoregressive coefficients for all panel members. In contrast, the IPS is more general in the sense that it allows for heterogeneity in these dynamics. Therefore, it is described as a "Heterogeneous Panel Unit Root Test". It is particularly reasonable to allow for such heterogeneity in choosing the lag length in ADF tests when imposing uniform lag length is not appropriate. In addition, slope heterogeneity is more reasonable in the case where cross-country data is used. In this case, heterogeneity arises because of differences in economic conditions and degree of development in each country. As a result, the test developers have shown that this test has higher power than other tests in its class, including LLC.

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

$$\Delta y_{i,t} = \alpha_i + \beta_i y_{i,t-1} + \sum_{j=1}^{p_i} \rho_{i,j} \Delta y_{i,t-j} + \varepsilon_{i,t} \quad (1)$$

where $y_{i,t}$ (i=1, 2,…..,N; t=1,2,…….,T) is the series for panel member (country) *i* over period *t*, p_i is the number of lags in the ADF regression, and the error terms $\varepsilon_{i,t}$ are assumed to be independently and normally distributed random variables for all *i*'s and *t*'s with zero means and finite heterogeneous variances σ_i^2. Both β_i and the lag order ρ in (1) are allowed to vary across sections (countries). Hence, the null hypothesis to be tested is:

$$H_0 : \beta_i = 0, \ \forall i$$

against the alternative hypothesis:

$$H_1 : \begin{cases} \beta_i = 0 & \text{for some } i\text{'s.} \\ \beta_i \prec 0 & \text{for at least one } i. \end{cases}$$

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 t-bar statistics is calculated using the average t-statistics for β_i from the separate ADF regressions in the following fashion:

$$\tilde{t-bar}_{NT} = \frac{\sum_{i=1}^{N} t_{i,T}(p_i)}{N} \quad (2)$$

where $t_{i,T}$ is the calculated ADF statistics from individual panel members. Using Monte Carlo simulations, IPS show that the t-bar is normally distributed under the null hypothesis, and it outperforms M-bar in small samples. They then use estimates of its mean and variance to convert t-bar into a standard normal 'z-bar' statistic so that conventional critical values can be used to evaluate its significance. The z-bar test statistic for 0-lag is defined as:

$$z_{\underset{t-bar}{\sim}} = \frac{\sqrt{N}\ (\tilde{t}-bar_{NT} - E[\tilde{t}_T \mid \rho_i = 0])}{\sqrt{\text{var}[\tilde{t}-bar_{NT} \mid \rho_i = 0]}} \rightarrow N(0,1) \qquad (3)$$

where $\tilde{t}$ is as defined before, $E[\tilde{t}_T \mid \rho_i = 0]$ and $\text{var}[\tilde{t}-bar_{NT} \mid \rho_i = 0]$ are the mean and variance of t_{it}. In their Table 2, IPS (2003) provide exact critical values of the *t-bar*$_{NT}$ statistic for some N,T ranges and for the 1, 5, 10% confidence levels. The IPS unit root test is used in this paper to test for stationarity of the panel data obtained for the GCC countries.

4.2. Heterogeneous Panel Cointegration

The concept of cointegration was first introduced into the literature by Granger (1980). Cointegration implies the existence of a long-run relationship between economic variables. The principle of testing for cointegration is to test whether two or more integrated variables deviate significantly from a certain relationship (Abadir and Taylor,1999). In other words, if the variables are cointegrated, they move together over time so that short-term disturbances will be corrected in the long-term. This means that if, in the long-run, two or more series move closely together, the difference between them is constant. Otherwise, if two series are not cointegrated, they may wander arbitrarily far away from each other (Dickey et. al., 1991).

Further, Granger (1981) showed that when the series becomes stationary only after being differenced once (integrated of order one), they might have linear combinations that are stationary without differencing. In the literature, such series are called "cointegrated". If integration of order one is implied, the next step is to use cointegration analysis in order to establish whether there exists a long-run relationship among the set of the integrated variables in question. Earlier tests of cointegration include the simple two-step test by Engle and Granger (EG hereafter) (1987). However, the EG method suffers from a number of problems. Alternatively, Engle and Yoo (1987) (EY, hereafter) 3-step procedure have been widely recognized as dealing with most of these problems. Nevertheless, a problem remains which is that

both EG and EY methods cannot deal with the case where more than one cointegrating relationship is possible. Hence, Johansen's Vector Auto Regression (VAR) test of integration (Johansen, 1988) uses a 'systems' approach to cointegration that allows determination of up to r linearly independent cointegrating vectors ($r \leq g-1$, where g is the number of variables tested for cointegration). The Johansen's procedure is useful in conducting individual cointegration tests, but does not deal with cointegration test in panel settings.

Recognizing the shortcomings of traditional procedures, this study utilized the two types of the heterogeneous panel cointegration test developed by Pedroni (1997, 1999) which, in addition to using panel data thereby overcoming the problem of small samples, allows different individual cross-section effects by allowing for heterogeneity in the intercepts and slopes of the cointegrating equation.

Pedroni's method includes a number of different statistics for the test of the null of no cointegration in heterogeneous panels[4]. The first group of tests is termed "within dimension". It includes the panel-v, panel rho(r), which is similar to the Phillips and Perron (1988) test, panel non-parametric (pp) and panel parametric (adf) statistics. The panel non-parametric statistic and the panel parametric statistic are analogous to the single-equation ADF-test. The other group of tests is called "between dimension". It is comparable to the group mean panel tests of Im et al. (1997). The "between dimension" tests include four tests: group-rho, group-pp, and group-adf statistics.

The seven of Pedroni's tests are based on the estimated residuals from the following long run model:

$$y_{it} = \alpha_i + \sum_{j=1}^{m} \beta_{ji} x_{jit} + \varepsilon_{it} \qquad (4)$$

where $\varepsilon_{it} = \rho_i \varepsilon_{i(t-1)} + w_{it}$ are the estimated residuals from the panel regression.

The null hypothesis tested is whether ρ_i is unity. The seven statistics are normally distributed. The statistics can be compared to appropriate critical values, and if critical values are exceeded then the null hypothesis of no-cointegration is rejected implying that a long run relationship between the variables does exist.

[4] Interested readers may refer to Pedroni (2004) for details and mathematical representations of the tests.

4.3. Causality

Pedroni's heterogeneous panel cointegration method tests only for the existence of long run relationships. The tests indicate the presence or absence of long run links between the variables, but do not indicate the direction of causality when the variables are cointegrated. Causality is traditionally tested by the standard two-step EG causality procedure. However, in our panel settings, traditional estimation techniques will result in inconsistent parameter estimates resulting from measurement errors and omitted variable problems. Therefore, we apply the General Method of Moments (GMM) dynamic panel estimator as developed by Holtz-Eakin et. al. (1988,1989) and Arellano and Bond (1991). The GMM method can help reduce the estimation bias often inherent in panel data estimation. It controls for problems often associated with cross-sectional estimators. These include unobserved problems associated with country-specific and time-specific effects, endogeneity in explanatory variables, and when lagged dependent variables are used as regressors.

To test for panel causality, the most widely used method in the literature is that proposed by Holtz-Eakin *et. al.* (1988,1989). Their time-stationary VAR model is of the form:

$$Y_{it} = \alpha_0 + \sum_{j=1}^{m} \alpha_j Y_{it-j} + \sum_{j=1}^{m} \delta_j X_{it-j} + f_{yi} + u_{it}$$

$$X_{it} = \beta_0 + \sum_{j=1}^{m} \beta_j Y_{it-j} + \sum_{j=1}^{m} \gamma_j X_{it-j} + f_{xi} + \nu_{it} \qquad (5)$$

where Y_{it} and X_{it} are the two co-integrated variables, i=1,…..,N represents cross-sectional panel members, u_{it} and v_{it} are error terms. This model differs from the standard causality model in that it adds two terms, f_{xi} and f_{yi} which are individual fixed effects for the panel member i.

In the equations above, the lagged dependent variables are correlated with the error terms, including the fixed effects. Hence, OLS estimates of the above model will be biased. The remedy is to remove the fixed effects by differencing. The resulting model is:

$$\Delta Y_{it} = \sum_{j=1}^{m} \alpha_j \Delta Y_{it-j} + \sum_{j=1}^{m} \delta_j \Delta X_{it-j} + \Delta u_{it}$$

$$\Delta X_{it} = \sum_{j=1}^{m} \beta_j \Delta Y_{it-j} + \sum_{j=1}^{m} \gamma_j \Delta X_{it-j} + \Delta v_{it} \qquad (6)$$

However, differencing introduces a simultaneity problem because lagged endogenous variables in the right hand side are correlated with the new differenced error term. In addition, heteroscedasticity is expected to be present because, in the panel data, heterogeneous errors might exist with different panel members. To deal with these problems, instrumental variable procedure is traditionally used in estimating the model, which produces consistent estimates of the parameters.

Assuming that the u_{it} and v_{it} are serially uncorrelated, the second or more lagged values of Y_{it} and X_{it} may be used as instruments in the instrumental variable estimation (Easterly *et. al*., 1997). Then, to test for the causality, the joint hypotheses $\delta_j = 0 \quad for\ j = 1,.....,m$ and $\beta_j = 0 \quad for\ j = 1,.....,m$ is simply tested.

The test statistics follow a Chi-squared distribution with (*k*-*m*) degrees of freedom. The variable *X* is said not to Granger-cause the variable *Y* if all the coefficients of lagged X in equation () are not significantly different from zero, because it implies that the history of *X* does not improve the prediction of *Y*. A widely used estimator for the system in () is an instrumental variable estimator, the panel Generalized Method of Moments (GMM) estimator, proposed by Arellano and Bond (1991). This method has been shown to produce more efficient and consistent estimators compared with other procedures. The lag length *k* is chosen to satisfy the classical assumptions concerning the error term.

5. Data and empirical results

The GCC is a new block of countries. Sufficiently long time series in the GCC, that are necessary for causality tests, are not currently available. However, acknowledging the problems associated with small samples, panel data are used to test for causality between GDP and FDI. Using panel data allows us to gain more observations by pooling the time series data across sections, leading to higher power for the Granger-type causality tests. GCC FDI series were compiled from UNCTAD reports. The

series of real GDP were obtained from "World Economic Outlook, 2005". All data are annual and span the years 1970-2004.

The analysis is started by the test of the statistical properties of the data series used. First, the order of integration in each of the GDP and FDI series is tested. The upper part of Table summarizes the test results for the individual panel countries and series. Standard individual ADF test results are included for the sake of comparison. The lag lengths were chosen using Akaike Information Criteria (AIC). The IPS results indicate, in general, that the null of a unit root for the individual series is not rejected for all of the series tested at their levels with a mixed results for the individual tests. Given the short span of the individual series, we are more confident to accept the more powerful IPS panel test results, which undoubtedly do not reject the unit root null of unit roots for the panel with 210 observations. On the other hand, the null of unit roots is strongly rejected at the 1% significance level for all series at their first difference. The results strongly support the conclusion that the series are stationary only after being differenced once. Hence, the IPS test in the lower part of Table indicates that the series are integrated of order one , i.e., I(1) at the 1% significance level. In brief, the test results on the levels of GDP and FDI indicate a failure to reject the null of nonstationarity. However, first-differenced series become stationary according to the IPS test results.

Having established that the FDI and GDP series are integrated of the first order, the second step in testing the relationship between FDI and GDP is to test for the cointegration relationship between the two variables, in order to determine if there is a long-run relationship between the two variables. The test for the long-run relationship between both variables using Pedroni's heterogeneous panel test was conducted. Table 4 reports the heterogeneous panel cointegration test results. It can bee seen from the test results in the table that 5 out of 7 of Pedroni's statistics significantly reject the null of no cointegration. This implies a long run co-movement of FDI and GDP in the long run. That is, there is a long-run steady-state relationship between FDI and GDP for the panel of GCC countries, even when we allow for country-specific effects.

Once we have established a cointegration relationship between FDI and GDP, then we may conclude that there exits a long-run relationship between the two variables, even if they are individually non-stationary. We therefore postulate that there is a (Granger) causality between FDI and GDP at least in one direction and

possibly in both directions. Therefore, after confirming the long run relationship between our variables, we next test for their causality hypothesis. We deal with the problem of joint endogeneity of GDP and FDI, and the possibility of two-way causality, by using instrumental variable estimation, emphasizing on the heterogeneous aspects of our panel. That is because assuming a homogeneous panel when country effects are actually heterogeneous may lead to obtaining biased results. We also consider the dynamic nature of the relationship when testing for Granger causality. Ignoring such dynamic aspect of the data represents "not only a loss of potentially important information but can lead to serious misspecification biases in the estimation" (Haque and Kim, 2003).

Table 3 ADF and IPS unit root tests

Country	GDP				FDI			
	Level		1st Difference		Level		1st Difference	
	Constant	Constant +Trend	Constant	Constant +Trend	Constant	Constant+ Trend	Constant	Constant + Trend
Bahrain	-1.83	-2.36	-2.85	-2.34	-2.41	-4.03***	-6.84***	-6.71***
Kuwait	-2.06	-2.74	-3.91**	-3.52*	-2.35	-2.27	-5.06***	-5.05***
Oman	-0.32	-1.80	-3.75**	-2.74	-1.25	-1.74	-3.96***	-3.91**
Qatar	-1.74	-0.63	-2.75	-3.02	-0.35	-1.21	-5.72***	-6.90***
Saudi Arabia	-2.36	-2.80	-4.29***	-3.32*	-2.90*	-2.85	-4.28***	-4.20***
UAE	-1.90	-4.61***	-3.05	-5.03 ***	-1.50	-2.09	-4.77***	-4.94***
Panel Unit Root Test (IPS) test:								
	-0.63	-1.11	-3.77***	-3.76***	-0.57	-0.75	-9.62***	-9.01***

Notes:

***Significant at 1% significance level.

**Significant at 5% significance level.

*Significant at 10% significance level

Table 1 Pedroni's Heterogeneous Panel Cointegration Test Results

Test Statistics	Value
panel v-stat	0.67
panel rho-stat	-1.62**
panel pp-stat	-3.03***
panel adf-stat	-3.49***
group rho-stat	-0.24
group pp-stat	-3.16***
group adf-stat	-3.65***
***Significant at 1% level	**Significant at 5% level

Therefore, to test for causality, the GMM estimation procedure as outlined in Arellano and Bond (1991) is applied to the balanced panel of the six GCC countries data with 35 annual observations for each country. This procedure deals with the estimations problems mentioned above. The estimated system is of the form:

$$\Delta GDP_{it} = \sum_{j=1}^{m} \alpha_j \Delta GDP_{it-j} + \sum_{j=1}^{m} \delta_j \Delta FDI_{it-j} + \Delta u_{it}$$

$$\Delta FDI_{it} = \sum_{j=1}^{m} \beta_j \Delta GDP_{it-j} + \sum_{j=1}^{m} \varphi_j \Delta FDI_{it-j} + \Delta \nu_{it} \qquad (7)$$

Where FDI represents the net flow of foreign direct investment, GDP represents real per capita gross domestic product, i= 1,2,….,6 represent countries, and t= 1,2,…….,35 represent time periods (years).

The null hypotheses tested are:

$$\delta_j = 0 \quad for\ j = 1,.....,6$$

$$\beta_j = 0 \quad for\ j = 1,.....,6 \qquad (8)$$

The results of the GMM estimates of the model are reported in Table 2 . The table also reports the tests used to choose both the lag length and the appropriate instruments used in estimation. First, determining the optimal lag structure is done

using Wald test. The test rejects the hypothesis of no second lag in both the GDP and FDI equations, in favor of two lag structure.

Table 2. GMM estimation and causality results

Estimated Coefficients	**Dependent Variable**	
	GDP(2 lags)	**FDI(2 lags)**
GDP_{it-1}	0.272	0.181
	(0.00)	(0.34)
FDIit-1	-0.001	-0.442
	(0.05)	(0.00)
GDPit-2	-0.232	0.101
	(0.00)	(0.24)
FDIit-2	-0.0002	-0.272
	(0.53)	(0.01)
Wald Lag Length Test:		
Null Hypothesis: (m=1)	37.29	11.6
	(0.00)	(0.00)
Sargan Test's P-value	(0.38)	(0.99)
Wald Causality Test		
Null Hypothesis:	FDI does not cause GDP	GDP does not cause FDI
	49.55	4.66
	(0.00)***	(0.00)***

Numbers in parentheses are the p-values.

*** Significant at 1% level

To test for causality between GDP and FDI, we turn to Wald test. Table 2 reports the estimated coefficients and the Wald test for the null of no causality as represented by (). In the FDI equation, the Wald test indicates that causality runs from GDP to FDI as the test rejects the null of no causality at the 1% significance levels. On the other hand, the evidence indicates that causality is running from FDI to GDP in the GDP equation as well. The Wald rejects the null of no causality at the same significance

levels. Therefore, we may conclude that in the GCC, evidence indicates a bi-directional causality running between GDP and foreign direct investment.

To make sure that our choice of instruments was valid in estimation, we test for the over-identifying restrictions using Sargan test, which is common test of the validity of instrumental variables used in estimation. The hypothesis being tested is that the instrumental variables are uncorrelated with residuals, and therefore may be used in estimation. The statistic is asymptotically distributed chi-squared if the null hypothesis is true. The results show that, when using all lagged values of the variables as instruments for t=3 and earlier, the Sargan test does not reject the validity of this set of instruments in both equations. This implies the validity of the instruments used in estimation.

6. Conclusion and Policy Implications

This paper is devoted to explore the direction of interaction between FDI and economic growth in the GCC countries using a panel cointegration framework. In most of the previous studies, the relationship between FDI and growth had been studied presuming causality running from FDI to GDP growth. The majority of the literature on the subject use growth models in the context of growth accounting to test for the significance of FDI as an exogenous variable in the growth equation. In addition, time series data at the country level have been traditionally used. In this article, we adopt a different approach to test the FDI-GDP relationship. Rather than presuming that FDI is one of the determinants of economic growth, we test for such assumption. To conduct such test, we use heterogeneous-panel cointegration and causality techniques to test for the possibility of causality running from FDI to GDP. In addition, we test for the possibility of reverse causality running from GDP to FDI.

The results obtained in this research, which are based on heterogeneous panel cointegration techniques, in addition to the GMM estimator that allow for country-specific heterogeneity of all parameters, indicate a strong causal link from FDI to GDP and vise versa. The results indicate that, in the GCC, FDI has been an important factor in this block's economic growth. This result confirms previous evidence obtained by a number of writers for other countries, and is in accordance with the

endogenous growth hypothesis. The same results also confirm the effect of their high GDP growth experienced during most of the period studied on the pace of FDI flow into these countries. In general, the two-way causality between GDP and FDI has some implications. On one hand, the economic growth of the GCC countries may further benefit from FDI inflows to the economies of this block of countries. The second is that GCC countries may benefit from further adopting policies that attracts FDI flows into their economies.

In particular, our findings indicate that while FDI promote growth, GDP growth also attract more FDI inflows. In other word, higher growth of GCC countries' GDP is the driving force behind the surge in FDI inflows in addition to being a consequence of these inflows. This issue has important policy implications. The results suggest that there is a positive correlation between FDI inflows and growth in a bidirectional way. Thus, if GDP growth seems to attract more FDI inflows, then promotional policies to encourage inward flows of FDI only may become unnecessary. Instead, efforts should be directed to other potential sources of growth. Once growth is enhanced and stimulated, foreign capital will then be attracted.

GCC countries should also be selective in attracting FDI. In contrast to other developing countries, GCC countries have abundant financial recourses and domestic investment could finance their development. However, influx of FDI has great potential to yield higher growth through higher efficiency in physical and human capital and through positive externalities such as facilitating transition and diffusing technology as well as introduction of alternative management practices, organizational arrangement, and improved entrepreneurial skills. Nevertheless, FDI externalities may have trivial effects if the links with local business were weak. Thus, policies should be adopted to strengthen the relationship between FDI and domestic investments and such relationship has to be complementary rather than competitive. It is also important to adopt policy measures to deepen the domestic capital markets by increasing savings and developing a strong domestic institutional investor base and strengthening the prudential supervision of financial markets. Privatization is being used ,with great success in many developing countries, as a vehicle to deepen capital markets and encourage foreign direct investment. While all GCC countries started the process of privatizing state-owned enterprises and opening up private investment opportunity in telecommunications, air-lines, tourism, and some industries such as petrochemicals, cement, and utilities, more effort should be put to expedite the

process toward decreasing the role of the government in the market and providing better incentives and institutional requirements for private investment.

Empirical studies[5] suggest that capital inflows more beneficial and create less problem if they are long-term, and in the form of direct investment, induced by growth prospects of the economy, invested in physical assets than consumed and domestically induced. As opposed to short-term portfolio investment, long-term FDI has positive spill over effect on the economy. Short-term investment and portfolio investments are often associated with increase in consumption and cause fragility in the financial systems. Recently, the GCC countries have witnessed short-term investment boom in equity and real estate markets and other low productivity and non-tradable sector. Such investment may result in problem of capital inefficiency and may hinder economic growth through externality emanated during both the surge and sudden reversals (Baharumshah: 2006, p 81). Thus, it is important for GCC countries to improve the quality of FDI that they can attract. Theory[6] also suggests that uncertain capital flows and a more volatile profile of FDI inflows are growth retarding. Accordingly, a key policy option is to maintain a steady stream of foreign capital flows and to minimize the fluctuations in these inflows.

The new wave of globalization sweeping through the world has intensified the competition for FDI among developing countries. Thus concentrated efforts are needed at both national and regional level in order to attract significant FDI flows to the GCC countries and improve prospects for sustained growth and development. GCC countries should work together to design and formulate adequate policies to attract stable investment flows. They must take policy measures that would substantially enlarge and diversify their economic base, policies that would improve local skills and build up a stock of human capital recourses capabilities, enhance economic stability and liberalize their market in order to benefit from long-term FDI inflows.

The recent pattern of FDI flows to GCC countries has been toward the oil sector. Attracting FDI to the extractive sector, i.e oil sector, proved not to be growth enhancing as much as other productive sectors[7]. Oil sector is often an enclave sector with little backward and inward linkages with other sectors. The GCC countries

[5] For example see Baharumshah, et.al (2006)
[6] Lensink and Morrissey (2001)
[7] See Akinlo (2004).

could benefit from increased FDI into the oil sector if the sector is liberalized and integrated into the economy.

Growth enhancing policies coupled with sound macroeconomic policies foster a healthy rate of returns to investment and hence attract FDI. To maximize the benefit of FDI GCC countries should establish investment agencies, improve the local regulatory environment, develop the local financial market, and enhance transparency in macroeconomic policies. A sound and transparent legal system governing financial transaction should be put in place. A central body or institution should be established to promote and market investment opportunity and attract genuine FDI.

Finally, these findings may provide useful information for the formulation of a general strategy that consider GCC countries as block when negotiating business deals and attract foreign direct investment. It is very difficult for a small country, with limited domestic market to establish a viable capital market and attract large-scale investment. Accordingly, monetary cooperation is required and regional capital market should be supported and investment opportunity should be promoted at the regional level.

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