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Abstract: The research aims to examine the relationship, whether complementary or substitutive, between inward FDI and gross domestic investment in the six GCC countries using cointegration techniques and fully modified GMM estimation. Based on the panel data during the period 1979-2010, the empirical evidence implies that in Qatar, Oman, the UAE and Saudi Arabia, the inward FDI has positive short-run and long-run effects on the domestic investment. For Bahrain, such a complementary relationship exists only in the short-run. For the majority of GCC countries, the long-run elasticities have large magnitude compared to the short-run counterparts, justifying more attraction policy of the IFDI in the future. The gap in the privatization process of public enterprises in the GCC explains in a large extent their heterogeneity in terms of elasticities and spillovers effects.

Key words: FDI, Domestic investment, GMM, Long-run, Elasticities, GCC.
JEL Classification: F2, C5

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1. Introduction

Considering investment as a basic engine of economic growth, we propose that openness to foreign direct investment (FDI) may stimulate public and private investment in the long run. This paper analyzes the interaction between FDI and gross domestic investment (GDI) in the short and long run to evaluate whether the effect is complementary or substitutive. Inward FDI (IFDI) makes a direct contribution to economic growth and impacts other macroeconomic variables such GDI (Borensztein et al. 1998). In addition, IFDI could potentially improve the efficiency of local natural and human resources, mainly when the host economy is characterized by consistent real economic growth and an optimal market size (Damiano 2010). The foreign firms could have access to domestic financial funds with better cost conditions, which would increase their financial returns relative to external financial markets. The lower costs of capital and labor in host economies could motivate the foreign firms to locate intermediate or final production abroad for local or foreign customers (Lipsey 2006). This argument could increase the competitiveness between local and foreign investors, which leads to crowding-out or crowding-in effects (Desai et al. 2005, Stevens and Lipsey 1992). Theoretically, the total effect of IFDI on domestic investment seems to be undetermined and requires an empirical investigation (Kim et al. 2003, 2013). The foreign investor could be attracted by the prevalence of natural resources of the host country. Generally in such cases, the increase in exports leads to more earnings for the foreign investor (Blomstrom & Kokko 2003, Lipsey 2006). Since the last decade, the economic and financial reforms in most Gulf Cooperation Council countries (GCC) have attracted more inward foreign capital, and from 2004, the FDI 'engine' has worked especially well in Qatar, Saudi Arabia and the United Arab Emirates (UAE) (UNCTAD, WIR 2011).

The economies of GCC, as one of the richest regional groupings in the world, are characterized by a 'saving glut effect' (Ghassan et al. 2011, Bracke et al. 2008), but they attract IFDI as the main channel of technology diffusion (Globerman et al. 2002). For the foreign capital owner, FDI implies direct control of assets used in the production process; FDI could increase or decrease their competitiveness vis-à-vis other enterprises in the world. For the host economy, the FDI process involves the transfer of resources other than capital such as technology, management, organizational and marketing skills (Helpman 2006). The relationship between FDI and GDI should influence the economic and financial processes in both the host and home countries.

Many empirical papers focused at the macro level find a negative relationship between IFDI and GDI for OECD countries (Feldstein 1994), Germany (Herzer & Schrooten 2008) and Finland (Sauramo 2008); in contrast, for the USA, the relationship seems to be positive (Desai et al. 2005). The study of Sadik & Bolbol (2001) examines the IFDI-total factor productivity relationship using aggregate cross-Arabic country data; the main result is that IFDI has dominant crowding-out effects on GDI. There are a large number of papers analyzing the nexus between FDI and economic growth, but few articles explore the dynamic relationship between FDI and

GDI as two flows of investments. This paper contributes to (i) the little literature of development economics and economic policy literature related to relation between inward FDI and domestic investment in GCC countries by examining the impact of IFDI on GDI in the short and long run using cointegration and causality analyses. From such econometric framework, we determine (ii) some specificities of each economy in GCC countries in terms of short and long run elasticities, which explain the success extent of the government FDI policy. The domestic productive capacity may strictly limit the non-inflationary level of FDI and domestic investment producing mainly non-tradable goods. The next Section 2 introduces the theoretical background of the potential impact of the inward FDI on the GDI and summarizes the findings of the related empirical literature and exhibits the data and discusses the inward FDI development in the GCC region. Section 3 shows the empirical issues, estimation methodology and the empirical results. Section 4 provides discussion on the main results and Section 5 provides the conclusion and policy implications.

2. Basic equation and data

The first- and the second-order conditions, corresponding to profit-maximizing levels of domestic investment and to the interactive effects between domestic and foreign investments, respectively, are as follows:

$$\frac{\partial Q(K,K^*,t,Z)}{\partial K} = \lambda(K^*,t,Z) \qquad\qquad \frac{\partial Q^2(K,K^*,t,Z)}{\partial K \partial K^*} = Q_{K,K^*}$$

where Q is the output function and λ is the marginal cost-capital function, K is domestic capital, K^* is foreign capital, and Z is a vector of variables relevant to output. In this setting, a change in K^* and Z affects domestic economic activity by influencing K. Supposing $Q_{K,K^*} \neq 0$ and non-fixed financial resources, the implicit relationship between home and foreign capital can be related through the production process and extracted from derived demand function. The implicit first-order condition may take any form, depending on market conditions and government policies. However, the main idea here addresses the final impact, which could reveal substitution or complementarities between domestic capital and foreign capital. When Q_{K,K^*} is negative, there is a crowding-out or at least a substitution effect between foreign and domestic investment. In contrast, when Q_{K,K^*} is positive, the presence of foreign capital motivates a high level of domestic activity. Nevertheless, the investment opportunities abroad leads initially to substitutability, but over time the increase in aggregate demand could lead to enhanced domestic investment mainly in non-tradable sector. Furthermore, financial liberalization allows the local foreign firms to borrow from domestic sources; this pattern of loans could amplify the effects of foreign investment on domestic investment. The challenge here is to model the individual dynamic interactions between domestic capital K and foreign capital K^* in terms of investment intensity, taking into account the fact that FDI would be weakly exogenous, by estimating the following investment equation:

$$\frac{\mathrm{I_{it}}}{Y_{it}} = \alpha_{i0} + \alpha_{i1}t + \alpha_{i2}\frac{\mathrm{I^*_{it}}}{Y_{it}} + \varepsilon_{it} \qquad (1)$$

where I and I* are domestic and foreign investment, respectively, and Y stands for gross domestic product. Empirically, the time series properties of these variables play a key role. t is a time trend that reflects the technological effect on the investment process and ε denotes the usual error term.[2] The individual index i corresponds to a specific country; our panel is composed of six GCC countries: (in alphabetical order) Bahrain (BAH), Kuwait (KUW), Oman (OMN), Qatar (QTR), Saudi Arabia (SAR) and the UAE. The GCC countries are quite heterogeneous; therefore, to avoid any endogeneity bias in the statistical results, we separately analyze each country. Gross capital formation is used as a measure of gross domestic investment, and the data on I/Y are drawn from the database of World Bank's World Development Indicators (2011).[3] Data on inward FDI are from the UNCTAD FDI/TNC database (www.unctad.org/fdistatistics).[4]

We can summarize the data set by examining the descriptive statistics using a box-plot as simple visual method identifying patterns that may otherwise be hidden in a data set.[5] The box-plot clearly highlights important landmarks of the data and the star point inside the box is the mean. Examination of the Fig. 1 readily suggests few conclusions. The inner fences in the box of ratio IFDI to GDP are small than ratio GDI to GDP. It appears clearly that the ratio IFDI-GDP does not exceed in average 10% for all GCC region. It is immediately evident that during the last three decades, while the investment rates in GCC (21.2%) have always been comparable in average to those of the largest industrial economies G7 (21.3%), IFDI have been consistently much lower, in fact during the period 2009-2010 almost 10% comparatively to G7.[6]

The Kuwait's average ratio IFDI-GDP is quasi-null and its GDI-GDP ratio is the less one among the GCC economies. The average of GDI to GDP in Qatar is the greatest in GCC region, but the average ratio IFDI-GDP of Qatar is similar to Oman, Saudi Arabia and UAE. The IFDI and GDI box-plots have quasi-similar size for Saudi Arabia and Bahrain. In addition, Qatar's GDI-GDP ratios exhibit that the distribution is positively skewed indicating that Qatar economy could potentially exceed 40% as a percent of GDI to GDP. Also, Saudi Arabia, Qatar and Oman show positively skewed distribution for IFDI ratio, whereas UAE indicates negative skewed distribution. Overall, SAR, QTR, OMN and UAE are a quasi-similar mean of IFDI-GDP, while

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[2] The variable I/Y could be stationary around the mean level α_{i0} or trend-stationary around t with spillover effects from FDI/GDP. The investment-GDP ratio could be non-stationary, in which case FDI/GDP would be irrelevant and the relationship could be examined using more appropriate tests and estimation methods.

[3] http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG/countries/latest?display=default.

[4] All data are presented in millions of U.S. dollars and transformed into logarithms. For all GCC, the annual sample period is 1979-2010. The plots of I/Y (GDI intensity) and I*/Y (Inward FDI intensity) exhibit many particularities.

[5] The box-plot summarizes the distribution of our data set by displaying the centering and spread of the data. The points outside the inner fence (shaded part of Fig. 1, Appendices) are known as outliers.

[6] Author's calculation from UNCTAD (WIR, 2011): www.bea.gov/international. http://www.economywatch.com/economic-statistics/Major-advanced-economies-(G7).

Bahrain has a greater mean. The share of IFDI has more variability across GCC countries; despite of increasing share of GDI to GDP, we expect that there are many disparities between economies in GCC countries conducting to specific behavior of IFDI across GCC region. We can directly conclude from Fig. 1 that the rates of GDI to GDP are at least double of the rates of IFDI to GDP, indicating a large potential IFDI in GCC region. We have to find out evidences for such deduction by modeling the relationships between IFDI and GDI in the short and long run.

Since the GCC countries have typically large current account surpluses, the relationship between GDI and IFDI depends on domestic capacity to attract abroad investors. The large accumulation of current account surplus during the recent episode of volatile rising oil prices (from US$ 145 to 40 and to 120 per barrel) has qualified the GCC region to emerge as a major net supplier of capital on a global scale, second only to East Asian countries (Strum et al. 2008). But, the perturbation in oil prices and export levels influences the current account, the official reserve assets (Mehrara & Oskoui 2007) and has a significant bearing on investment choices. During the last decade, the GCC economies records continuous excess in payment balance and then official reserves. Since 2000, the GCC countries have engaged important development plans upgrading the region's infrastructure, favoring internal economic activities and attracting foreign investors through profitable investment opportunities. After the US invasion in Iraq, political developments in Iran and increased instability in neighboring countries, the GCC region has strived to deepen ties with EU member states on economic, security and defense matters. The GCC has become the EU's 6th largest export market and trade flows have proved resilient to the worldwide economic and financial crisis.[7] Patterns of trade revolve around exports of machinery, electrical products, manufactured goods and chemicals from the EU (Antikiewicz et al. 2009). EU-GCC investments are even more important in magnitude, but still be small player in GCC economies in comparison to the USA top partner in IFDI.

3. Results

3.1. Testing for the existence of a level relationship

To test the existence of a long-run relationship between IFDI and GDI, we use the autoregressive distributed lag (ARDL) approach (Pesaran et al. 2001), which does not require pre-testing for unit roots prior to the cointegration test. Then, the error correction form of the ARDL model for Eq.(1) is as follows:

$$\Delta\left(\frac{\mathrm{I}}{Y}\right)_{\mathrm{it}} = \beta_{i0} + \beta_{i1}t + \beta_{i2}\left(\frac{\mathrm{I}}{Y}\right)_{\mathrm{it}-1} + \beta_{i3}\left(\frac{\mathrm{I}^*}{Y}\right)_{\mathrm{it}-1} + \sum_{j=1}^{p}\gamma_{1j}\,\Delta\left(\frac{\mathrm{I}}{Y}\right)_{\mathrm{it}-j} + \sum_{j=0}^{q}\gamma_{2j}\,\Delta\left(\frac{\mathrm{I}^*}{Y}\right)_{\mathrm{it}-j} + u_{it} \quad (2)$$

Consequently, the existence of a long-run relationship among specified variables is tested by calculating the F-statistic for the null hypothesis of no cointegration. The conditional ARDL model in Eq.(2) involves selecting the optimal orders of p and q;

[7] European Commission, Directorate General for Trade (DG TRADE), "EU Bilateral Trade with the GCC and Trade with the World", September 2010 and March 2012. http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_113482.pdf.

we started by selecting the order of the VAR using many lag criteria such AIC, SIC and BIC. With the annual data, the maximum number of lags for parsimony is less than or equal to 3. The bound cointegration test is performed through a standard F-test for the joint significance of the lagged levels of the variables: $H_0: \beta_{i1} = \beta_{i2} = \beta_{i3} = 0$ against $H_1: \beta_{i1} \neq \beta_{i2} \neq \beta_{i3} \neq 0$. When a long-run relationship exists between the variables in Eq.(2), the F-test indicates which variable should be normalized. The normalization gives the statistic $F_y(y/x)$ where y is the dependent variable. As discussed by Pesaran et al. (2001), the F-test has a non-standard distribution; they provide two asymptotic critical value bounds.[8]

To determine whether a trend t should be included in the specification, Eq.(2) is estimated with and without a trend using least squares and the generalized method of moments. It turns out that a trend is needed only for the case of United Arab Emirates. For Kuwait, one impulse dummy $D91$ is required to transform the residuals to be normally distributed. The dummy variable $D91$ controls for the invasion of Kuwait known as the Iraq-Kuwait war, which was closely related to the crude oil production quota of OPEC members. The bound critical values are not valid with an impulse dummy in Eq.(2); however, these critical values will be valid when we consider dummy D91 as an outlier point using the program TRAMO (Gómez & Maravall 2001) allowing us to obtain the corrected series of GDI/GDP for Kuwait. The standard lag selection criteria from the underlying VAR model for the conditional ECM i.e., Eq.(2) and the related Lagrange Multiplier (LM) statistics for residual serial correlation suggest that the optimal lags lie between 1 and 4.[9] For Bahrain, Oman and Saudi Arabia, equation (2) is estimated by fully modified GMM (Kitamura and Phillips 1997) to determine the statistical significance of the relevant parameters. The calculated F-statistics and some residual diagnostics are reported in Table 1.1 and Table 1.2 (Appendix), respectively.[10] Because the F-statistics are larger than the upper bound critical values, the null of no cointegration (H_0) can be rejected at the 1% significance level for Saudi Arabia and the UAE and at the 5% significance level for the other GCC countries.

[8] The lower value of the F-statistic assumes that the variable is I(0) and the upper value supposes that the variable is I(1). If the calculated F-statistic lies above the upper bound critical value, then the null hypothesis of no cointegration is rejected. This null hypothesis is accepted if the F-statistic falls below the lower critical value.

[9] Because the serially uncorrelated errors assumption is so important for the validity of the bounds tests, we apply the general-to-specific model reduction procedure by successively eliminating the least significant variables of the ARDL model. This process leads us to select $k = 3$ for Bahrain and Oman and $k = 2$ for Kuwait, Saudi Arabia, Qatar and United Arab Emirates.

[10] For Bahrain, Kuwait, Oman, United Arab Emirates and Saudi Arabia, the ARDL model corresponds to a specification with an unrestricted intercept and no trend: the relevant critical value bounds are from Table C1.iii. For Qatar, the ARDL model corresponds to a specification with an unrestricted intercept and an unrestricted trend: the relevant critical value bounds are from Table C1.v.

All the p-values exceed the conventional significance levels. Table 1.2 (Appendix) shows that the residuals do not display any signs of autocorrelation, conditional heteroskedasticity or non-normality. Furthermore, for Kuwait, Qatar and UAE, the CUSUM of squares tests indicate that the equations estimated by least squares are stable. For the other countries (Bahrain, Oman and Saudi Arabia), Eq.(2) is estimated by fully modified GMM (Kitamura and Phillips 1997); this estimation procedure requires an appropriate test of stability. Following Andrews (1993) and using the GMM estimators, the data may be stationary or non-stationary under the null hypothesis of parameter stability. The stability test can perform well in cointegrated models that include at least many extra lags of each variable with correct lag order without affecting the distributional result under the null hypothesis (Dolado & Lutkepohl 1996). To test the stability, we use statistics from the W-test and the O-test.[11] Under the null hypothesis, the over-identifying restrictions are valid before and after the break point (Hall and Sen 1999). Due to the sample size, the break point year (1997) is chosen by partitioning the sample in two equal subsamples. The results of the composite null hypothesis based on the W- and O-tests unanimously indicate that the parameters are not a source of instability and that the over-identifying restrictions are valid in both subsamples. Thus, statistically valid inference can be drawn for a level relationship between $(I/Y)_t$ and $(I^*/Y)_t$.

Table 1.1 Bound cointegration test

Country	H_0	F-stat.
BAH	$\beta_2 = \beta_3 = 0$	6.436*
OMN	$\beta_2 = \beta_3 = 0$	6.738*
SAR	$\beta_2 = \beta_3 = 0$	9.144†
QTR	$\beta_1 = \beta_2 = \beta_3 = 0$	8.444*
KWT	$\beta_2 = \beta_3 = 0$	7.425*
UAE	$\boldsymbol{\beta_2 = \beta_3 = 0}$	9.804†

Note: † and * denote the 1% and 5% level of significance, respectively. The critical value bounds for I(0) and I(1) are from Pesaran et al. (2001). Critical values from Table C1.iii with an unrestricted intercept and no trend: (6.84; 7.84) at 1% and (4.94; 5.73) at 5%. Critical values in Table C1.v with an unrestricted intercept and an unrestricted trend: (8.74; 9.63) at 1% and (6.56; 7.30) at 5%.

Table 1.3 Stability tests: Andrews & Fair (1988), Hall & Sen (1999)

Country	BAH	OMN	SAR
W-statistic	65.934 [0.00]	59.245 [0.00]	13.948 [0.03]
O-statistic	5.772 [0.22]	5.489 [0.24]	1.761 [0.41]

Note: Numbers in brackets are the p-values.

[11] The null hypothesis of the O-test has an advantage in two situations that arise in empirical work. The first situation is that only the parameter values have changed, but all other features of the model have remained the same (Hall & Sen 1999). The second situation is that instability causes a more fundamental misspecification, which can be reflected in a violation of the null hypothesis.

When cointegration is confirmed to involve stationarity of the estimated error e_t, we can use the Stock (1987) approach after the estimation of Eq.(2) and check for robustness using the Phillips and Loretan (1991) procedure (Herzer & Schrooten 2008). Nevertheless, other single equation methods such as fully modified OLS (FMOLS) by Phillips and Hansen (1990), canonical cointegration regression (CCR) by Park (1992) and dynamic OLS (DOLS) by Saikkonen, Stock and Watson (1992) could serve to check for robustness of the results by estimating the long-run elasticity α_{i2} directly from the ARDL equation.[12] The equation of Phillips-Loretan (1991) is determined as follows:

$$\left(\frac{\mathrm{I}}{Y}\right)_{\mathrm{it}} = \lambda' y_t + \sum_{j=1}^{p} \rho_j \left(\frac{I_{it-j}}{Y_{it-j}} - \lambda' y_{t-j}\right) + \sum_{j=-q}^{q} \gamma_j \Delta \left(\frac{\mathrm{I}^*_{\mathrm{it-j}}}{Y_{it-j}}\right) + \sum_{k=1}^{m} \gamma_k D_{kt} + \varepsilon_{\left(\frac{\mathrm{I}}{Y}\right)_{it}} \quad (3)$$

where $\lambda' y_t = (\alpha_{i0} \;\; \alpha_{i1} \;\; \alpha_{i2}) \begin{pmatrix} 1 \\ t \\ \frac{\mathrm{I}^*_{\mathrm{it}}}{Y_{it}} \end{pmatrix}$, α_{ij} represents the conditional long-run multiplier and D_{kt} is an impulse dummy. The Phillips-Loretan equation is estimated with up to three lags and leads ($q = 3$). The impulse dummies are introduced to achieve normally distributed residuals. From the lagged error-correction term $ect_{t-1} \coloneqq \sum_{j=1}^{p} \rho_j \left(\frac{I_{it-j}}{Y_{it-j}} - \lambda' y_{t-j}\right)$ derived from the second term of Eq.(3), the final stage obtains the short-run dynamic coefficients from the ECM in Eq.(4):

$$\Delta \left(\frac{\mathrm{I}}{Y}\right)_{\mathrm{it}} = \mu + \sum_{j=1}^{p} \varphi_{1j} \Delta \left(\frac{\mathrm{I}}{Y}\right)_{\mathrm{it}-j} + \sum_{j=0}^{q} \varphi_{2j} \Delta \left(\frac{\mathrm{I}^*}{Y}\right)_{\mathrm{it}-j} + \sum_{k}^{m} \varphi_{3k} D_{kt} + \theta ect_{it-1} + v_{\Delta\left(\frac{\mathrm{I}}{Y}\right)_{it}} \quad (4)$$

where $(\varphi_{1i}, \varphi_{2i})$ are the short-run dynamic coefficients and θ is the speed of adjustment to the long-run equilibrium.

3.2. Estimation of the long-run relationship

Having found that $(I/Y)_t$ and $(I^*/Y)_t$ are cointegrated, the next stage is to estimate the long-run parameters. We make use of the simple Stock (1987) approach and obtain the long-run coefficients from Eq.(2) by dividing the estimated coefficients on $(I^*/Y)_t$ by the absolute values of the estimated coefficients on $(I/Y)_t$: $\hat{\alpha}_2 = \hat{\beta}_3 / \left|\hat{\beta}_2\right|$. Table 2 displays the results.

[12] In our empirical work, the DOLS equation is more comparable to the Phillips-Loretan equation than to FMOLS or CCR, which do not involve an augmented cointegrating regression.

Table 2 Long-run relationship: Stock (1987) procedure

	BAH	KUW	OMN	QTR	SAR	UAE
$\hat{\beta}_2$	-0.386	-0.621	-0.693	-1.412	-0.219	-0.683
	(-3.57)	(-3.74)	(-3.67)	(-4.97)	(-2.26)	(-3.88)
$\hat{\beta}_3$	-0.217	-5.196	0.972	6.210	0.272	0.934
	(-1.75)	(-1.81)	(3.36)	(4.55)	(4.09)	(4.02)
$\hat{\boldsymbol{\alpha}}_2 = \hat{\boldsymbol{\beta}}_3/\lvert\hat{\boldsymbol{\beta}}_2\rvert$	-0.562	-8.367	1.402	4.398	1.242	1.367

Note: Numbers in parentheses are the t-statistics.

For Qatar, the UAE, Oman and Saudi Arabia, the coefficients on $(I^*/Y)_t$ are positive; for Bahrain and Kuwait, these coefficients are negative. For Qatar, the coefficient is 4.398, which implies that a one-dollar increase in inward investment leads to a more than four-dollar increase in domestic investment. Accordingly, in Qatar, the investment effects are substantial and indicate the presence of positive spillovers from IFDI to the domestic economy. For Oman, Saudi Arabia and United Arab Emirates, these positive spillovers are tiny: a one-dollar increase in FDI leads to less than a two-dollar increase in domestic investment, as discussed in AlObaidan (2002). Additionally, Roberts and Almahmood (2009) conclude that exporters to Saudi Arabia do not invest there.

However, for Kuwait, the coefficient on $(I^*/Y)_t$ is -8.367; this value implies that domestic investment decreases by 8.36 dollars with a one-dollar increase in inward FDI. This result is not surprising: according to IMF and UNCTAD data reports, GCC countries, with the exception of Kuwait, are net importers of FDI.[13] In addition, for Kuwait, inward FDI constitutes a minor share of GDI; therefore, IFDI might simply be too marginal to have a serious growth impact. For Bahrain, a one-dollar increase in inward investment leads to a greater-than-half-dollar decrease in domestic investment. Possible factors behind this result are the gap in the privatization process of public enterprises in Bahrain compared to other GCC countries and the limited oil supplies of Bahrain.

3.3. Test of Robustness

To ensure the robustness of our findings, the Phillips-Loretan equation is used for all panels. Nevertheless, for Bahrain, Oman and Saudi Arabia, the long-run coefficients are robust for cointegrated variables because they are obtained from fully modified GMM.

[13] The GCC countries still account for more than 60% of all foreign investment flows to the Arab world (UNCTAD, World Investment Report 2011, Table A in the Appendices).

Table 3.1 Phillips-Loretan (1991) procedure: nonlinear LS

	$\hat{\alpha}_2$	R^2	$LM(2)$	$ARCH(2)$	JB
KUW	-8.633 (-2.37)	0.83	2.00 [0.17]	0.94 [0.40]	1.05 [0.59]
QTR	4.428 (8.93)	0.97	0.88 [0.78]	0.31 [0.74]	0.12 [0.94]
UAE	1.403 (4.07)	0.84	0.12 [0.89]	1.04 [0.37]	0.56 [0.75]

Note: Numbers in parentheses are the t-statistics, and p-values are in brackets.

After applying the general-to-specific modeling approach to equation (3), the estimated coefficients on $(I^*/Y)_t$ in Tables 3 are roughly equal to the corresponding $\hat{\alpha}_2$ values in Table 2. Indeed, our results for Kuwait, Qatar and United Arab Emirates are robust to different estimation procedures. For other countries, we use also the Phillips-Loretan (1991) procedure to obtain the corresponding error correction terms that will be introduced in the dynamic ECM equation (4). Overall, the results from the Phillips-Loretan procedure suggest that our results are robust to different estimation methods, including the DOLS procedure (Appendix, Table 3.3).

Table 3.2 Phillips-Loretan (1991) procedure

	$\hat{\alpha}_2$	R^2	$LM(2)$	$ARCH(2)$	JB
BAH	-0.564 (-2.68)	0.79	0.13 [0.88]	0.32 [0.73]	0.76 [0.69]
OMN	1.430 (1.84)	0.83	0.44 [0.65]	0.11 [0.74]	3.09 [0.21]
SAR	1.158 (2.78)	0.89	0.17 [0.69]	0.21 [0.65]	0.64 [0.73]

Note: Numbers in parentheses are the t-statistics, and p-values are in brackets.

3.4. Test of causality

In testing for Granger (1988) causality, we introduce the residuals from the long-run relationships in Tables 3; these estimates correspond to the second term of the right-hand side of Eq.(3). The appropriate residuals are included as error correction terms in Eq.(4); we allow for up to three lags. For each of the GCC countries, we have the following error correction terms:

$$ect_t(KUW) := \left(\frac{I}{Y}\right)_t - \left[0.314 - 8.633\left(\frac{I^*}{Y}\right)_t\right]$$
$$ect_t(BAH) := \left(\frac{I}{Y}\right)_t - \left[0.396 - 0.564\left(\frac{I^*}{Y}\right)_t\right]$$
$$ect_t(SAR) := \left(\frac{I}{Y}\right)_t - \left[0.111 + 1.158\left(\frac{I^*}{Y}\right)_t\right]$$
$$ect_t(UAE) := \left(\frac{I}{Y}\right)_t - \left[0.252 + 1.403\left(\frac{I^*}{Y}\right)_t\right]$$
$$ect_t(OMN) := \left(\frac{I}{Y}\right)_t - \left[-0.161 + 1.430\left(\frac{I^*}{Y}\right)_t\right]$$
$$ect_t(QTR) := \left(\frac{I}{Y}\right)_t - \left[0.130 - 0.002t + 4.428\left(\frac{I^*}{Y}\right)_t\right]$$

Table 4 reports the results of the ECM from Eq.(4) after applying the general-to-specific model reduction procedure. To make easy the comparison between GCC countries, we summarize the estimated GDI elasticities with regard to FDI in the Fig. 3.

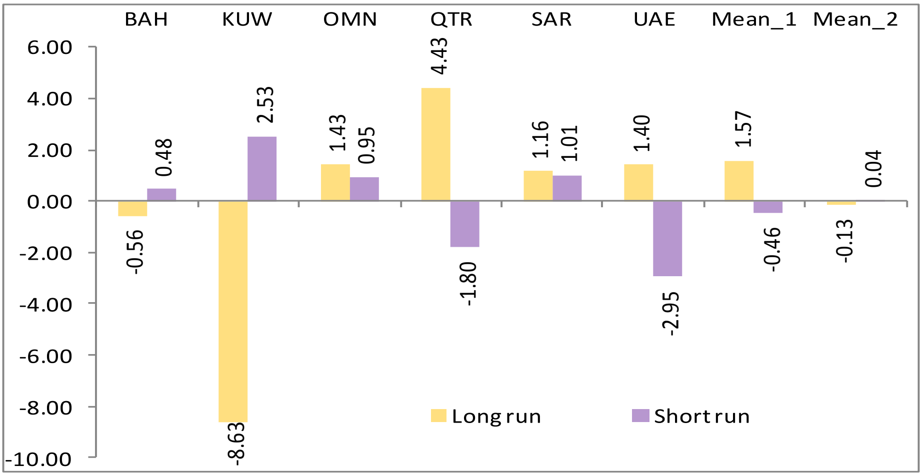

Fig. 3 Long and short run elasticities of GDI to FDI in GCC countries
Note: Mean_2 is for all countries. Mean_1 is calculated without Kuwait.

On average without the exceptional case of Kuwait, the long run elasticities have large magnitude compared to their short run counterparts. We expect that even if the short run elasticity is negative, the long run elasticity has a large positive effect on domestic investment. Hence, for the majority of GCC countries these results justify to attract the foreign direct investment. Oman and Saudi Arabia exhibit positive elasticities in short and long run. These results could be explained by the facts that Oman and Saudi Arabia are more open to private foreign GCC and non-GCC investors in financial and real sectors. In the other side, Qatar and UAE have less concentrated banking sector than the other GCC countries, but this sector still open only for foreign GCC banks.

Saudi Arabia, UAE and Qatar attract the high level of IFDI in GCC region (Table A) by accumulating more than US$ 44 billion during 2009. The foreign investment flows lead to buy new imported machinery and increase output in many sectors. These mechanisms could explain the high level of the long run elasticities in Qatar, Oman, UAE and Saudi Arabia, respectively (Fig. 3). These empirical findings are compatible with the UNCTAD report about investment perspectives in GCC countries (UNCTAD 2011). Furthermore, the economic policies of governments in Qatar, UAE and Saudi Arabia plan to reduce economic dependence on the oil and gas sectors by accelerating growth and diversifying the economy through non-oil and non-gas foreign investments. The investment in construction and commerce sectors, in addition to Greenfield investment, constitute business opportunities in the long run. While most of our results validate the findings of previous research (as Sadik & Bolbol 2001, Desai & Foley & Hines 2005, Herzer & Shrooten 2008, Roberts & Almahmood 2009), the comparison of the impact of IFDI reveals disparate results across GCC-countries. This disparity requires more investigation and could be explained by several factors such the gap in privatization process, the nature and size of foreign investments, the degree of financial sophistication, the openness to foreign non-GCC banks, the level of development of the economy, the shocks that each country encounters, and the policies adopted by different governments.

The lagged error correction terms have the expected negative sign and are statistically significant, which implies the existence of a relationship between IFDI and domestic investment for each of the GCC countries. The long-run Granger causality indicates that the IFDI has a long-run effect on GDI; it also indicates that the speed of adjustment is very fast for the UAE, Kuwait and Qatar. However, the speed of adjustment from any disequilibrium towards the long-run equilibrium is more gradual for SAR, Bahrain and Oman. For all GCC countries, the short-run effects are statistically significant except for Kuwait, and the sign is either positive or negative as indicated in Table 4. The same signs are also already established from Eq.(2). Therefore, for Bahrain, Saudi Arabia and Oman, IFDI has a positive short-run effect, but a negative long-run effect on domestic investment. Meanwhile, for the UAE and Qatar, IFDI has negative short- and long-run effects. Saudi Arabia exhibits opposite effects compared with Qatar and the UAE: the short-run effect on Saudi domestic investment is negative, while the analogous effect in Qatar and the UAE is positive. Additionally, for Saudi Arabia, the short-run impact of inward FDI has a positive sign; however, the short-run impact is negative for the UAE and Qatar. The results of a Wald test indicate that the lagged first difference of IFDI intensity for Bahrain, Saudi Arabia and the UAE jointly affects the first difference of the GDI intensity. These results reveal a short-run crowding-in effect for Bahrain and Saudi Arabia, but a short-run crowding-out impact for the UAE.

4. Discussion

We shall argue that the differences in elasticities are likely to reflect the variations in resource endowment and attractiveness capacity of FDI across the GCC countries. We can briefly discuss some non-standard features of investment in oil-exporting developing economies. Part of the difficulty stems from the fact that the government holds exclusively the ownership and extraction rights to hydrocarbon resources. The oil-export revenues affect directly the balance of payments and accrue directly to the national treasuries. The saving must in turn be allocated to either domestic capital formation or accumulation of foreign assets (Ghassan et al. 2011). The domestic capital formation has the advantages to develop the capacity of oil export, and to diversify the domestic production and export, and thereby reducing the dependence on the oil and gas sectors. Generally, the level of domestic investment depends on complementary resources, supply of skilled labor and domestic market size. The IFDI can reduce such constraints when foreign investors target both domestic and international markets leading to induce more domestic investment. However, it remains that too high level of GDI may result in an increase in prices of non-tradable goods, due probably to the low level of competitiveness.

A further feature of the Gulf countries is that the private domestic investment is low relative to public investment. The government should break down the vicious loan-credit cycle and expand the joint domestic private local and foreign investment projects. The investors seek high return opportunities, whereas developing countries look for technologies and large share of world markets. In 1990s, the private to public investment ratio was less than 2:1, whereas for the OECD countries it was over 6:1 (Sala-i-Martin & Artadi 2002). The low level of private investment can be explained by the low decoupling level of the non-oil sector from the oil sector –resulting in an apparent rareness of investment opportunities. The IFDI seeks to capture new opportunities mainly when the financial markets of the host economy are more developed and competitive, reducing then the monopole of banks. The financial liberalization, between markets across the world, contributes to increase the financial flows, extending direct and financial investments (Bracke & Fidora 2008). The dominance of public ownership in many companies caused low levels of financial development in the GCC region (Sala-i-Martin & Artadi 2002). Bohnet et al. (2010) find that in Kuwait, Oman and UAE, a high minimum trustworthiness threshold is required compared to the USA and Switzerland. Another feature of the financial markets is that bank investments in securities are higher in public than private sector.[14] The situation is largely exacerbated during economic downturn caused by the unexpected decrease of oil prices leading to public sector's borrowing from the banking system. The IFDI can promote domestic capital formation in GCC region, when the direct investments are more diversified and heavily re-directed towards construction, real-estate, high education, financial intermediation, insurance, ICT, water, solar energy and other sectors in addition to traditional oil and gas and wholesale and retail trade sectors. It will also increase the export of the total non-oil-export reaching for example in Saudi Arabia 73% in 2006 and 58% in 2009 (Source: SAGIA Annual Report of FDI, 2010). We expect that the IFDI in real-estate is more speculative and hence has limited positive spillover effect participating little to economic progress in comparison to the IFDI in construction. This latter may contribute to diversify the productive base of the GCC economies and could upgrade labor skills.

To sum up the previous discussion, two main elements describe a picture of the investment processes in GCC region: (i) the GDI is crucially affected by the public investment, which in turn is affected by foreign investors both leading to improve the productive capacity of the GCC economies; (ii) the domestic productive capacity may

[14] In Saudi Arabia, the private share in bank securities during 2008 is 1.2% and 12.0% for the public sector. In contrast, bank credits are higher in private sector with 40.6% than the public sector with 1.8% only (author's calculation source: SAMA Annual Economic Reports and Bulletin 44, 2009).

strictly limit the non-inflationary level of domestic investment producing non-tradable goods, but the foreign investment may be not constrained by domestic capacity when the output can also be oriented to the international markets. These elements suggest the existence of linkage between GDI and IFDI, where the causality runs from IFDI to GDI and the investments are limited by the available saving resources and the non-inflationary level of domestic public and private investments (Basher & Fachin 2013).

The big residual public savings are used for the accumulation of foreign assets serving the dual purpose of stabilization and precautionary saving (World Bank, 2006). For instance, since 2006 the ratio of international liquidity to GDP in Saudi Arabia becomes greater than 100% (Ghassan et al. 2011). Following Nowak, Andritzky, Jobst & Tamirisa (2009), we expect that the international liquidity shocks could occur from domestic (good or bad) news when the fiscal policy decide to increase the investment to GDP ratio or when the domestic stock markets become less (more) volatile requiring less (more) domestic liquidity. Furthermore, the international liquidity shocks could happen from external financial markets as during the last international financial crisis or during high increase in the external asset prices. Since the short and long-run effects of the financial markets shocks on economic growth do not exhibit negative signs, and then there is no crowding-out between domestic investment and investment in foreign assets. But, it remains that the long-run shifting from saving glut effect to absorption effect would increase the investment-to-GDP ratio, which is in average, during the two last decades, less than 20% (Kenc & Dibooglu 2010).

Considering the factor related to the domestic productive capacity, we observe in particular, for Kuwait that his absorptive capacity is extremely limited in industrial and agricultural sectors in comparison to the other GCC economies. Kuwait's rate of domestic investment is the lowest among GCC members (Fig. 2), possibly because of the low level of the government investment in infrastructure. The limited domestic productive capacity has persuaded Kuwait government to invest a large share of its oil revenue in foreign assets. The income from these assets helped Kuwait to deal with financial and political crises happening in 1982 and 1990. In contrast, the high investment rates in Qatar, followed by UAE and Saudi Arabia, can be explained by their efforts to diversify the economic activities, which lead to expand the non-oil production capacities to the gas production and the non-hydrocarbon production. This expansion in the gas sector has made Qatar the world's leading exporter of Liquefied Natural Gas (LNG). The export of LNG is driven by the long-run contracts, helping Qatar's economy to be decoupled partially from volatility of oil prices (Pindyck 2004). In particular, the development in Qatar is behind the high significant positive correlation 0.889 (with the P-value equals to 9.7E-12) between IFDI and GDI in comparison with other GCC members.[15]

[15] This correlation is also positive and significant for Oman and Saudi Arabia with 0.458 (P-value=0.008) and 0.442 (P-value=0.011), respectively; whereas, for United Arab Emirates, Kuwait and Bahrain, this correlation is not significant.

The UAE is considered among the GCC the least dependent on oil. In addition, the State of Dubai, the second largest Emirates in the UAE, has emerged as the leading financial center in the Middle East region. Since Bahrain and Oman are relatively smaller in oil resources, they were under severe pressure to generate and diversify economic activities. Looney (2009) shows a detailed comparative analysis of development in Bahrain and Oman. The Saudi Arabia is the largest GCC country with the highest IFDI. Since 1990, the private sector is encouraged to take part of the investment opportunities. The burden of defense and security budget constitutes on average half of the total government expenditures (Author's calculation based on SAMA Annual Report 48, 2012), but the ratio of investment to GDP still be in average around 20% and then lower than the East Asian economies.[16] However, if the crowding-out effect is verified in the Saudi Arabia economy, it does not signify the unavailability of capital. The international market affects the domestic banking markets by attracting the Saudi liquidity and reduces the loanable funds available for local investors (Claessens et al. 2001). The Saudi Arabia investment effort appears to be lower owing the slight declining of public investment and stagnating private investment rates. Furthermore, compared to other GCC economies the Saudi Arabia is more integrated in terms of international liquidity invested in USA and slightly in Europe and Asia, but the domestic financial markets still less integrated to the world financial markets compared to other GCC members, which is due to the low foreign participation in the domestic financial sector.[17]

5. Conclusion

The empirical evidence implies that in the Qatar, Oman, the UAE and Saudi Arabia, inward FDI has positive long-run effects on domestic investment. This complementary relationship means that multinational corporations stimulate domestic investment by combining their production in the host economy with home nation production. However, for Bahrain, such a complementary relationship exists only in the short-run: in the long run, IFDI is a weak substitute for domestic investment. For Kuwait, the substitution is considerable, indicating a long-run loss of IFDI attractiveness due to the flight of domestic capital abroad. For Qatar and the UAE, in the short-run, a decrease in IFDI might increase domestic investment. The contribution of FDI to domestic investment is generally positive for the majority of GCC countries. Even if Kuwait is a net exporter of FDI, it does not reach the optimal resource allocation. By looking abroad for profitable foreign opportunities, Kuwait needs more strategic policies to reallocate scarce funds by increasing domestic investment and attracting FDI, as is done in other GCC countries. Furthermore, any policy makers encouraging FDI should prioritize the improvement of domestic investment by increasing the competitiveness of the economy in international markets. Such a focus allows for more exports and

[16] The mean of the investment rate of South Korea, Singapore and Thailand is around 32% during 1980-2006. For more details, Kim & Jeon (2013).

[17] For more details and discussion see Al-Hassan et al. (2010).

boosts the efficiency gains from technology spillovers in domestic firms and foreign affiliates.

Firm- and industry-level data may be particularly useful for differentiating among FDI oriented toward oil exports, non-oil exports and the domestic market. Additionally, the effects of FDI in high-value-added manufacturing activities might differ from those in extractive sectors. Such sectorial analyses may provide valuable insights into the interactions between FDI and GDI.

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Appendices

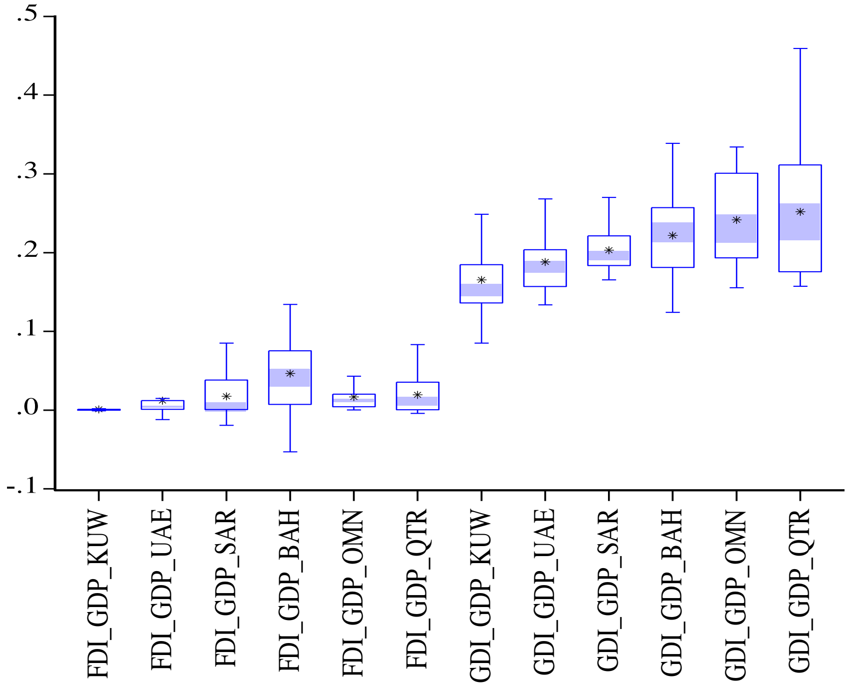

Fig. 1 Ratio of GDI and FDI to GDP for all GCC countries

Table A Global data of the GCC countries

	BAH	OMN	SAR	KUW	QTR	UAE
SCR [a]	Stable A	Stable A	Stable AA-	Stable AA-	Stable AA-	Stable AA-
CA to GDP 2009 [b]	2.9	-1.3	5.6	23.6	10.2	3.0
CA to GDP 2010	4.9	8.8	14.9	27.8	25.3	7.0
IFDI 2009 [c]	257	1508	32100	1114	8125	4003
IFDI 2010	156	2333	28105	319	4670	5500

Notes: [a] represents the Sovereign Credit Rating (SCR) determined by Capital Intelligence Agency for Mid-December 2010. [b] stands for the share of Current Account (CA) to GDP in percent (Source: IMF.stat). [c] corresponds to Inward FDI (IFDI) in US$ millions (Source: UNCTAD, WIR, 2011).

Table 1.2 Diagnostic tests

Country	Diagnostic tests						
	R^2	SE	$LM(1)$	$LM(4)$	$ARCH(1)$	$ARCH(4)$	JB
BAH	0.43	0.04	0.28 [0.60]	0.64 [0.65]	0.43 [0.52]	1.78 [0.17]	0.16 [0.92]
KWT	0.55	0.02	0.11 [0.74]	0.12 [0.97]	0.02 [0.89]	2.05 [0.13]	0.84 [0.66]
OMN	0.32	0.04	0.28 [0.60]	0.48 [0.75]	0.39 [0.54]	1.52 [0.24]	0.82 [0.66]
QTR	0.79	0.03	0.01 [0.92]	0.77 [0.56]	0.48 [0.50]	0.99 [0.43]	1.47 [0.48]
SAR	0.51	0.01	0.08 [0.78]	0.59 [0.68]	1.51 [0.23]	1.58 [0.22]	0.87 [0.65]
UAE	0.66	0.02	1.33 [0.26]	1.11 [0.40]	0.03 [0.87]	0.38 [0.77]	0.47 [0.79]

Notes: The numbers in brackets below the diagnostic test statistics represent the p-values. $LM(k)$ is the Lagrange Multiplier test for serial correlation based on k lags. $ARCH(k)$ is for testing for heteroskedasticity. JB is the Jarque-Bera test for normality.

Table 3.3 Estimation of long-run coefficients by the DOLS procedure

	BAH	OMN	SAR	KUW	QTR	UAE
$\hat{\alpha}_2$	-0.518	1.355	0.784	-5.532	4.717	1.533
	(-1.13)	(1.94)	(4.34)	(-2.43)	(5.14)	(2.89)
R^2	0.58	0.73	0.89	0.70	0.92	0.78

Note: Numbers in parentheses are the t-statistics.

Table 4 Long-run and short-run causality using ECM

	KUW	BAH	SAR	UAE	OMN	QTR
Constant	0.114 (2.35)	-0.178 (-3.26)	0.099 (3.77)	-0.036 (-3.07)	-0.126 (-1.74)	0.116 (2.94)
$\Delta\left(\frac{I}{Y}\right)_{t-1}$	0.314 (2.24)		-0.420 (-2.65)			0.362 (2.28)
$\Delta\left(\frac{I}{Y}\right)_{t-2}$		0.489 (3.61)		0.515 (5.92)		
$\Delta\left(\frac{I^*}{Y}\right)_{t-1}$		0.191 (3.35)	0.483 (2.58)	-1.331 (-5.44)		-1.797 (-3.72)
$\Delta\left(\frac{I^*}{Y}\right)_{t-2}$	2.526 (1.94)	0.290 (5.42)	0.529 (2.62)	-1.619 (-2.96)	0.950 (3.69)	
ect_{t-1}	-0.534 (-4.83)	-0.215 (-2.41)	-0.224 (-2.12)	-0.730 (-6.21)	-0.166 (-1.91)	-0.433 (-2.14)
$D82$	-0.046 (-2.05)				-0.050 (-2.44)	-0.079 (-12.9)
$D83$	-0.050 (-2.15)			-0.048 (-10.4)		
$D85$		0.122 (3.97)				
$D86$	-0.055 (-2.49)	-0.059 (-2.09)		-0.047 (-8.06)		-0.009 (-1.92)
$D87$			-0.026 (-1.73)		0.123 (5.69)	
$D88$		0.088 (2.92)				
$D90$				0.037 (11.27)	0.044 (2.17)	
$D91$						
$D93$			-0.025 (-1.94)			
$D94$						-0.050 (-9.70)
$D98$			-0.037 (-2.74)		-0.080 (-4.00)	
$D99$					0.082 (3.80)	0.124 (23.17)
$D00$				0.036 (8.41)	0.076 (3.79)	
$D07$	-0.047 (-2.09)					
$D09$						-0.066 (-2.55)
Diagnostic tests						
R^2	0.71	0.74	0.70	0.80	0.86	0.70
$LM(2)$	1.098 [0.35]	0.836 [0.45]	0.119 [0.89]	1.062 [0.37]	2.215 [0.14]	0.352 [0.71]
$ARCH(2)$	0.236 [0.79]	0.595 [0.56]	0.910 [0.35]	0.208 [0.81]	0.257 [0.78]	1.504 [0.24]
JB	0.535 [0.76]	0.138 [0.93]	1.113 [0.57]	0.344 [0.84]	0.529 [0.77]	0.769 [0.68]

Note: The numbers in parentheses are the t-statistics; the p-values are in brackets.