Outflow FDI and Domestic Investment: Aggregated and Disaggregated Analysis

Waqar Ameer 1,2, Helian Xu 2,*, Kazi Sohag 3, and Syed Hasanat Shah 4,*

1 School of Economics, Shandong Technology and Business University, Yantai 264005, China; waqar.ameer@yahoo.com
2 School of Economics and Trade, Hunan University, Yuelushan, Changsha 410079, China
3 Graduate School of Economics and Management, Ural Federal University, 620002 Yekaterinburg, Russia; ksokha@urfu.ru
4 School of Economic, Jilin University, Changchun 130012, China
* Correspondence: xuhelian@163.com (H.X.); haist@jlu.edu.cn (S.H.S.); Tel.: +86-13037319676 (H.X.)

Abstract: Recently, the Gulf Cooperation Council (GCC) member countries increased their foreign investment outflows (OFDI), underpinning domestic investment (DCF) and diversifying their economies to reduce the reliance on hydrocarbon economies and augmenting green investments. Thus, our research study examines the effects of OFDI on aggregate capital formation and the decomposing effects of capital formation in to private as well as public investment by applying the common correlation effects (CS-ARDL) panel data methodology in the GCC countries. Our empirical result findings show that OFDI do not significantly spur domestic investment in the GCC countries. However, our disaggregated analysis shows that OFDI significantly contributes to private capital formation only while its contribution to public capital formation remains inconclusive. The extensive public involvement in the economies causes a crowding-out effect, eventually impedes the economic diversification, competitiveness and green activities. Our empirical evidence provides a few policy implications.

Keywords: outbound FDI; inbound FDI; private capital formation; GCC; panel data; CS-ARDL

JEL Classification: C23; F21; F22; F23

1. Introduction

The Gulf Cooperation Council (GCC) is the economic alliance of six gulf economies i.e., (Kuwait, Qatar, Oman, Bahrain, Saudi Arabia, and the UAE). The GCC countries signed a charter in 1981. The GCC has evolved and unified into an economic bloc over more than four decades. The GCC economies seriously depend on hydrocarbon earnings. Even today, the situation is not different. The GCC countries have relied on hydrocarbon to maintain a better standard of living, accumulate foreign exchange reserves and improve infrastructure over the last four decades. Hydrocarbon contributed a lot to the GDP of the GCC countries (see Figure 1) during the period of 2000 to 2017 (IMF, 2018) (https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/12/04/pp120618gcc-trade-and-foreign-investment (accessed on 4 December 2018)). Since then, the dynamic of the oil market is changing rapidly due to the production of renewable energy, technological advancement, the discovery of more proven oil reserves and environmental policy. Hence, the GCC economies aim to reduce their reliance on the hydrocarbon economy. Hypothetically, this is an alarming situation for the hydrocarbon-addicted GCC countries (Figure 1). They need to diversify or face the consequences. In addition, the sustainable investment dynamic is paramount for the sustainable development in GCC countries. Anecdotal evidence shows that GCC countries significantly augment their FDI outflow from 2004 (Figure 2). Aggregated OFDI sharply increased from USD 20,000 million
to approximately USD 70,000 from 2004 to 2008. Mainly, the GCC countries invest in many Asian countries (China, Japan), the European Union (France, Italy, Cyprus and Iceland), the USA, etc.

![Total Natural Resources Rents (% of GDP) in 2019](image)

**Figure 1.** Outward foreign direct investment from GCC countries. Source: WDI, 2019 (https://databank.worldbank.org/).

![OFDI from GCC Countries](image)

**Figure 2.** Outward foreign direct investment from GCC countries. Source: UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics). Author’s Calculation.

Domestic capital, especially private capital, is a linchpin in the process of diversification (IMF, 2018) (https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/12/04/pp120618gcc-trade-and-foreign-investment (accessed on 4 December 2018)). Domestic capital works as a buffer to absorb economic shocks and help to maintain economic stability at home. The GCC countries are aware of this fact, and they adopted multipronged strategies, including luring foreign direct investment inflows (IFDI) and increasing their stake in OFDI to encourage domestic investment. IFDI and OFDI boost domestic investment through diverse channels. For instance, IFDIs encourage domestic investment by bringing in capital, technology and technical knowledge [1–5]. Nevertheless, outbound investment stimulates DCF by connecting domestic investors to the international market [6–8]. The effects of OFDI on domestic investment is a bit tricky in comparison to that of the IFDI. The OFDI contributes to domestic investment if it is backed by excess savings reserves and abundant exchange reserves of an economy (called ‘firepower’
by Wu (2008)). Otherwise, Outward foreign direct investment financing from domestic capital market might critically and negatively influence domestic investment. Secondly, OFDI decreases cost and raises the return to domestic capital market by engaging efficient capital and labor abroad and, hence, lead to upsurge in the domestic investment [8,9].

From a theoretical perspective, OFDI may affect domestic capital formation through different channels such as financial perspective and the production side. From the financial point of view, an increase of OFDI flows in an ineffective financial market may create excess money supply in the domestic market. Consequently, interest rates may rise and, due to the rise in interest rates, it will be hard for local firms to borrow and invest. Hence, OFDI negatively effects domestic capital formation through the financial market and, thus, hampers the economic growth of the country. When firms invest in the production base of host countries via production source, it reduces the exports thereby decreasing the foreign exchange reserves of the source country. Though, if firms connect their outbound investment to backward and forward connections in the source country, it can favorably upsurge the exports of the country. From the production point of view, OFDI may have complementary effects on domestic capital formation and thus, may positively affect economic growth. Accordingly, OFDI may neutrally, negatively or positively influence the economic development of the domestic country [7–10].

Nevertheless, several empirical studies argue that OFDI can impede the economic diversification process in the host countries. The outcome from OFDI is conditional with many other exogenous factors [7,11,12]. OFDI inversely influences domestic capital formation through two different channels. First, it can affect domestic capital formation through domestic financial markets as multinational firms invest in foreign economies by shifting a portion of private domestic savings from their home country. Due to the constraint of financial capital, a trade-off relation may occur between domestic investment and outward foreign direct investment (OFDI) in the foreign economies. Second, OFDI can hinder domestic capital formation even through the channel of goods markets [9]. Many empirical studies observed an adverse impact of OFDI on domestic capital formation for the USA, Japan, Germany and the UK [13–16]. Such contrasting empirical evidence motivates us to reassess the subject more robustly.

We emphasized on GCC economies for many reasons. For instance, the role of IFDI in the GCC countries has received central attention; however, the role of OFDI in the GCC countries is still an unexplored territory despite a marked increase in OFDI from the GCC countries (Figure 3). Thus, in our paper, our key focus is to comprehend the impact of growing OFDI on the domestic investment in the GCC economies. We assume that domestic capital formation and connectivity to the global international market will diversify the GCC economies away from hydrocarbon. Another central question that we explore in this study is the decomposition of aggregate domestic investment into public investment and private investment. The literature considers private investment and public investment to be very different from each other [17,18]. Private capital is supposed to enhance productivity, increase efficacy and diversify economic activities, while public investment is considered to be the other way around. Public investment (PUBI) and private investment (PRI) usually crowd-out each other. Thus, aggregating them together can result in an aggregation bias issue. Thus, to address this issue, in our study, we separately explore the effects of OFDI on public capital formation (PUBI) and private capital formation (PRI) in the GCC countries. This study also explores the relation between public investment and private investment in the presence of OFDI in the GCC countries. We deem the significant and favorable effects of OFDI on private investment to be a good sign for diversification and economic stability. Figure 1 shows that gross domestic investments are increasing over time in all GCC countries. From 2010 to 2015, PRI in the Gulf economies vacillated within the range of 32 to 34 per cent of the GDP; PUBI ranged within the limits of 20 to 23 per cent of the GDP. Figure 4 shows the OFDI increase from 2005 in most of the GCC countries.
Our empirical research study contributes to the existing economic literature in several ways. We extend the prior works of [19] but with significant differences. Notably, we specify our model by contextualizing a few more relevant control variables, including institutional quality. In addition, our estimation is more robust as we utilize an updated dataset and control the common correlation bias. We address the shortcomings of prior literature by decomposing domestic capital formation and estimating the effects of FDI on aggregate domestic investment (DCF) simultaneously to reduce omitted variable bias.

First, the GCC countries are closely connected through political, economic, financial, trade, factor mobility and cultural integration. Therefore, to address the potential common correlation effects is an important issue to obtain unbiased estimators. We tackle a common correlation biased issue by applying CS-ARDL (Cross-Sectional Dependency–Autoregressive Distributive Lags) methodology, where this framework is robust in the presence of common correlation effects in the long-term and short-term. Furthermore, this
CS-ARDL is formulated under the Error Correction Mechanism (ECM). Thus, this approach provides long run and short-term coefficients along with error correction coefficients by imposing long-term homogeneity and short-term heterogeneity restrictions. In addition, our empirical study measures the long-term and short-term impacts of OFDI on aggregated and disaggregated (private investment and public investment) capital formation in the GCC economies. We also incorporate a structural break in our empirical models. Importantly, we scrutinize whether the crowding in and crowding out impacts exist between public investment and private investment in the framework of the GCC countries. Our findings echo the realities of the GCC countries, as OFDI insignificantly explains the public capital formation. In contrast, it significantly explains the private capital formation as the hydrocarbon economy largely contributes to public capital formation. Our empirical results provide several policy implications.

Our research study is arranged into five sections. Section 2 is the review of literature. Section 3 illustrates the data and methodology. Section 4 comprises of the result estimations and discussion, and Section 5 consists of the conclusion.

2. Literature Review

This study carefully reviews the prior literature to enhance the understanding between OFDI and domestic capital formation from the theoretical and empirical points of view. The study of [20] analyzed the effects of the unanticipated permanent increase of PUBI on the changing aspects of private investment. The effects of public investment on private investment depend upon numerous factors in the long-term, such as (1) how public investment intermingles with private investment in production (2) the degree of congestion interconnected with public investment and (3) the process of finance [20]. Public investment is considered a durable capital good, which is subject to congestion. The effects of public investment on private capital formation involve an inverse relationship between the amount of substitution between private investment and public investment in production and the portion of congestion. If lump-sum tax financing, as well as distortionary tax financing, is also considered, then the trade-off relationship is more tightened in the latter case [20]. The study of [21] has analyzed 578 sample estimates gathered from 68 studies from a time span of 1983 to 2008. This empirical study evaluates the average output elasticity of public investment as well as detects the variation sources across studies by applying fixed and random effects meta-regression methods. Empirical result findings claim that the output elasticity of public investment is underestimated in OECD economies in the existing research literature [21]. The study of [22] highlighted three objects for firms focused on investing abroad (i.e., market-seeking, efficiency-seeking and strategic asset-seeking). The strategic asset-seeking motive is seen to improve domestic investment as new knowledge and technologies improve the productivity at home, therefore based on this channel, the outward investment will have favorable effects on the DI. The vertical FDI is seen as complementing trade as it helps with relocating parts of the production chain to the host country. On the basis of endogenous growth theories, the modernization theory deems FDI a principal cause of capital reserve accumulation and productivity enhancement (Learning by doing and learning by watching are the two important channels of FDI spillover impact) [23,24]. Modernization theory further rationalizes the key productive role of IFDI in the host countries by assigning IFDI the role of a prime force behind the increase in investment, technology transfer, encouraging competition, relaxing the borders for international trades and also providing strong support for infrastructure development together with an enhancement in the labor productivity skills and management [25]. However, some studies consider that IFDI adversely affects domestic capital formation [26].

The empirical literature about the OFDI and domestic capital nexus is divided into three main categories. The first-tier emphases is on the positive role of OFDI in augmenting domestic capital formation [8,9]. The studies conducted by [8] and [9] focused on the United States, where their investigations discovered that OFDI augments domestic capital formation in the long-term. Specifically, the research analysis conducted by [9] based on
seven multinational companies of the USA from a time span of 16 to 20 years has shown a significant and positive association between outbound investment and domestic capital formation. Similarly, the study conducted by [27] demonstrates that outbound investment positively and significantly affects domestic capital formation by using the GMM methodology on industrial-level data. Furthermore, the study conducted by [28] examined the nexus between outward foreign direct investment and domestic capital formation in China by applying time series ARDL approaches, including bivariate and multivariate Granger causality models. The resulting findings show that there is a positive unidirectional causality running from OFDI to domestic investment in the long-term. However, there is no causality relationship that exists between OFDI and domestic investment in the short-term [28]. OFDI is likely to stimulate domestic capital formation by means of firms that export capital and intermediate goods [12].

The second strand of literature highlights the negative effects of outbound investment in promoting domestic investment [29,30]. The study conducted by [30] has used annual aggregate data for 46 developing economies to investigate whether inbound investment displaces private capital formation. The findings of [30] concluded that countries with strong institutional quality receive FDI; there is also an argument that inbound investment crowds out domestic capital formation and the level that inbound investment crowds out private capital formation is linked with good institutional quality. Governance indicators such as political indicators and corruption highly impact domestic private investment. Political stability is considered the most crucial governance indicator of institutional quality in defining the nexus between foreign direct investment and private capital formation. In essence, an increase in inbound investment reduces private investment to a large extent in politically stable regimes [30]. The study conducted by [14] using datasets for OECD countries and found that a dollar of outward FDI leads to the reduction in DI by about one dollar. Moreover, [8] and [14] conducted cross-country studies based on macroeconomic datasets to investigate the increase in flows of outbound investment leading to a decrease in the domestic investment in an interesting one-to-one ratio. The research study conducted by [30] argues that inbound investment displaces aggregate domestic capital formation.

The last strands of literature show a mixed relation between OFDI and domestic capital formation [13]. For example, the study conducted by [19] analyses the effects of aggregate and disaggregates FDI on domestic investments in the GCC region. The findings show that FDI inflows stimulate public capital formation but deter private capital formation. Outbound investment stimulates private capital formation but discourages public investments. Inbound investment in oil produces a favorable effect on public capital formation, and non-oil inbound investments neutrally influence domestic capital formation in the GCC region [19]. In addition, the findings of [16] claim that improvements in the construction of the proxies and refinements in the estimation methodology reverse the findings of research literature such as [30]. This study has investigated the effects of the OFDI on private investment for GCC economies by applying feasible generalized least squares (FGLS) and panel corrected standard error (PCSE) methodologies and concluded that OFDI significantly complements private investment in the GCC countries. GCC economies should boost private capital formation to decrease their dependence on the public economy and reduce their reliance on hydrocarbon-addicted economies [31]. This study has examined whether OFDI either expands or obstructs public and private capital formation for developed and emerging economies by integrating institutional quality as a key important factor in our model. Our result estimations recommend policy implication that OFDI expands private investment for developed countries. Institutional quality (IQ) is considered to be a key factor to endorse private investment in the developed economies. However, OFDI is negatively associated with public investment in the developed countries, while IQ is positively linked with public capital formation. On the contrary, our result findings show that OFDI insignificantly effects private and public capital formation for emerging countries. Remarkably, for emerging economies, IQ has unfavorable effects on both private and public capital formation [32].
This study has investigated the nexus between outward foreign direct investment and domestic capital formation in the context of GCC countries. The resulting estimations show that domestic investment negatively and significantly effects foreign direct investment outflows in the long run by controlling cross-sectional dependency issues in the panel of GCC countries. However, domestic investment has insignificant effects on outward foreign direct investment in the long run if we assume that there is no cross-sectional dependency in our GCC countries. The result findings suggest that ignoring cross-sectional dependency in the data set may result in spurious result estimations [33]. Furthermore, the study conducted by [16] concludes that there is no substantial evidence that good governance positively affects domestic capital formation. For Germany and the USA, the empirical analysis was conducted by [34]. They conclude that OFDI negatively influences domestic capital formation in the long-term in the case of Germany. In contrast, there are positive effects of OFDI on the domestic investments in the short-term for Germany. Similar results were confirmed by the study conducted by [13] for the US, Japan, Germany and the UK using data covering the time from the 1960s to the 1990s. If OFDI displaces the exports, its effects on the domestic investment remain ambiguous. Outbound investment decreases domestic capital formation if it replaces exports, or if a firm transfers its production and manufacturing services from the source to the host country. On the other hand, while displacing the exports of final products, perhaps it will boost the exports of unfinished products from parent companies in the home country; the net impact remains unclear [12].

3. Research Methodology, Variable Description and Dataset

3.1. Data Description and Source (Data will Be Provided Based on the Request)

Our research work comprises of a panel of six GCC economies. We obtain the panel time series data over a period from 1993 to 2017 based on the availability of the dataset. Our dependent variable is the DCF normalized with the GDP. We disaggregate our dependent variable into private capital formation (% GDP), and public capital formation (% GDP) as PUBI plays an essential role in GCC countries, which is mostly obtained from natural resource rent. As our primary concern variables, we consider OFDI normalized with the GDP. We consider a few relevant control variables to reduce the omitted variable bias problem. The control variable of this study includes IFDI as a percentage of the GDP, the GDP growth rate (GR), the quality of institutions and the total trade share of GDP, known as trade openness (TRD) in the case of the GCC countries. We exclude the interest rate in the investment function due to the characteristics of the banking system of the GCC countries as they follow the Islamic principles, somewhat prohibiting interest rates and following profit sharing approaches. All respective variables are transformed into natural logarithms. The definition, description and source of the dataset is reported in Table 1.

| Variable | Description                                      | Theoretical Explanation of the Variables                                                                 | Source |
|----------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------|
| DCF      | Domestic Capital Formation share of GDP          | Domestic capital formation increases productivity as well as helps achieve technical development and stimulate economic activities in a country [17]. Outbound investment positively stimulates the production of the local industry in the source countries by providing them access to adequate finance, advanced technology, sufficient financial resources, technical skills as well as access to the global chain of production [35]. | WDI    |
| OFDI     | Foreign Direct Investment Outflows share of GDP  | IFDI increases production and stimulates the exports in recipient countries by transporting capital assets, latest technologies as well as access to financial and managerial expertise [36]. | WDI    |
| IFDI     | Incoming Foreign Direct Investment share of GDP  |                                                                                                          | WDI    |
Table 1. Cont.

| Variable | Description | Theoretical Explanation of the Variables | Source |
|----------|-------------|------------------------------------------|--------|
| GR       | GDP Growth rate of the GCC countries | GDP growth expands socioeconomic activities, enhances productivity, boosts technical skills and stimulates economic development in a economy [18]. Private capital formation stimulates as well as enhances output, sharpens technical and professional development as well as encourages economic development in a country [37]. | WDI    |
| PRI      | Private Capital Formation share of GDP | Classical economists assert that public investment negatively influences economic activities [17] while Keynesians claim that it positively contributes to economic development of the economy [38]. | IMF Fiscal Affairs Department |
| PUBI     | Public Capital Formation share of GDP | Trade openness diversifies an economy and stimulates economic development in a economy [39]. | IMF Fiscal Affairs Department |
| TRD      | Trade Openness. Total trade share of GDP | Institutional Quality reduces cost of business, safeguards property rights and provides an encouraging environment for business to thrive [40]. | WDI    |
| IQ       | Quality of institutions in the GCC Countries. Index values | | International Country Risk Guide (ICRG) dataset |

3.2. Cross-Sectional Dependency and Panel Unit Root Tests

The GCC economies are interlinked through trade, political, economic and cultural integrations. Due to such strong integrations, a common correlation effect among the economies is created, which should be accounted for in any empirical framework. Since this study deals with FDI inflows and outflows, the issue of cross-sectional dependency or common correlation effect is more pronounced. The research study of [41] claims that cross-correlation happens normally because of spatial spillover effects, omitted common factors and interconnection as well as interlinkage within the socioeconomic network [41]. Thus, the outbound investment in one country is dependent on the outbound investment in another country in the Gulf economies. This is also true for inbound investments. Hence, in this study, we use the CS-ARDL framework to solve the problem of common correlation effects in our proposed study. To check for common correlation effects in the panel data with the null hypothesis of cross-sectional independence against the alternative hypothesis of cross-sectional dependence, this study applies the methods of Pesaran (2004) [42] as follows:

$$CD = \left( \frac{TN(N-1)}{2} \right)^{1/2} \tilde{\rho}$$

where $$\tilde{\rho} = \left( \frac{2}{N(N-1)} \right)^{1/2} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}$$ and $$\hat{\rho}_{ij}$$ denotes the pairwise, cross-sectional correlation coefficient of the residuals obtained from the ADF regression. $$N$$ and $$T$$ denote the cross-section and time dimensions, respectively. In the presence of a cross-sectional dependency in our variables, we have used a second generation panel unit root that can capture the cross-sectional dependency bias by taking into account the common correlation terms. We have applied the second-generation panel unit-root CIPS test proposed by Pesaran (2007) [43]. The panel time series dataset requires the stationary check of the variables. The first-generation panel unit root test approaches consider the cross-sectional independence across units [44–46]. Nevertheless, the following second-generation unit root test methods not only solved the problem of cross-correlation effects across units, but they also solve out the problem of structural breaks in the panel unit root test [43,47–50]. To check the common correlation effects in the dataset, we assess the subsequent regression by a cross-sectional, augmented Dickey–Fuller (CADF) panel unit root (CIPS) test as:

$$\Delta y_{it} = \alpha_i + K_i t_i + \beta_i y_{it-1} + \gamma_i y_{t-1} + \phi_i \Delta y_{t-1} + \varepsilon_{it}$$

(2)
where \( t = 1, \ldots, T \), \( i = 1, \ldots, N \). and \( \bar{y}_t \) enotes the cross-sectional mean of \( y_{it} \), which is derived from 
\[
\bar{y}_t = \frac{1}{N} \sum_{i=1}^{N} y_{it}
\]
. The null hypothesis of Equation (2) is \( H_0 : \beta_i = 0 \) for all \( i \) and the alternative hypothesis is \( H_a : \beta_i < 0 \) for some \( i \). Pesaran (2007) [43] provides the cross-sectional augmented panel unit root (CIPS) test statistic as:
\[
CIPS(N, T) = \frac{1}{N-1} \sum_{i=1}^{N} t_i(N, T)
\]
where \( t_i(N, T) \) in the Equation (3) denotes the t-statistic for \( \beta_i \). A CD test is applied to confirm cross-sectional dependency issues in the variables. Panel unit root (CIPS) results are displayed in the Table 3.

3.3. Empirical Model and Method

Prior studies have mainly applied different approaches such as Autoregressive Distributed Lags (ARDL) or Generalized Method of Moments (GMM). However, the GMM panel data methodology controls the endogeneity issue, but it is not an effective approach if there is a presence of cross-sectional dependency and structural break issues in the panel dataset. The system GMM approach suffers from many drawbacks or demerits in the studies based on \( T \), i.e., time dimension \( >N \) in the cross-section (large \( T \) and small \( N \)). On the opposite side, the CS-ARDL approach not only controls the endogeneity issue but also solves the problem of cross-sectional dependence and captures the long- and short-term effects of the variables. Our model can be displayed as follows:

\[
DCF_{it} = a_i + \beta_{1i} OFDI_{it} + \beta_{2i} IFDI_{it} + \beta_{3i} GR_{it} + \varepsilon_{it}
\]

where \( DCF_{it} \) represents the domestic capital formation in the GCC countries. The variable of key importance in our study in Equation (4) is the sign and scale of coefficient of outbound investment. Still, we are also quite keenly focused to exactly know the impact of inbound investment and GDP growth (GR) on the aggregate domestic investment in the GCC countries. In order to capture more properly the effects of OFDI on aggregate domestic investment in a more comprehensive way, we also add several control variables in our model to Equation (4). The control variables are selected based on the existing empirical literature and is symbolized by ‘X’. Here, we report our extended model as follows:

\[
DCF_{it} = a_i + \beta_{1i} OFDI_{it} + \beta_{2i} IFDI_{it} + \beta_{3i} GR_{it} + \beta_{4i} X_{it} + \varepsilon_{it}
\]

The error term and coefficients in Equation (5) follows same characteristics of coefficients and the error terms and in Equation (4). Nevertheless, as we proceed further, we will add several explanatory variables such as the public capital formation (PUBI), private capital formation (PRI), trade openness (TO) and institutional quality (IQ) into the GCC countries in Equation (4). The addition of explanatory variables will not only strongly explain the economic condition of the GCC economies, but it will also provide strong robust checks to our existing findings. Equations (4) and (5) capture the effects of the OFDI, IFDI, GR and other explanatory variables on the aggregate domestic capital formation in the GCC countries. To go a step further and explore the impact of OFDI and key explanatory variables on the PUBI and the PRI in GCC countries, we will replace \( DCF \) in Equations (4) and (5) with \( PRI \) and \( PUBI \), respectively. Hence, we use CS-ARDL.
approach in this study to control the cross-sectional dependency issues in our dataset as follows:

\[
\Delta Y_{it} = \mu_i + \varphi_i(Y_{it-1} - \beta_iX_{it-1} - \phi_2\overline{Y}_{t-1} - \phi_3\overline{X}_{t-1}) + \sum_{j=1}^{p-1} \lambda_{ij}\Delta Y_{it-j} + \sum_{j=0}^{q-1} \zeta_{ij}\Delta X_{it-j} + \eta_1\Delta\overline{Y}_t + \eta_2\Delta\overline{X}_t + \epsilon_{it}
\]

Here, \( Y_{it} \) (DCF) is the dependent variable, \( \mu_i \) is the intercept and \( \beta_{it} \) is the slope coefficients of independent variables and a lagged dependent variable. \( X_{it} \) (OFDI, IFDI and GR) is a vector of the independent variables. Furthermore, \( \varphi_i \) is the error correction term (ecm) and denotes an adjustment of short-term disequilibrium towards long-term equilibrium after an economic shock. \( Y_{t-1} \) and \( X_{t-1} \) denote a proxy for the unobserved factors in the long-term, while \( \Delta\overline{Y}_t \) and \( \Delta\overline{X}_t \) provide a proxy for the unobserved factors in the short-term.

4. Result Estimations, Analysis and Discussion

4.1. Descriptive Data and Figures

We report our descriptive statistics and result findings in Table 2. We start our analysis on result estimations by reporting the descriptive statistics in Table 2. For our whole panel dataset, the average level of OFDI (% GDP) is 1.45 while the average level of aggregate domestic capital formation (% GDP) is 21.21. Moreover, the average level of IFDI (% GDP) in the GCC economies is 2.365 while the average level of institutional quality is 5.6 out of total 12 in the GCC countries. The standard deviation of trade openness is higher compare to that of macro-economic variable in our empirical study.

Table 2. Descriptive data and estimations.

| Variable | Obs | Mean  | Std. Dev. | Min   | Max   |
|----------|-----|-------|-----------|-------|-------|
| DCF      | 150 | 21.212| 5.112     | 10.480| 34.520|
| OFDI     | 150 | 1.450 | 3.172     | −10.350| 9.550 |
| IFDI     | 150 | 2.362 | 3.760     | −5.285| 33.560|
| GR       | 150 | 5.222 | 5.833     | −7.071| 33.990|
| PRI      | 150 | 26.155| 12.833    | 8.233 | 70.221|
| PUBI     | 150 | 14.866| 9.400     | 3.588 | 50.577|
| TRD      | 150 | 85.266| 32.100    | 39.078| 87.877|
| IQ       | 150 | 5.600 | 0.942     | 3.800 | 7.600 |

4.2. Cross-Sectional Dependence and Panel Unit Root Testing

First, we have to diagnose the common correlation effects in the errors. After checking cross-sectional dependency issues in our dataset, we have to conduct unit root tests on our panel dataset. The panel unit root test for cross-sectional independent dataset might produce biased and spurious estimations if estimated on data which have common correlation effects in the dataset [51]. We will apply Pesaran’s (2004) cross-sectional dependency methodology in order to examine common correlation effects in the panel dataset [42]. The cross-sectional dependency (CD) test of Pesaran (2004) considers the average of the pairwise correlations of the ordinary least squares’ residuals from the individual regressions in the panel dataset. The CD test of Pesaran (2004) tends to produce unbiased estimators as the cross-country numbers increase and reach to infinity [42]. Our null hypothesis assumes that there are no common correlation effects (CD) in the variables against the alternative hypothesis of the existence of common correlation effects (CD) in the variables among the respective panel of 6 GCC countries. The findings reported in Table 3 for the cross-sectional dependency (CD) test clearly exhibits that each series suffers from cross-sectional dependency issues. Table 3 also reports correlation (\( \rho^{*} \)) results, and its coefficient is quite high across the variables. Hence, this study has applied Pesaran’s
We have applied cross-sectional dependency (CS-ARDL) methodology to address the issue of common correlation effects in our panel time-series data in our research study. The result findings are reported in Table 3. We solve common correlation bias both in the long-term and short-run. Cross-Sectional Augmented-Autoregressive Distributed Lags (CS-ARDL) imposes short-term heterogeneity and long-term homogeneity on estimated parameters. Since CS-ARDL is executed under the error-correction framework which provides the speed of short-term adjustment towards the long-term equilibrium.

4.3.1. Analyzing Effects of Inbound Investment and Outbound Investment on Aggregate Domestic Formation (DCF) in the Gulf Economies

In Model 1, we estimate the impact of OFDI on DCF in the framework of GCC countries. Table 4 reports the results. Model 1 comprises four different sub-models. Model 1.1 controls the role of OFDI, IFDI and GR (GDP growth rate), whereas Model 1.2 additionally controls the trade openness (TRD), M1.3 controls institutional quality (IQ), and M.14 includes a structural break.

The error correction coefficients appear to be negative and significant in all four models (M1.1, M1.2, M1.3 and M1.4), which confirms the long-term convergence towards the equilibrium (Table 4). Specifically, the speeds of convergence of M1.1, M1.2, M1.3 and M1.4 are 17.35%, 43.13%, 26.97% and 53%, respectively, towards the long-term equilibrium in a year. The coefficients of OFDI are positive but insignificant consistently over the four models in the long-term, implying that OFDI plays an insignificant role in spurring gross domestic capital formation in GCC economies. Our empirical finding is in line with [7] and [12], those who document inconclusive results between outbound investment and aggregate capital formation. In the framework of GCC countries, OFDI and domestic investment can be mutually exclusive or have an insignificant linkage, as public investment is mostly defined by the natural resource rent. Thus, we argue that OFDI may appear to be neither complementary nor substitutable with domestic investment. We provide more economic justifications to support our finding in the disaggregated analysis in the next sections.

Nevertheless, our analysis in the Table 4 shows the coefficients of inflow of IFDI is significant and negative in M1.1 and M1.3, signifying that IFDI impedes DCF in the long run. This trade-off relation between IFDI and DCF can be explained by the fact that the inflow of FDI can crowd out the local investment. Our empirical finding is in harmony with [52], who documented a trade-off result between IFDI and domestic capital formation. Our results are supported by [53–56], which find evidence for crowding-out effects of
inbound investment (IFDI) on domestic capital formation in Poland in 1990. In addition, our findings echo [52], which argues that multinationals have higher probability to access finance and productivity benefits compared to local industries.

Table 4. Result estimations for aggregate capital formation as the dependent variable (CS-ARDL).

| DV: DCF | M1.1       | M1.2       | M1.3       | M1.4       |
|---------|------------|------------|------------|------------|
| Error Correction (EC) | −0.173 *** | −0.431 *** | −0.269 *** | −0.538 *** |
| (−3.160) | (−4.455)   | (−3.100)   | (0.147)    |

Long-term estimates

|          | M1.1       | M1.2       | M1.3       | M1.4       |
|----------|------------|------------|------------|------------|
| OFDI     | 0.548      | 0.447      | 0.391      | 0.022      |
| (1.451)  | (1.36)     | (1.64)     | (0.224)    |
| IFDI     | −0.812 *** | 0.021      | −0.398 **  | 0.010      |
| (−2.67)  | (0.110)    | (−2.333)   | (0.108)    |
| GR       | 0.207      | −0.081     | 0.131      | 0.024      |
| (0.531)  | (−0.900)   | (0.522)    | (0.056)    |
| TRD      | −0.054 *** | −0.100 *** | −0.050 *** |
| (−4.355) | (−3.133)   | (0.008)    |
| IQ       | 1.039      | 0.752      |
| (0.532)  | (0.755)    |
| SB       | 5.535      | 5.355      |
| (0.907)  | (0.907)    |

Short-term estimates

|          | M1.1       | M1.2       | M1.3       | M1.4       |
|----------|------------|------------|------------|------------|
| Δ OFDI   | −0.1976    | −0.2281    | −0.2717    | −0.538 *** |
| (−1.01)  | (−1.05)    | (−1.27)    | (0.147)    |
| Δ IFDI   | 0.006      | −0.0491    | 0.1435     | −0.353     |
| (0.11)   | (−0.69)    | (1.40)     | (0.295)    |
| Δ GR     | 0.0371     | 0.0102     | −0.0214    | 0.155      |
| (0.36)   | (0.18)     | (−0.34)    | (0.127)    |
| Δ TRD    | −0.0451    | −0.0202    | 0.0359     |
| (−1.30)  | (−1.02)    | (0.0702)   |
| Δ IQ     | 3.3089 *** | −0.0153    |
| (3.60)   | (0.0229)   | (3.085 *** |
| Constant | 6.5960 *** | 4.3242 *** | 2.8801 **  | 10.21 ***  |
| (2.91)   | (5.35)     | (2.08)     | (2.714)    |

Note: Table 4 displays the result estimations of the effects of outbound investment (OFDI) on the domestic investment (DCF) for Gulf Economic Cooperation (GCC) countries from 1993 to 2017 annually. ***, ** and * denote significance level of the coefficients at 1%, 5% and 10%, respectively. The T-Values are in parentheses.

Regarding our control variables, GDP growth appears to be insignificant in explaining the domestic capital formation of GCC economies in the long-term. A significant and negative coefficient of trade openness (TRD) signifies that it impedes domestic investment in the long-term. This might be the reason that local enterprises are less trade-oriented. Table 4 also shows a positive but insignificant coefficient of IQ, implying that IQ plays an inconclusive role in explaining domestic investment in the long-term. Interestingly, the coefficient of a structural break (0 before 2005 and 1 after 2005) is highly significant and positive, indicating that domestic capital formation augmented from 2005 due to economic reforms.

In our baseline model, the coefficient of OFDI insignificantly influences domestic capital formation in the short-term in the GCC countries. However, M1.4 displays that outbound investment impedes domestic investment in the short-term. Among the control variables, only institutional quality shows significant and positive effects on the domestic investment in the short-term in the GCC economies. Strong institutions are supposed to
decrease the financial cost of running a business in a country and accordingly, upsurge domestic investment. In addition, the strong institutions protect the legal property and business rights of an industry, which boosts investors’ confidence in the commercial setup. However, due to unexpected results, we need to further investigate the role of OFDI and domestic investment by disaggregating into public and private investments to comprehend the nexus as government fiscal expenditures play a significant role in GCC economies.

4.3.2. Analyzing Effects of Inbound Investment and Outbound Investment on Private Capital Formation in the Gulf Economies

At this stage, we estimate the effects of outbound investment on private capital formation in the GCC countries (Model 2). Table 5 reports the results from Model 2, which has five sub-models with a different set of control variables. The significant and negative error correction terms in M2.1, M2.2, M2.3, M2.4 and M.2.5 confirm the long-term equilibrium by adjusting the short-term disequilibrium in a year after an economic shock. Table 5 reports a positive and significant parameter of OFDI, which implies that it spurs private investment (DCF) in the GCC economies in the long-term and the short-term as well. Our finding implies that OFDI can be a useful policy tool to promote domestic capital formation and divert economic activities away from hydrocarbon in the Gulf economies. Our empirical finding is consistent with the finding of [19], who demonstrates that FDI outflows stimulate private investments but discourage public investments in Gulf countries.

The positive relationship of outbound investment with private investment also assures that outbound investment in the GCC is not financially supported from the private financial assets (The GCC countries have plenty and ample foreign exchange funds). Likewise, it also confirms that outbound investments in the GCC countries most probably link it to the multinational firms and, thus, it upsurges the efficiency and output of local industry. Additionally, IFDI and public investment do not influence private investment in the short run. However, as we move from the short-term to the long-term results in Table 5, we found that, except for trade openness, all the variables significantly impact private capital formation in the Gulf economies. OFDI, IFDI, public investment and institutional quality all report significant and expected impacts while GR is negatively significant, but GR influences private capital in an unexpectedly negative way. Our findings reconfirm in Table 5 that OFDI is a useful policy and strategy tool to diversify the GCC economies. Although IFDI also asserts positive and significant impacts on private investment in the GCC countries, the impact of IFDI on private investment is smaller than OFDI across all columns in Table 5. This shows that, compared to IFDI, OFDI can quickly reform the GCC counties. As expected, the public capital formation with negative coefficient suggests that increase in public capital formation in the Gulf economies decrease the private capital formation and vice versa. This finding underlines the neoclassical approach to public sector investment in which public investment crowds out private investment. On the backing of this finding, this study strongly recommends that the GCC countries slowly and gradually reduce the public control on economic activities and allow private investment to flourish. Private business will wipe inefficiencies and will imbibe the sense of competition and thus will promote diversification in the hydrocarbon-dependent GCC economies. Hence, quality institutions decrease the transaction costs of a business and bring economic stability to the economic system as well. Consequently, quality institutions positively stimulate private capital formation (i.e., our result estimations show that a one-unit increase in institution quality increases private capital by 11 units).

It is difficult to justify the negative and significant influence of the GDP growth in the GCC countries on private capital formation. However, when we consider that most of GDP growth (GR) in the GCC countries is coming from the government-controlled sectors, then it is easy to understand why GDP growth in the GCC countries does not contribute to private capital. Additionally, it slightly adversely affects private investment (DCF) in the GCC economies.
Table 5. Result estimations for private investment (PRI) as the dependent variable (CS-ARDL).

| DV: PRI | M2.1 | M2.2 | M2.3 | M2.4 | M2.5 |
|---------|------|------|------|------|------|
| **Long run** |
| Error Corr. | −0.144 ** | −0.203 * | −0.291 * | −0.234 ** | −0.374 *** |
| (−2.342) | (−1.688) | (−1.932) | (−1.977) | (0.109) |
| **Long-term estimates** |
| OFDI | 4.099 *** | 7.517 *** | 5.274 *** | 6.755 *** | 3.392 *** |
| (3.350) | (4.271) | (6.321) | (5.022) | (0.658) |
| IFDI | 0.593 | 2.102 ** | 0.970 * | 0.612 | 1.136 ** |
| (0.811) | (2.577) | (1.866) | (1.020) | (0.344) |
| GR | −0.957* | −0.723 ** | −0.669 *** | −1.030 *** | 0.090 |
| (−1.80) | (−2.31) | (−3.15) | (−2.97) | (0.260) |
| TRD | 0.100 | 0.122 | 0.060 | −0.090 *** | |
| (0.98) | (1.60) | (0.81) | (0.0315) | |
| PUBI | −0.578 ** | −0.81 * | −0.0923 |
| (−2.02) | (−1.88) | (0.163) |
| IQ | 11.55 * | 1.308 |
| (−1.86) | (2.270) |
| SB | 23.41 *** |
| (5.713) |
| **Short-term estimates** |
| ∆OFDI | 1.5113 ** | 1.9074 ** | 1.6255 ** | 1.7994 ** | 0.862 *** |
| (2.48) | (2.22) | (2.27) | (2.27) | (0.276) |
| ∆FDI | 0.0138 | 0.1132 | −0.1355 | −0.0291 | 0.373 *** |
| (0.04) | (0.39) | (−0.46) | (−0.11) | (0.115) |
| ∆GR | 0.1069 | 0.0639 | −0.0868 | −0.0510 | 0.00775 |
| (0.73) | (0.50) | (−1.04) | (−0.48) | (0.0696) |
| ∆TRD | 0.0175 | 0.0440 | 0.0468 | 0.0510 |
| (0.59) | (1.29) | (1.15) | (0.0466) |
| ∆PUBI | 0.0622 | 0.0070 | 0.233 |
| (0.23) | (0.03) | |
| ∆IQ | 1.3299 | 4.291 * |
| (0.92) | (2.479) |
| ∆SB | −3.779 |
| (2.526) |
| **Constant** | 7.5216 ** | 1.4619 | −3.2534 * | 0.57 | 8.617 *** |
| (2.00) | (0.74) | (−1.84) | (0.36) | (2.531) |
| **Observations** | 144 | 144 | 144 | 144 | 144 |

Note: Table 5 displays the result estimations of the effects of outbound investment (OFDI) on the private investment (PRI) for Gulf Economic Cooperation (GCC) countries from 1993 to 2017 annually. ***, ** and * denote significance level of the coefficients at 1%, 5% and 10%, respectively. The T-Values are in parentheses.

4.3.3. Analyzing Effects of Inbound Investment and Outbound Investment on Public Capital Formation in the Gulf Economies

At the last stage, we focus on estimating the dynamic effects of outbound investment on domestic public investment in GCC economies. Table 6 reports the results from Model 3 (Model 3 contains five different sub-models with a different set of control variables). The significant and negative coefficients of the error correction term confirm the existence of the long-term relationship and stability of all five sub-models in Table 6. The sign of coefficients of outbound investment are significant and negative in all models (except M3.2), which implies that it obstructs and hampers the domestic public investment (PUBI) of the Gulf economies in the long-term. Our research estimations are in line with many prior studies, e.g., [19], who demonstrates that FDI outflows stimulate private investments but discourage public investments in GCC countries. However, in our extended models, OFDI does not influence PUBI in GCC countries. In our base model, the coefficient of OFDI is lesser in the short-term relative to the OFDI coefficient in the long-term, which
shows that OFDI, in the long run, is a good policy option for domestic reforms in the GCC countries. The positive effects of outbound investment on the PRI (Table 6) and the adverse effects of outbound investment on the PUBI (Table 6) make it an ideal policy tool to fix the problem of economic diversity in the GCC economies. The effects of IFDI on public capital is insignificant except in the second extended model where IFDI positively influences PUBI in the Gulf economies. This finding reflects the ground reality in the GCC countries, i.e., major sectors are controlled by the government and therefore inflows of foreign investment in these or other supporting sectors directly increase public capital in the GCC countries. OFDI, trade and GDP growth all have a consistently negative impact of the public capital formation, while IFDI affects public capital in the GCC countries only in extended models, except in M3.4. Similarly, private capital has the right direction, i.e., negative, but the coefficients of private capital in Table 6 are insignificant.

Table 6. CS-ARDL results for public capital formation as the dependent variable.

| DV: PUBI | M3.1  | M3.2  | M3.3  | M3.4  | M3.5  |
|----------|-------|-------|-------|-------|-------|
| Error Corr. | −0.2555 *** | −0.4597 ** | −0.4473 ** | −0.4406 ** | −0.238 *** |
|           | (−3.800) | (−2.400) | (−1.500) | (−1.960) | (0.0855) |
| Long-term estimates | | | | | |
| OFDI | −1.0443 *** | 0.3320 | −1.475 *** | −1.123 *** | −1.047 ** |
|       | (−2.710) | (1.440) | (−7.690) | (−6.340) | (0.511) |
| IFDI | 0.6758 | 0.3190 ** | 1.3290 *** | 0.3764 | 1.890 *** |
|       | (1.240) | (1.980) | (3.550) | (1.640) | (0.550) |
| GR | −0.4884 ** | −0.1699 *** | −0.7211 *** | −0.504 *** | −0.207 |
|       | (−2.200) | (−3.270) | (−6.280) | (−5.150) | (0.128) |
| Trade | −0.0571 *** | −0.1050 *** | −0.047 *** | −0.0127 | |
|       | (−5.470) | (−5.830) | (−4.280) | | |
| PRI | −0.0909 | 0.0924 | 0.0924 | 0.0249 | |
|       | (−1.030) | (1.330) | | (0.0948) | |
| IQ | 4.440 | 2.607 | | |
|       | (0.220) | (2.069) | | |
| SB | 1.677 | | | | |
|       | (3.601) | | | | |
| Short-term estimates | | | | | |
| Δ OFDI | −0.5135 * | −0.3381 | −0.3532 | −0.1770 | −0.220 |
|        | (−1.830) | (−1.270) | (0.334) | (−0.920) | (0.177) |
| Δ IFDI | 0.0003 | 0.0275 | −0.790 | 0.3074 ** | 0.324 * |
|        | (0.000) | (0.610) | (0.122) | (2.080) | (0.196) |
| Δ GR | −0.1959 | −0.1399 | −0.1661 *** | −0.202 *** | −0.108 *** |
|        | (−1.63) | (−1.46) | (−4.77) | (−4.21) | (0.0349) |
| Δ Trade | 0.0089 | 0.0391 | 0.0376 | 0.0429 | |
|        | (0.210) | (0.650) | (0.660) | | (0.0669) |
| Δ PRI | −0.0680 | −0.0688 | −0.0927 | | |
|        | (−0.410) | (−0.430) | | (0.145) | |
| Δ INST | −0.342 | −1.595 | | |
|        | (−0.150) | (1.475) | | | |
| Δ SB | −2.636 | | | | |
|        | (2.390) | | | | |
| Constant | −0.5335 | −1.6530 | 5.980 *** | −0.7945 | −3.093 ** |
|          | (−0.62) | (−0.99) | (3.16) | (−0.83) | (1.401) |
| Observations | 144 | 144 | 144 | 144 | 144 |
| Country | 6 | 6 | 6 | 6 | 6 |

Note: Table 6 displays the result estimations of the effects of outbound investment (OFDI) on the public capital formation (PUBI) for Gulf Economic Cooperation (GCC) countries from 1993 to 2017 annually. ***, ** and * denote significance level of the coefficients at 1%, 5% and 10%, respectively. The T-Values are in parentheses.
For a robustness check, we estimated the Panel ARDL technique on our panel series data, however, the impact of the variable of interest in most of the cases was flawed and biased due to a non-control common correlation effects error. The results under the Panel ARDL produced insignificant and unexpected coefficients. Therefore, to save space, we did not display the result estimations of the ARDL (result estimations are available on demand).

4.3.4. Robustness Check

We apply Dumitrescu & Hurlin (2012) [57] Granger non-causality as a robustness check. Table 7 reports that, out of all variables, only trade and institutional quality Granger cause domestic capital formation. We find a somewhat reverse causality between domestic capital formation and outward foreign direct investment as well as domestic capital formation and trade. However, the reverse causality insignificantly influences the parameter of the CS-ARDL estimate.

Table 7. Dumitrescu & Hurlin (2012) Granger non-causality test.

| Pair      | \( \bar{Z} \) | Outcome | Pair      | \( \bar{Z} \) | Outcome |
|-----------|---------------|---------|-----------|---------------|---------|
| OFDI → DCF | 1.2056        | No      | DCF → OFDI | 10.8143       | *** Yes |
| IFDI → DCF | -0.3614       | No      | DCF → IFDI | 0.5071        | No      |
| GR → DCF  | -0.7747       | No      | DCF → GR  | -0.8778       | No      |
| Trade → DCF | 1.9002 **    | Yes     | DCF → Trade | 4.8475 ***   | Yes     |
| INST → DCF | 3.3940 ***    | Yes     | DCF → INST | -0.7973       | No      |
| PRI → PUBI | 0.7353        | No      | PUBI → PRI | 0.7353        | No      |

Note: Table 7 displays the bidirectional causal relationship between variables for Gulf Economic Cooperation (GCC) countries from 1993 to 2017 annually. ***, ** and * denote significance level of the coefficients at 1%, 5% and 10%, respectively.

5. Conclusions and Recommendations

Our research study explores impact of foreign investment, both inbound investment and outbound investment, on the domestic investment in the long-term and the short-term for the GCC economies. Thus, we apply the common correlation effects (CS-ARDL) panel data methodology approach to analyze our empirical models incorporating the structural break because of the existence of the cross-sectional dependence and non-stationary properties in our variables. Our empirical investigation retrieves several exciting findings. Firstly, for GCC economies, outbound FDI insignificantly influences aggregate domestic investment in the long run. We assumed that an outbound FDI and aggregate domestic capital formation nexus might work differently with the bifurcate aggregate capital formation into public and private investment. Our decomposed analysis result findings confirm that OFDI augments domestic private investment in the long run. We argue that the earnings from OFDI can eventually facilitate the local private capital formation through a channel of foreign exchange reserves in the long run. A stimulating and significant influence of outbound investment in promoting private investment implies that it can be a useful policy instrument to encourage domestic capital formation as well as diversify socioeconomic activities to reduce reliance on hydrocarbon in the GCC countries in the long run. OFDI connects local investors to international markets, and eventually enhances the local capital market and the economy as a whole. In addition, IFDI also promotes private investment in the long run.

Nevertheless, outbound investment failed to spur public capital formation. We supported our empirical findings by the anecdotal fact that public capital formation is mainly defined by the rent of natural resources in GCC economies. Interestingly, institutional quality positively stimulates and encourages private capital formation. In addition, our structural break dummy reveals that the GCC countries experienced a higher flow of capital formation after 2005. GDP growth insignificantly influences overall capital formation. Despite some novelty of this current study, another rigorous study is required considering the firm-level data and some gravity variables.
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