The Causal Relationships Between Corruption, Investments and Economic Growth in GCC Countries

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Abstract
This paper investigates the impact of corruption on economic growth and investments in the Gulf Cooperation Council countries over the period 2003 to 2016 using the panel vector error correction model and the panel fully modified ordinary least squares method developed by Pedroni. We find that there is at least one cointegration relationship between the variables. The results of Granger causality tests indicate that corruption does not cause economic growth, foreign and domestic investments in the short run. Moreover, we find that there is strong long run unidirectional causality running from corruption to economic growth, foreign direct investment, domestic investment, and domestic credit. Estimation of the panel fully modified ordinary least squares model indicates that corruption has a negative impact on economic growth whereas a positive influence on domestic investment. Hence, the policy implication resulting from this study is that the improvement of corruption perception index in Gulf Cooperation Council countries is not without a positive impact on economic growth in the long run for these countries even not for domestic investments.

Keywords
economic growth, corruption, panel cointegration, PVECM, panel FMOLS, GCC countries

Introduction
According to international organizations such as the International Monetary Fund (IMF, 1997, 2018), the World Bank (1997), and Transparency International (TI, 2003, 2011), corruption represents a major challenge for many nations. Moreover, the impact of corruption on investments and economic growth represents a debate through economists. For some authors, corruption is similar to a grabbing hand. It can limit economic growth by reducing investment activities through the increase of transaction costs, leading to misallocation of resources and undermining policy institutions functions (Chamseddine, 2016; Hakimi & Hamdi, 2017; Mauro, 1995). It deteriorates the infrastructure and increases the cost of public and private business activities (Hakimi & Hamdi, 2017; Wei, 2000; Zhao et al., 2003). The second stand of economists think that corruption can have a positive impact on investments and economic growth by facilitating and activating the creation of projects and business doing in countries with excessive bureaucracies and regulations (Bayley, 1966; Huntington, 1968; Leff, 1964; Méon & Weill, 2010). Thus, corruption is viewed as a “helping hand.” Accordingly, the results of empirical studies on the topic are controversial, and they do not give clear conclusions. Some empirical studies have confirmed that corruption greases the wheels (Evrensel, 2010; Huang, 2016; Wedeman, 1997) whereas others have found that it sands the wheels (Brunetti et al., 1997; d’Agostino et al., 2016; Gyimah-Brempong, 2002; Hakimi & Hamdi, 2017).

Some Middle East and North Africa (MENA) countries have experienced troubles and social upheavals since 2011 due mainly to corruption. Since this date, Gulf Cooperation Council (GCC) countries have undertaken some anti-corruption measures to avoid the spread of social tensions. The GCC countries have been able to keep abreast of the international community’s approach to protecting integrity and combatting corruption, and have initiated the establishment of a committee of heads of anti-corruption bodies in the Gulf Council in 2013 and to accede to and ratify the International Convention against corruption in 2013, as well as other relevant conventions. Moreover, the GCC countries have adopted legislation that would ensure justice and transparency in transactions.

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Thus, our research question is to study the effects of corruption on domestic investment, foreign direct investment, and economic growth in GCC countries. Does corruption play the role of “grabbing hand” or “helping hand” for the GCC countries. Precisely, the purpose of this study is to analyze the dynamic causal relationships between corruption, domestic investment, net foreign direct investment inflows, domestic credit to private sector, trade openness and economic growth in the GCC countries over the period 2003 to 2016 using panel cointegration techniques, Granger causality tests and fully modified OLS (FMOLS) method. We use the variable of corruption perceptions index as proxy for corruption, which was introduced by the TI for the first time in 1995. Since that date, TI is issuing the corruption perception index (CPI) annual observation for all countries around the world, according to the degree of the extent of the note the presence of corruption in staff and politicians. The organization defines corruption as the abuse of authority entrusted to personal interest. The CPI is one of the most important research issues of the organization TI, a leading global index that shed light on the corruption in the public sector and gives an annual overview of the relative degree of widespread corruption. CPI is a composite index based on corruption-related data collected through specialized surveys carried out by different institutions, independent and reputable. It reflects the opinions of business owners and analysts from all over the world, including the specialists and experts of the same country being evaluated. The CPI takes the values from 0 to 100. The higher grade 100 means no corruption while the least grade 0 means the most corrupt country in the 100-point system.

Many reasons can explain the importance of this study for the case of GCC region. First, the GCC countries have become a center for international business and investment activities. Second, the GCC countries have many common characteristics (in terms of language, culture, history, political system, and oil and gas resources). The analysis of such small group permits to control for differences between countries. Moreover, the abundance of oil and gas resources can provide an opportunity for authorities to obtain payments. Third, some GCC countries have undertaken various measures to limit the impacts of corruption in different sectors of the economy. According to the Transparency International Global Corruption Report (2011), 36% of citizens of the Arab countries repeatedly paid bribes to public state employees. Thus, knowing the impact of corruption on investments and growth for these countries will be interesting since all GCC countries are trying to reduce their oil dependence and diversify their economic activities after the fall of oil prices since November 2014.

This study starts from the fact that corruption is a phenomenon in all the countries of the world, whether developed or developing countries, without exception. What are summoned to confront this phenomenon are its negative effects on investments and economic growth. Even theoretically, the majority of studies confirmed that corruption is not good for domestic investment, foreign direct investment and economic growth; the findings of previous empirical studies are sometimes contradictory for some countries and regions. The contradicting findings are due to many factors such as the methods and techniques used, the variables used as proxy for corruption, the control variables considered, the periods of study, and the examined countries or panels of countries. This observation motivates our work to see what about the effects of corruption on investments and economic growth in GCC countries. Generally, some scholars have investigated the topic of corruption in MENA region. However, to our knowledge, studies on corruption in GCC countries are inexistent. Therefore, the main originality of this study is that it is the first work that investigates the impact of corruption on domestic investment, net FDI inflows, and economic growth in GCC countries. Moreover, we use sophisticated approaches such PVECM and panel fully modified OLS (FMOLS) methods. In addition, we integrate in the model two other control variables, which are domestic credit accorded to private sector and trade openness. Finally, this study will contribute to the investment-growth-corruption nexus literature and give more insights on which holds the grabbing hand or the helping hand of corruption for GCC countries.

The study is organized as follows. Section 2 presents an overview of some relevant previous theoretical and empirical studies that investigate the relationships between corruption, investments and economic growth. In section 3, we present the data and the different techniques and methods employed. Section 4 reports the different results and their interpretations. Finally, section 5 closes the paper by presenting some conclusions and policy implications.

A Brief Theoretical and Empirical Literature Review

In this section, we review the studies dealing with the relationship between economic growth, investments and corruption. Theoretical and empirical findings on the relationships between corruption and economic growth are controversial. The seminal paper of Leff (1964) was the first study that investigates the impact of corruption on economic growth. Since then, various theoretical and empirical studies have been undertaken to analyze the impact of corruption on economic growth or investments, but they have provided inconclusive results. These studies are conducted either for individual countries or for a group of countries.

Theoretical Review

There are a large number of theoretical investigations that study various channels through which corruption could affect investments and economic growth. Even, these theoretical essays are suggestive, they have some empirical support. The theoretical literature on corruption is controversial. It has
corruption could positively affect economic growth. They justify their findings by the fact that some corruption acts can help in overcoming the administration bureaucracy and inefficiency regulations by speeding up domestic and foreign investments, and thereby lead to economic growth. For these authors, bribery acts play the role of “speed money” and reduce the transaction costs. Corruption can facilitate the entrance of FDI inflows into the host countries. It can also positively affect economic growth because it improves the efficiency of public administrative agencies, decreases the transactions cost of time, and can improve economic efficiency in certain cases when individuals or corporations may give some bribery to decision makers to turn around unfavorable situations caused by existing laws and regulations. According to Acemoglu and Verdier (1998), corruption leads to an optimal allocation of resources when market fails. For these researchers, corruption greases the wheels. It is known by the “helping hand” theory of corruption. This is true mainly for the case of China and India where they unregister high levels of FDI and economic growth even their levels of corruption are high.

From the other side, Krueger (1974), Shleifer and Vishny (1993), Bardhan (1997), Mauro (1995, 1998), Tanzi (1998), Aidt (2003), and Zhao et al. (2003) have supported the idea that corruption has a negative impact on economic growth through the different channels of decreases in domestic and foreign investment, increases in cost of production, uncertainty and misallocation of resources. They argue that by the fact that corruption leads to the misallocation of resources by diverting them from public interests to private ones. Moreover, corrupted acts in public administration can discourage domestic and foreign investments that in turn may reduce economic growth (Bardhan, 1997; Mauro, 1995). Corruption may reduce the capacity of domestic investment in generating the economic output (Zhao et al., 2003). According to Bardhan (1997), foreign investors could pay bribes in order to get permits to conduct business in host countries and thus these bribes represent extra costs that would decrease the profitability. Tanzi (1998) shows that corruption acts as an extra tax and thus it may distort the markets. In addition, corruption could increase the uncertainty in countries with low degree of law enforcement and thus foreign investments would decrease. Overall, for these scholars corruption sands the wheels. These ideas and thoughts are known by the “grabbing hand” theory of corruption.

**Empirical Literature Review**

In this work, we limit our empirical literature review for panel studies. From the first side, the studies that find a negative impact of corruption on investments and economic growth are various. For example, from the important studies that found an adverse impact of corruption on domestic investment and economic growth, we cite Mauro (1995) and Brunetti et al. (1997). Mauro (1995) also reports that the causality is unidirectional running from corruption to economic growth. Gyimah-Brempong (2002) analyzes the impacts of corruption on economic growth and income distribution in African countries by employing a dynamic panel data modeling approach. His findings demonstrate that corruption affects negatively economic growth and income inequality through the reduction in investments. By investigating various developing and developed countries, Lambsdorff (2003) shows that corruption negatively affects economic growth through its negative effects on capital productivity. Not later, Gyimah-Brempong and Camacho (2006)’s study analyzes the impact of corruption on economic growth and income distribution for 61 countries having various levels of economic development by employing panel data models. Their findings indicate that corruption affects negatively economic growth in African countries more than in Organization for Economic Cooperation and Development countries and Asian countries. Moreover, African countries have the largest impact of corruption on income distribution. Mobolaji and Omotoso (2009) investigate the impact of corruption and other institutional factors on economic growth for some selected transitional economies over the period 1990 to 2004. They use International Country Risk Guide (ICRG) index as a proxy for corruption. Their findings show that corruption affects negatively economic growth. Freckleton et al. (2012) analyze the relationship between corruption, economic growth, and FDI for a group of 42 developing countries and 28 developed countries over the period 1998 to 2008 using a dynamic panel ordinary least squares method. They find that lower levels of corruption lead FDI inflows to have positive impact on economic growth. Saha and Gounder (2013) examine the nonlinear relationship between income and corruption for 100 countries over the period 1995 to 2008 by employing a hierarchical polynomial regression. When including some socio-economic and institutional factors as control variables, they find that corruption has a negative impact on income. Castro and Nunes (2013) study the impact of corruption on FDI inflows for 73 countries over the period 1998 to 2008. Their findings show that countries with a lower level of corruption have greater FDI inflows. In the same line, Azam and Ahmad (2013) test the effects of corruption on FDI inflows using data for 33 less developed countries observed during the period of 1985 to 2011 by estimating a fixed effects model. They include in their model along with corruption index the variables of GDP and inflation rate as independent variables. Their results show that the level of FDI inflows is negatively affected by corruption index. Shera et al. (2014) analyze the relationship between corruption and economic growth for 22 developing countries over the period 2001 to 2012 using panel data framework.
and including many other control variables such as population growth, government expenditures, the level of secondary education enrollment, investment, trade as a percentage of GDP, inflation, and capital formation. They find that there is a negative relationship between both variables of corruption and economic growth. Ayadi et al. (2014) investigate the cointegration relationship between the degree of transparency in an economy and the level of foreign direct investment inflows for 13 Sub-Saharan African countries over the period 1998 to 2008 using the Pedroni panel fully modified ordinary least squares (FMOLS) cointegration framework. Their findings show that there is a positive long-run relationship between both variables of transparency and FDI. Delgado et al. (2014) analyze the effects of corruption on FDI and economic growth for a large group of non-OECD countries over the period 1985 to 2002 using a semi-parametric model. They find that corruption affects the FDI-growth relationship by reducing the positive impact of FDI inflows on economic growth. In the Asian context, Quazi (2014) investigates the effect of corruption on FDI inflows in East Asia and South Asia over the period 1995 to 2011 by employing the generalized least squares (GLS) panel data method. He finds that corruption has a negative impact on FDI. Therefore, his findings validate the “grabbing hand” hypothesis. d’Agostino et al. (2016) estimate a dynamic panel data growth model for 48 African countries covering the period 1996 to 2010. They find that corruption has a negative impact on economic growth, and the impact of corruption becomes worse for the countries having high military burdens. Aghion et al. (2016) study the effect of taxation and corruption on growth, innovation, and entry using an endogenous growth model. They find that the reduction of corruption level can promote the welfare gain. Ghoneim and Ezzat (2016) analyze the impact of corruption on economic growth in 15 Arab countries by estimating a panel data random effects model over the period 1998 to 2009. Their results indicate that corruption has negative effects on economic growth in Arab countries. In the same line, Hakimi and Hamdi (2017) study the causal relationships between corruption, investment and economic growth in 15 MENA countries over the period 1985 to 2013 using a panel cointegration framework and Granger causality tests. Their findings show that corruption negatively affects economic growth in MENA countries through its negative impacts on domestic investment and foreign direct investment inflows.

Cieślik and Goczek (2018) estimate both equations of investment and economic growth using the generalized method of moments (GMM) technique for the case of a panel of 142 countries over the period 1994 to 2014. They find that the shortage of corruption has positive impacts on investments and economic growth and thus they conclude that corruption sand the wheels. Gründler and Potrafke (2019) study the corruption-growth-nexus for the case of 175 low and high-income countries by employing a dynamic panel data model and annual data covering the period of 2012 to 2018. Their findings report that corruption has a negative impact on economic growth mainly in in autocracies countries and those with low government effectiveness. Zakharov (2019) analyzes the impact of corruption on investment for the case of 79 Russian regions over the period 2004 to 2013. His empirical results report that corruption has a negative impact on fixed capital investment and FDI inflows in Russian regions. Specifically, the negative impact is significant for private companies, but it is not significant for public companies. Saouelgl (2019) investigates the effects of corruption on private and public investments and economic growth in MENA region using annual data from 1990 to 2017 by estimating a simultaneous equations model. The author finds that corruption affects negatively private and public investments and thus economic growth. Alfa (2019) investigates the impact of corruption on economic growth for different provinces in Indonesia by estimating a threshold model and using annual data from 2004 to 2015. His findings indicate that corruption affects negatively economic growth in provinces with low levels of corruption (corruption levels below the threshold of 1.765 points) and provinces with high levels of corruption (corruption levels above the threshold of 1.765 points). However, the effect is stronger in the case of provinces with high levels of corruption. Similarly, Hoinaru et al. (2020) find that the effects of corruption on economic development are more important in developed countries than in less developed countries. Moreover, corruption may positively affect economic development in low-income countries. Recently, Truong (2020) studies the relationship between corruption and economic growth for the case of Vietnamese provinces by employing a dynamic panel data model. The author finds that corruption is harmful to economic growth by reducing the efficiency of investments. Moreover, the negative impact of corruption is enormous in provinces with higher investment rates.

From the second side, some empirical studies confirm the positive effect of corruption on economic growth for some countries. Wedeman (1997) shows that there are many countries where the level of corruption is high but they enjoy rapid economic growth. By considering a sample of countries including the emerging economies of East Asia such as China, Korea, Indonesia, and Thailand, Rock and Bonnett (2004) support the hypothesis that found corruption greases the wheels. Evrensel (2010) studies the corruption–growth and the corruption–growth volatility relationship for a sample of 121 developed and developing countries. His findings show that higher corruption control, expropriation risk control, government effectiveness, and government consumption lead to decrease growth volatility. In the context of Asia-Pacific countries, Huang (2016) uses a panel data model to study the impact of corruption on economic growth within 13 Asia-Pacific countries over the period 1997 to 2013. His findings show that corruption does not affect economic growth in all investigated countries, with the exception of South Korea. He finds that corruption has a positive
and significant impact on economic growth in South Korea. This finding is in line with that of Wedeman (1997)’s study that shows that corruption in South Korea is functional for its economic development. Okada and Samreth (2014) study the impact of FDI inflows on economic growth by including the variable corruption as an absorptive factor in each country for the case of 130 countries over the period 1995 to 2008. They find that, although FDI alone does not affect economic growth, its effect is significant when the interaction term between FDI and corruption is included in the model. They conclude that FDI promotes economic growth in only the countries where the level of corruption repasses a threshold level. In the context of the African continent, Quazi et al. (2014) investigate the relationship between corruption and FDI inflows using a panel data set of 53 African countries over the period 1995 to 2012 by employing the dynamic system generalized method of moments modeling approach. They find that corruption promotes the inward of FDI into Africa. Bayar and Alakbarov (2016) analyze the relationship between FDI inflows and corruption for 23 emerging countries over the period 2002 to 2014 using the Westerlund-Durbin-Hausman (2008) cointegration test. They find that the variables representing control of corruption do not lead to attract FDI inflows into the countries. More recently, Bitterhout and Simo-Kengne (2020) study the influence of corruption on economic growth in the BRICS countries by employing various panel data techniques over the period 1996 to 2014. They find mixed results. However, when controlling for heterogeneity and endogeneity, it is shown that corruption positively affects economic growth and thus it greases the wheels.

Overall, we can conclude from these previous studies that corruption discourages domestic and foreign investments, and thus economic growth mainly in countries lacking law enforcement and having weak institutions such as MENA and Arab countries (Ghoneim & Ezzat, 2016; Hakimi & Hamdi, 2017; Sbaouelgi, 2019). Our investigation will be in the same line. We try to verify if the “sand the wheels” hypothesis holds in the case of GCC countries as found before in the case of Arab and MENA countries.

Data and Econometric Techniques

Data

We use data covering the period 2003 to 2016 for GCC countries including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. We employ in this study a panel vector error correction model (PVECM) and cointegration techniques to check for the various causal directions between the variables under investigation. The PVECM is very useful in the case of panel data as it allows the analysis of causal relationships between the different variables. Beyond economic growth (measured by the growth rate of real GDP per capita) and corruption (approximated by corruption perceptions index), we include in the model net foreign direct investment inflows as a percentage of GDP (FDI), gross fixed capital formation as a percentage of GDP (GFCF), trade openness as the sum of exports and imports to GDP (TO) and the total credit accorded to the private sector as a percentage of GDP (DC).

The variables trade openness and credit to private sector are included as control variables. Trade openness is included in the model because it is assumed as one of the main channels through which corruption affects economic growth. Moreover, trade openness is necessary for attracting FDI. The variable credit to private sector is included in the model as a proxy of financial development because financial development is necessary for investment to have a positive effect on economic growth (Hermes & Lensink, 2003).

Except CPI, all the other variables are obtained from the World Bank’s (WB) Statistics Database (World Bank, 2017). CPI is an index that varies from 0 to 100, where lower value implies higher corruption. Data on corruption are extracted from Transparency International (2017). TI publishes even the corruption perception index annually since 1995, it is available for GCC countries only since 2003. This is why our data are restricted to the period 2003 to 2016. Except corruption and economic growth, all other variables are expressed as ratio of GDP to control for the scale effects. The different variables are enlisted along sources and measurements in Table 1.

Research Method

The empirical methodology is undertaken in multiple stages. First, it is crucial to check for the existence of unit roots in the data because a non-stationary series “has no long-run mean to which the series returns [after a shock], and the variance will depend on time and will approach infinity as time goes to infinity” (Asteriou & Hall, 2015). We test the stationarity of all the variables using Levin-Lin-Chu (LLC) (Levin et al., 2002), Im, Pesaran and Shin (IPS) (Im et al., 2003), the Augmented Dickey-Fuller (F-ADF) (Dickey & Fuller, 1981), Philips-Perron (PP) (Phillips and Perron, 1988), and Breitung (2000) tests. Both LLC and Breitung tests have a null hypothesis that supposes a common unit root process whereas IPS, F-ADF, and F-PP tests have a null hypothesis that supposes individual unit root processes. The use of a panel unit root tests allows combining the information from time series with the information from cross-sectional units. The addition of cross-sectional variation to time series variation improves estimation efficiency, leading to smaller standard errors and, consequently, to higher $t$-ratios. Levin et al., (2002) show that, in situations where there is not enough time-series variation to produce good power in the ADF test, a relatively small amount of cross-section variation can result in substantial improvement. The IPS test is based on the well-known Dickey-Fuller procedure. It combines information from the time series dimension and
Table 1. Description of Variables.

| Variables | Definition                                      | Measurement                                      | Source                                      |
|-----------|------------------------------------------------|-------------------------------------------------|---------------------------------------------|
| CPI       | Corruption                                      | Corruption perception index                      | Transparency International (2017)            |
| TO        | Trade openness                                  | The sum of exports and imports to GDP            | World Development Indicators (WDI, 2017) of the World Bank |
| DC        | Domestic credit                                 | Total credit accorded to the private sector as a percentage of GDP |                                     |
| GFCF      | Domestic investment                             | Gross fixed capital formation as a percentage of GDP |                                      |
| FDI       | Foreign direct investment                       | Net foreign direct investment inflows as a percentage of GDP |                                      |
| EG        | Economic growth                                 | Growth rate of real GDP per capita               |                                             |

the cross section dimension; such that it does not need many observations for the test to be powerful. LLC (2002), Im et al. (2003) and Hadri (2000) tests are generally based on the assumption that the series that make up the panel are independent of each other. Moreover, panel unit root tests are more powerful than individual unit root tests because the information contained in the time series is consolidated by that contained in the cross sections (Chamseddine, 2016; Ramirez, 2006).

Stationarity tests will then be followed by carrying various cointegration tests in order to check for the presence of a panel cointegration relationship (Pedroni, 1999, 2004). In the case of non-stationary variables, they are cointegrated if there is at least one linear combination of the stationary variables. We employ the seven panel cointegration statistics (panel v-statistic, panel rho-statistic, panel PP-statistic, panel ADF-statistic, group rho-statistic, group PP-statistic, and group ADF-statistic) developed by Pedroni (1999, 2004), which are originated from the Engle-Granger residual-based approach. The first four tests form the “within dimension” panel, which is “pooling the AR coefficients across different sections of the panel for the unit-root on the residuals” (Asteriou & Hall, 2015; Chamseddine, 2016). However, the last three tests form the “between dimension” group that is “averaging the AR coefficients for each member of the panel for the unit-root test on the residuals” (Asteriou & Hall, 2015; Chamseddine, 2016). For the seven tests, the null hypothesis supposes the absence of cointegration. If the variables are found cointegrated through the first group of panel statistics, we say that the variables are cointegrated for all cross-sections whereas if they are found cointegrated through the second group statistics, thus the variables are cointegrated for at least one cross-section (Chamseddine, 2016). Moreover, the Kao (1999) residual cointegration test is employed. However, the Kao test does not allow for heterogeneity under alternative hypothesis. The existence of cointegration indicates the presence of causality between the variables, but it does not indicate the direction of causality. The presence of long run association between the variables is important because it rules out the possibility of “spurious” correlation (Alshehry & Belloumi, 2014). Then, in case we find that all the variables have the same order of integration (I(1)) and cointegrated, we conduct a PVAR technique suggested by Engle and Granger (1987) to examine the short and long run Granger causality between the various variables. The PVAR allows the distinction between the long- and short-run relationships among the variables. The PVAR can be written as follows:

\[ \Delta EG_t = \mu_1 + \theta_1 \text{trend} + \theta_2 ECT_{t-1} \]
\[ + \sum_{j=1}^{p} \gamma_{1j} \Delta EG_{t-j} + \sum_{j=1}^{p} \gamma_{2j} \Delta FDI_{t-j} \]
\[ + \sum_{j=1}^{p} \gamma_{3j} \Delta GFCF_{t-j} + \sum_{j=1}^{p} \gamma_{4j} \Delta DC_{t-j} \]
\[ + \sum_{j=1}^{p} \gamma_{5j} \Delta TO_{t-j} + \sum_{j=1}^{p} \gamma_{6j} \Delta CPI_{t-j} + \varepsilon_{1t} \]  

(1)

\[ \Delta FDI_t = \mu_2 + \theta_3 \text{trend} + \theta_4 ECT_{t-1} \]
\[ + \sum_{j=1}^{p} \beta_{1j} \Delta EG_{t-j} + \sum_{j=1}^{p} \beta_{2j} \Delta FDI_{t-j} \]
\[ + \sum_{j=1}^{p} \beta_{3j} \Delta GFCF_{t-j} + \sum_{j=1}^{p} \beta_{4j} \Delta DC_{t-j} \]
\[ + \sum_{j=1}^{p} \beta_{5j} \Delta TO_{t-j} + \sum_{j=1}^{p} \beta_{6j} \Delta CPI_{t-j} + \varepsilon_{2t} \]  

(2)

\[ \Delta GFCF_t = \mu_3 + \theta_5 \text{trend} + \theta_6 ECT_{t-1} \]
\[ + \sum_{j=1}^{p} \delta_{1j} \Delta EG_{t-j} + \sum_{j=1}^{p} \delta_{2j} \Delta FDI_{t-j} \]
\[ + \sum_{j=1}^{p} \delta_{3j} \Delta GFCF_{t-j} + \sum_{j=1}^{p} \delta_{4j} \Delta DC_{t-j} \]
\[ + \sum_{j=1}^{p} \delta_{5j} \Delta TO_{t-j} + \sum_{j=1}^{p} \delta_{6j} \Delta CPI_{t-j} + \varepsilon_{3t} \]  

(3)
Table 2. Descriptive Statistics.

| Variables | CPI  | TO   | DC   | GFCF | FDI  | EG   |
|-----------|------|------|------|------|------|------|
| Mean      | 53.29| 111.15| 52.71| 25.39| 2.80 | 5.68 |
| Median    | 51.50| 98.45| 47.08| 24.44| 2.38 | 4.83 |
| Maximum   | 77.00| 196.74| 103.77| 46.02| 15.75| 26.17|
| Minimum   | 33.00| 61.86| 28.23| 12.84| -3.11| -7.08|
| Std. Dev. | 10.28| 31.31| 16.97| 7.19 | 2.91 | 5.32 |
| Observations | 84  | 84   | 84   | 84   | 84   | 84   |

\[
\Delta DC_t = \mu_4 + \theta_4 \text{trend} + \theta_4 \text{ECT}_{t-1}
\]
\[+ \sum_{j=1}^{p} \gamma_j \Delta EG_{t-j} + \sum_{j=1}^{p} \gamma_j \Delta FDI_{t-j}
\]
\[+ \sum_{j=1}^{p} \psi_2 \Delta DC_{t-j}
\]
\[+ \sum_{j=1}^{p} \phi_3 \Delta GFCF_{t-j}
\]
\[+ \sum_{j=1}^{p} \phi_4 \Delta DC_{t-j}
\]
\[+ \sum_{j=1}^{p} \phi_5 \Delta TO_{t-j} + \sum_{j=1}^{p} \phi_6 \Delta CPI_{t-j} + \epsilon_{6t}
\]

\[
\Delta TO_t = \mu_5 + \theta_5 \text{trend} + \theta_5 \text{ECT}_{t-1}
\]
\[+ \sum_{j=1}^{p} \pi_1 \Delta EG_{t-j} + \sum_{j=1}^{p} \pi_2 \Delta FDI_{t-j}
\]
\[+ \sum_{j=1}^{p} \pi_3 \Delta GFCF_{t-j} + \sum_{j=1}^{p} \pi_4 \Delta DC_{t-j}
\]
\[+ \sum_{j=1}^{p} \pi_5 \Delta TO_{t-j} + \sum_{j=1}^{p} \pi_6 \Delta CPI_{t-j} + \epsilon_{5t}
\]

\[
\Delta CPI_t = \mu_6 + \theta_6 \text{trend} + \theta_6 \text{ECT}_{t-1}
\]
\[+ \sum_{j=1}^{p} \alpha_1 \Delta EG_{t-j} + \sum_{j=1}^{p} \alpha_2 \Delta FDI_{t-j}
\]
\[+ \sum_{j=1}^{p} \alpha_3 \Delta GFCF_{t-j} + \sum_{j=1}^{p} \alpha_4 \Delta DC_{t-j}
\]
\[+ \sum_{j=1}^{p} \alpha_5 \Delta TO_{t-j} + \sum_{j=1}^{p} \alpha_6 \Delta CPI_{t-j} + \epsilon_{6t}
\]

where \(\Delta EG_{it}, \Delta FDI_{it}, \Delta GFCF_{it}, \Delta DC_{it}, \Delta TO_{it}\) and \(\Delta CPI_{it}\) are the first differences for the various variables investigated that capture their short-run disturbances; \(\epsilon_{1it}, \epsilon_{2it}, \epsilon_{3it}, \epsilon_{4it}, \epsilon_{5it}\), and \(\epsilon_{6it}\) are the serially uncorrelated error terms; and \(ECT_{t-1}\) are the error-correction terms (ECT) that are derived from the long-run cointegration relationships and measure the magnitude of the past disequilibrium. The coefficients, \(\theta\) of the \(ECT_{t-1}\), represent the deviation of the dependent variables from the long-run equilibrium. They should be negative and statistically significant to have long-run relationships among the variables.

The PVECM is set up for investigating short- and long-run causality. For example, in the first equation by testing the joint significance of the coefficients \(\gamma_{2t}\) or \(\gamma_{3t}\) or \(\gamma_{4t}\) or \(\gamma_{5t}\) or \(\gamma_{6t}\) of the independent variables, we check for short run causality. We employ the \(\chi^2\) Wald statistic. When the estimated coefficients on lagged values of CPI are statistically significant, then the implication is that there is a short run causality running from CPI to economic growth. The long-run causality is tested by checking the significance of the speed of adjustment \(\theta\) in each equation. The significance of \(\theta\) indicates that the long-run equilibrium relationship is directly driving the dependent variable. If, for example, \(\theta\) is zero in the first equation, then it can be implied that the change in EG does not respond to deviation in the long-run equilibrium for the \(t-1\) period.

It is also desirable to check whether the two sources of causation are jointly significant to test the strong Granger causality. This can be done by testing the joint hypotheses for all variables in all equations. The joint test indicates which variable(s) bear the burden of short-run adjustment to reestablish long-run equilibrium, following a shock to the system (Ben Jebli & Belloumi, 2017).

Lastly, as all the variables considered here are cointegrated with a time trend, and thus a long-run equilibrium relationship exists among these variables through the panel unit root test and panel cointegration test, we estimate the equations of economic growth, FDI, and domestic investment by the method of panel FMOLS for heterogeneous cointegrated panels proposed by Pedroni (2000). This methodology allows consistent and efficient estimation of cointegration vector in small samples and addresses the problems of serial correlation and endogeneity (Sallahuddin et al., 2014).

Results and Discussion

Descriptive Statistics

The descriptive statistics for the different variables investigated in this study are reported in Table 2. They indicate that the mean of economic growth over the period for all the
The mean of CPI is about 53. The maximum value of CPI is 77 whereas the minimum value is 33.

Figure 1 shows the evolution of CPI in GCC countries over the period 2003 to 2016. According to TI, three (the United Arab Emirates, Qatar, and Saudi Arabia) of six GCC countries have seen their CPI improved since 2003. The United Arab Emirates is the best Arab country in the area of the fight against corruption. Its worldwide rank is 24 in 2016 while Qatar recorded the biggest decline, losing 10 points on the index from 71 in 2015 to 61 in 2016. Qatar is ranked 31 in 2016. Among the reasons attributed to the decline in Qatar on the index was “corruption scandals” in relation to the FIFA World Cup 2020 hosting, and violations of human rights, especially with regard to migrant workers. Saudi Arabia recorded also a decline from 2015 to 2016. Its corruption perception index passed from 52 in 2015 to 46 in 2016. The rank of Saudi Arabia is 62 in 2016. Bahrain, Kuwait, and Oman recorded a decline in their CPI during all the period. The CPI passed from 61 in 2003 to 43 in 2016 for the case of Bahrain while it passed from 53 in 2003 to 41 in 2016 for the case of Kuwait. In the case of Oman, the CPI passed from 63 in 2003 to 45 in 2016. The rank of Oman is 64 in 2016 (Transparency International).

Results of Panel Unit Root Tests

A preliminary check of the graphics for the different series can give an idea about the stationarity of the variables. Figure 2 shows the evolution for the various series over the period 2003 to 2016. It indicates that the majority of variables present a stochastic trend. However, these observations are intuitive; this is why we use the panel unit root tests to confirm our conclusions.

The results of panel unit root tests are shown in Table 3. Majority of them have shown that all variables are not stationary at 5% significance level. Besides, as the results of panel unit root tests are contradictory for some variables at their levels, we can say that they are not stationary. When the series are differenced, they become stationary. Thus all the variables are integrated of the same order one, I(1).

Results of Panel Cointegration Tests

As all series are integrated of the same order one, we pass to test for the existence of cointegration between the various variables by employing the Pedroni panel cointegration tests and the Kao residual cointegration test. The results of these tests are reported in Table 4. Five tests (four Pedroni residual cointegration tests [panel PP-statistic, panel ADF-statistic, group PP-statistic, and group ADF-statistic] and one Kao Residual cointegration test [ADF t-statistic]) out of eight indicate that we reject the null hypothesis of no cointegration at 1% significance level. Hence, majority of them show that economic growth, FDI, GFCF, DC, TO, and CPI are cointegrated. Thus, we can conclude that our variables are cointegrated for all countries in question, and there is at least one long run relationship between the variables investigated for the group of GCC countries.
Results of Estimated Models and their Discussion

As the variables are cointegrated, we estimate the PVECM presented above when economic growth is the first dependent variable. Table 5 reports some diagnostic tests for autocorrelation, heteroscedasticity and the stability of the coefficients of the PVECM. The robustness of the PVECM is evaluated by using a battery of some diagnostic tests. It passes all diagnostic tests used without any caution. Both VEC residual Portmanteau for autocorrelations and VEC residuals serial correlation LM tests show that the error terms are not correlated. Moreover, VEC residual heteroskedasticity tests with and without cross terms indicate the absence of

Figure 2. Trends of different variables.
Table 3. Results of Panel Unit Root Tests.

| Method                      | EG     | First difference | Level | FDI     | First difference | Level | GFCF    | First difference | Level | DC      | First difference | Level | TO      | First difference | Level | CPI     | First difference | Level |
|-----------------------------|--------|------------------|-------|---------|------------------|-------|---------|------------------|-------|---------|------------------|-------|---------|------------------|-------|---------|------------------|-------|
| Null hypothesis: Unit root (assumes common unit root process) | Levin, Lin & Chu t | -4.05* | -9.63* | -2.72* | -5.47* | 0.27 | -3.64* | 1.18 | -4.44* | -0.79 | -5.50* | -3.60* | -6.25* |
|                             | Breitung t-stat | -2.60* | -7.36* | -1.29*** | -2.95* | -0.85 | -3.15* | 0.72 | -3.95* | 2.66 | -2.91* | 0.18 | 0.38 |
| Null hypothesis: Unit root (assumes individual unit root process) | Im, Pesaran and Shin W-stat | -1.4*** | -6.32* | -1.02 | -3.63* | 0.46 | -2.54* | 1.16 | -2.82* | 0.59 | -1.99** | -1.76** | -5.97* |
|                             | ADF – Fisher Chi-square | 18.22 | 52.62* | 16.48 | 32.87* | 7.74 | 25.13* | 5.98 | 26.93* | 11.48 | 21.63** | 20.62*** | 52.80* |
|                             | PP – Fisher Chi-square | 33.74 | 80.52* | 12.66 | 45.42* | 6.89 | 25.23* | 1.91 | 27.06* | 3.77 | 25.59** | 20.67*** | 81.29* |
| Null hypothesis: Stationarity | Hadri Z-stat | 4.06* | 1.53*** | 2.91* | 1.43*** | 1.68** | -0.26 | 3.01* | 0.83 | 3.10* | 1.52*** | — | — |

Note. *, **, ***: significance at 1%, 5% and 10% levels, respectively.
heteroskedasticity of the error terms. In addition, as shown in Figure 3, the absolute values of the inverse AR roots are less than the unity. Thus, the estimated coefficients are stable. Therefore, we can conclude that our results are robust, and thus we can analyze the results of short and long causality tests without caution.

The main objective of the estimation of the PVECM is to test for the short run causality between the different series as well as the strong long run relationships. The short and strong long run causalities are determined by Wald tests. Their results are shown in Tables 6 and 7, respectively. Overall, the findings of short run causality tests show that there are only unidirectional causality running from domestic credit accorded to private sector to economic growth, foreign direct investment, domestic investment, and trade openness and a unidirectional causality running from corruption perception index to trade openness. In sum, the corruption perception index does not Granger cause economic growth, FDI and domestic investment in the short run for the case of GCC countries. This result is conform to theoretical findings where corruption does not represent a serious problem for investments and growth in the short-run. However, our result is in contradiction to that found by Hakimi and Hamdi (2017) who reported that corruption causes FDI and economic growth in the short-run for the case of MENA countries.

The ECT coefficient estimates are negative and significant for at least 10% level, except for the corruption perception index equation. This implies that there are long run causality running from all the variables to EG, FDI, GFCF, DC, and TO but not to CPI. Thus, corruption causes all the variables including economic growth, FDI and domestic investment in the long run whereas all the variables do not cause corruption in the long run. The results reported in Table 7 indicate that there are strong long run causality running from all the variables to EG, FDI, GFCF, and DC for at least 10% level of significance but not to TO and CPI. These findings show that there is unidirectional causality running from corruption to economic growth, FDI, domestic investment, and domestic credit. These findings are conform to theoretical and empirical findings, which indicate that corruption causes investments and economic growth in the long run (e.g., Gherghina et al., 2019; Hakimi & Hamdi, 2017; Mauro, 1995).

The results also indicate the absence of short run causality between trade openness and investments and between trade openness and economic growth whereas there is strong long run unidirectional causality running from trade openness to domestic investment, FDI, and economic growth (e.g., Grossman & Helpman, 1990; Romer, 1986). We also find that there is unidirectional causality running from finance development (proxied by credit to private sector) to domestic investment, FDI, and economic growth in the short run. Moreover, there are strong long run bidirectional causality between finance development and domestic investment, strong long run bidirectional causality between finance development and FDI, and strong long run bidirectional causality between finance development and economic growth. These results of finance development are conform to the supply-leading hypothesis where finance development improves both domestic and foreign investment and thus economic growth (Calderón & Liu, 2003). The financial development leads to increase the supply of financial services that increase the investments and thus leads to economic growth.

Finally, we estimate the equations of economic growth, FDI, and domestic investment using the method of panel FMOLS for heterogeneous cointegrated panels. The pooled panel FMOLS heterogeneous estimates for the three long run equations are shown in Table 8. In the case of economic growth equation, we integrate the interactive variables CPI*FDI and CPI*GFCF that combine, respectively, corruption with FDI, and corruption with domestic investment to test for the impact of CPI on economic growth in the presence of FDI and domestic investment. Nevertheless, we find that both interactive variables are not significant. This implies that corruption does not enhance the effects of foreign and domestic investments on economic growth. The results of panel FMOLS method of economic growth long run equation shows that the long run coefficient of our main variable of interest CPI is positive and significant at 1% level of significance. This means that a high level of CPI is associated to high level of economic growth in GCC countries. Hence, a high level of corruption that is associated to a low level of CPI may hurt economic growth in GCC countries. These results are conform to the majority of studies that support the negative links between corruption and economic growth (e.g., Alfiada, 2019; d’Agostino et al., 2016; Freckleton et al., 2012; Ghoneim & Ezzat, 2016; Gründler &

**Table 4. Results of Panel Cointegration Tests.**

| Pedroni Residual Cointegration Test | Null hypothesis: no cointegration |
|-----------------------------------|----------------------------------|
| Weighted statistic | Prob. |
| Panel v-statistic | −2.83 | .99 |
| Panel rho-statistic | 2.51 | .99 |
| Panel PP-statistic | −11.99* | .00 |
| Panel ADF-statistic | −4.63* | .00 |
| Statistic | Prob. |
| Group rho-statistic | 3.50 | .99 |
| Group PP-statistic | −14.34* | .00 |
| Group ADF-statistic | −5.37* | .00 |

**Kao Residual Cointegration Test**

| Null hypothesis: no cointegration |
|----------------------------------|
| ADF t-statistic | −6.31 | .00 |

*Note: *: Significance at 1% level.*
Therefore, the “grabbing hand” hypothesis is valid in the case of economic growth for GCC countries. However, our findings are not consistent with those of Huntington (1968), Lui (1985), Wedeman (1997), Rock and Bonnett (2004), Evrensel (2010), Huang (2016), and Bitterhout and Simo-Kengne (2020). For example, Huang (2016) found that the “helping hand” hypothesis and it supports the idea that corruption can be beneficial to domestic investment through the bypass of the bureaucratic administrative system. Hence, corruption can be a tool to improve domestic investment in GCC countries. Our finding concerning the impact of corruption on FDI inflows is not conform to many previous studies that support the “grabbing hand” hypothesis such those of Quazi et al. (2014) for the case of 53 African countries and Bayar and Alakbarov (2016) for the case of 23 emerging countries. In the case of the impact of corruption on domestic investment, our result confirms the ideas of Leff (1964), Bayley (1966), Huntington (1968), and Lui (1985) who show that corruption has beneficial effects and thus it “greases the wheels” of domestic investment. Nevertheless, it is not conform to the empirical studies that support the so-called “sand the wheels” hypothesis such as Al-Sadig (2010) for the case of 71 developing countries, Hakimi and Hamdi (2017) for the case of 15 MENA countries, and Zakharov (2019) for the case of 79 Russian regions.

Overall, our results confirm the “sand the wheels” hypothesis in the case of economic growth whereas they validate the “grease the wheels” hypothesis in the case of domestic investment. It is shown that corruption has a negative economic impact on economic growth in GCC countries because it might lead to increases in the cost of production, misallocation of resources by redirecting them from public interests to private ones, and distort the markets (Aidt, 2003; Bardhan, 1997; Krueger, 1974; Mauro, 1995, 1998; Shleifer & Vishny, 1993; Tanzi, 1998; Zhao et al., 2003). However, our findings report that corruption helps domestic investments in GCC countries. This result is maybe justified by the fact that some corruption acts can help in overcoming the administration bureaucracy and inefficiency regulations by speeding up
domestic investment, and thus bribery acts play the role of “speed money” and reduce the transaction costs (Bayley, 1966; Huntington, 1968; Leff, 1964; Lui, 1985). In addition, we find that trade openness does not affect FDI and domestic investment in GCC countries. This implies that openness to trade in GCC countries is not linked to FDI and domestic investment that lead to produce goods and services designated for exportation. Finance development has a positive and significant impact on domestic investment but this impact is insufficient to lead to economic growth in GCC countries. Therefore, GCC countries should give more attention to develop their financial systems in order to be more efficient. The last important result is that FDI has a positive and significant impact on domestic investment. This means that FDI allows the transfer of well-being to local enterprises in GCC countries.

Conclusions and Policy Implications

Main Conclusions

The empirical literature on the economic growth corruption relation is inconclusive. In this line, this paper seeks to study

Table 6. Results of Short Run Causality Tests.

| Indep. variables | D(EG) | D(FDI) | D(GFCF) | D(DC) | D(TO) | D(CPI) |
|------------------|-------|--------|---------|-------|-------|--------|
| D(EG)            | —     | 1.378  | 1.739   | 0.095 | 0.029 | 0.344  |
| D(FDI)           | 0.580 | —      | 2.125   | 0.000 | 0.106 | 0.004  |
| D(GFCF)          | 2.011 | 0.267  | —       | 1.266 | 1.037 | 0.091  |
| D(DC)            | 3.640*** | 4.541** | 7.569* | —     | 2.684*** | 1.902 |
| D(TO)            | 0.005 | 0.634  | 0.196   | 1.231 | —     | 0.026  |
| D(CPI)           | 0.623 | 0.193  | 0.570   | 1.076 | 5.040** | —     |

Note. *, **, ***: significance at 1%, 5% and 10% levels, respectively.

Table 7. Results of Long Run Causality Tests.

| Ind. variables | D(EG) | D(FDI) | D(GFCF) | D(DC) | D(TO) | D(CPI) |
|----------------|-------|--------|---------|-------|-------|--------|
| ECT(-1)        | −0.109* | −0.327* | −0.159* | −0.238* | −0.048*** | 0.0005 |
| D(EG) and ECT  | —     | 12.59* | 15.38*  | 7.29** | 1.308 | 0.463  |
| D(FDI) and ECT | 10.31* | —      | 13.98*  | 7.97** | 1.300 | 0.311  |
| D(GFCF) and ECT| 9.80*  | 11.64* | —       | 8.45** | 2.258 | 0.242  |
| D(DC) and ECT  | 8.16*  | 11.56* | 14.63*  | 7.50** | 2.019 | 1.035  |
| D(TO) and ECT  | 8.18*  | 13.90* | 14.05*  | 7.50** | 0.315 | —      |
| D(CPI) and ECT | 11.99* | 12.58* | 14.75*  | 7.23** | 3.998 | —      |

Note. *, **, ***: significance at 1%, 5% and 10% levels, respectively. For ECT, the values represent t statistics.

Table 8. Results of Panel FMOLS Method.

| Independent variables | EG     |          | FDI     |          | GFCF   |          |
|-----------------------|--------|----------|---------|----------|--------|----------|
|                       | Coefficient | Prob. | Coefficient | Prob. | Coefficient | Prob. |
| EG                    | —      | —       | —       | —       | 0.247* | .000     |
| FDI                   | −0.110 | .453    | —       | —       | 0.588* | .000     |
| GFCF                  | 0.478* | .000    | 0.378*  | .000    | —      | —        |
| DC                    | −0.288* | .000  | −0.140* | .000    | 0.358* | .000     |
| TO                    | −0.099* | .006 | 0.017   | .271    | 0.020 | .422     |
| CPI                   | 0.273* | .002    | 0.033   | .389    | −0.179* | .003   |

Diagnostic tests

- R-squared: .658, .618, .895
- Adjusted R-square: .569, .518, .867
- Jarque-Bera stat: 2.230 (0.327), 2.910 (0.19), 0.072 (0.964)
- Q-stat: 9.150 (0.69), 13.777 (0.315), 3.518 (0.172)

Note. *: Significance at 1% level.
the impact of corruption on investments and economic growth in GCC countries using a PVCEM and panel FMOLS method for annual data covering the period of 2003 to 2016. This study makes a new contribution to the corruption-growth-nexus literature. We find that there is at least one cointegration relationship between the variables. The results of Granger causality tests indicate that corruption does not granger cause economic growth, FDI and domestic investment in the short run for the case of GCC countries. However, it Granger causes all the variables including economic growth, FDI and domestic investment in the long run. Moreover, we find that there is strong long run unidirectional causality running from corruption to economic growth, FDI, domestic investment, and domestic credit to private sector. Results report also that the reverse causalities from domestic investment, FDI inflows and economic growth to corruption are absent in both short and long run. These findings indicate that investments and economic output do not lead to create more corruption in GCC countries.

Estimation of the panel FMOLS models indicates that the corruption perception index has positive impact on economic growth and negative impact on domestic investment. The impact of corruption on FDI inflows is not significant. Corruption is neutral to FDI inflows in GCC countries. Therefore, the “helping hand” hypothesis holds for the case of domestic investment whereas the “grabbing hand” hypothesis holds for economic growth. None of hypotheses hold for the case of FDI inflows. These results are generally not surprising. In the same line with previous theoretical and empirical studies, our results are controversial of the effect of corruption on domestic investment, FDI inflows and economic growth.

Finding that corruption helps domestic investment in emerging countries such as GCC is evident. This is can be explained by the fact that some bribery acts can help in overcoming the administration bureaucracy and inefficiency regulations by speeding up domestic investment in countries where the abundance of oil and gas resources offers the opportunity for some agents to obtain payments. Corruption negatively affects economic growth in GCC countries due maybe to the increases in the cost of production, the uncertainty and the misallocation of resources caused by the market failure. Hence, policies should be addressed to fight corruption that will likely foster the economic growth in GCC countries.

Policy Implications

As we find that corruption has a negative impact on economic growth in GCC countries, it is necessary for the governments of this group of countries to work on fighting corruption because corruption has many negative effects on societies. The economy of GCC countries cannot grow fast if they permit any tolerance in corruption. Moreover, governments are encouraged to improve the institutional environment that could help attract foreign investors. In addition, GCC countries should formulate strategies and policies that may curb corruption and foster a healthy economic environment in order to attract more FDI inflows. Overall, the policy implication resulting from this study is that the improvement of corruption perception index in GCC countries is not without a positive impact on economic growth in the long run for these countries even they have huge oil and gas resources that create opportunities for rent-seeking behavior. The relevance of this implication lies in the GCC’s effort to keep abreast of the international community’s approach to protecting integrity and combating corruption and to adopt legislation that would ensure justice and transparency in transactions. The GCC countries have initiated the establishment of a committee of heads of anti-corruption bodies in the Gulf Council in 2013. Moreover, they ratified the International Convention against corruption in 2013. The GCC countries are also working on that the culture of impunity should be prohibited. For example, they should learn the anticorruption measures from least corrupted countries. Finally, the GCC authorities should increase public awareness of the various disadvantages of corruption by disseminating data on the most corrupt sectors in each country. Awareness is one of the important measures to fight corruption. Anti-corruption campaigns can raise awareness of corruption. In this case, the media will disseminate the necessary information.

The one limit of this study is that it relies on short time frame due to the lack of data on corruption perception index, which is available for GCC countries only since 2003. It would be also interesting for future research to consider a nonlinear relationship mainly between corruption and investment in order to determine the critical level of corruption that maximizes the level of investments and economic growth.

Authors’ Note

Mounir Belloui is Prof. Dr. at Najran University, Saudi Arabia. He teaches and researches in Business and Economics. He has published many articles published in indexed reputable journals.

Acknowledgments

The authors would like to express their gratitude to the ministry of education and the deanship of scientific research—Najran University—Kingdom of Saudi Arabia for their financial and technical support under code number NU/SHED/16/039.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by the deanship of scientific research—Najran
University—Kingdom of Saudi Arabia under the grant number NU/ SHED/16/039.

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**References**

Acemoglu, D., & Verdier, T. (1998). Property rights, corruption and the allocation of talent: A General Equilibrium Approach. *Economic Journal, 108*, 1381–1403.

Aidt, T. (2003). Economic analysis of corruption: A survey. *The Economic Journal, 113*, 632–652.

Aghion, P., Akcigit, U., Cagé, J., & Kerr, W. R. (2016). Taxation, corruption, and growth. *European Economic Review, 86*, 24–51.

Alfada, A. (2019). The destructive effect of corruption on economic growth in Indonesia: A threshold model. *Heliyon, 5*(10), 1–14.

Al-Sadig, A. (2010). Corruption and private domestic investment: Evidence from developing countries. *International Journal of Economic Policy in Emerging Economies, 3*(1), 47–60.

Alshehry, A., & Belloumi, M. (2014). Investigating the causal relationship between fossil fuels consumption and economic growth at aggregate and disaggregate levels in Saudi Arabia. *International Journal of Energy Economics and Policy, 4*(4), 531–545.

Asteriou, D., & Hall, S. G. (2015). *Applied econometrics* (3rd ed.). Red Globe Press.

Ayadi, F., Aibolade, S., Williams, J., & Ladelle, M. H. (2014). Transparency and foreign direct investment into Sub-Saharan Africa: An econometric investigation. *African Journal of Economic and Management Studies, 5*(2), 146–159.

Azam, M., & Ahmed, S. A. (2013). The effects of corruption on foreign direct investment inflows: some empirical evidence from less developed countries. *Journal of Applied Sciences Research, 9*(6), 3462–3467.

Bardhan, P. (1997). Corruption and development: A review of the literature. *Journal of Economic Literature, 35*(3), 1320–1346.

Bayar, Y., & Alakbarov, N. (2016). Corruption and foreign direct investment inflows in emerging market economies. *Eco Forum Journal, 5*(2), 303–308.

Bayley, D. H. (1966). The effects of corruption in a developing nation. *Western Political Quarterly, 19*(4), 719–732.

Belloumi, M., & Alshehry, A. (2018). The impacts of domestic and foreign direct investments on economic growth in Saudi Arabia. *Economics, 6*(1), 18.

Ben Jebli, M., & Belloumi, M. (2017). Investigation of the causal relationships between combustible renewables and waste consumption and CO2 emissions in the case of Tunisian maritime and rail transport. *Renewable and Sustainable Energy Reviews, 71*, 820–829.

Bitterhout, S., & Simo-Kengne, B. D. (2020). *The effect of corruption on economic growth in the BRICS countries. A panel data analysis* (EDWRG Working Paper Number 03-2020). Economic Development and Well-being Research Group. University of Johannesburg, College of Business and Economics.

Breitung, J. (2000). The local power of some unit root tests for panel data. In B. Baltagi (Ed.), *Nonstationary panels, panel cointegration, and dynamic panels, advances in econometrics* (Vol. 15, pp. 161–178). JAI.

Brunetti, A., Kisunko, G., & Weder, B. (1997). *Economic growth with ‘incredible’ rules: Evidence from a world wide private sector survey* (World Bank Policy Research Working Paper No. 1760). The World Bank, Washington, DC.

Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics, 72*(1), 321–334.

Castro, C., & Nunes, P. (2013). Does corruption inhibit foreign direct investment? *Política/Revista de Ciencia Política, 51*(1), 61–83.

Chamserdine, N. (2016). *Corruption and economic growth in the Middle East and North Africa* [Senior Theses, Trinity College].

Cieślik, A., & Goczek, L. (2018). Control of corruption, international investment, and economic growth – Evidence from panel data. *World Development, 103*(C), 323–335.

d’Agostino, G., Dunne, J. P., & Pieroni, L. (2016). Corruption and growth in Africa. *European Journal of Political Economy, 43*, 71–88.

Delgado, M., McCloud, N., & Kumbhakar, S. (2014). A generalized empirical model of corruption, foreign direct investment, and growth. *Journal of Macroeconomics, 42*, 298–316.

Dickey, D., & Fuller, W. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica, 49*, 1057–1072.

Engle, R. F., & Granger, C. J. (1987). Co-integration and error correction: representation, estimation and testing. *Econometrica, 55*(2), 251–276.

Evrensel, A. Y. (2010). Corruption, growth, and growth volatility. *International Review of Economics and Finance, 19*(3), 501–514.

Freckleton, M., Wright, A., & Craigwell, R. (2012). Economic growth, foreign direct investment and corruption in developed and developing countries. *Journal of Economic Studies, 39*(6), 639–652.

Gherghina, S. C., Simionescu, L. N., & Hudea, O. S. (2019). Exploring foreign direct investment–economic growth nexus—empirical evidence from Central and Eastern European countries. *Sustainability, 11*, 5421–5433.

Ghoneim, A. F., & Ezzat, A. M. (2016). Growth and corruption in Arab countries: What type of relationship connects them? *Journal of Economics and International Finance, 8*(5), 44–55.

Grossman, G. M., & Helpman, E. (1990). Comparative advantage and long run growth. *American Economic Review, 80*, 796–815.

Gründler, K., & Potrafke, N. (2019). Corruption and economic growth: New empirical evidence. *European Journal of Political Economy, 60*, 1–14.

Gyimah-Brempong, K. (2002). Corruption, economic growth, and income inequality in Africa. *Economics of Governance, 3*(3), 183–209.

Gyimah-Brempong, K., & Camacho, S. M. D. (2006). Corruption, growth, and income distribution: Are there regional differences. *Economics of Governance, 7*(3), 245–269.

Hadri, K. (2000). Testing for stationarity in heterogeneous panels. *The Econometrics Journal, 3*, 148–161.

Hakimi, H., & Hamdi, H. (2017). Does corruption limit FDI and economic growth? Evidence from MENA countries. *International Journal of Emerging Markets, 12*(3), 550–571.

Hermes, N., & Lensink, R. (2003). Foreign direct investment, financial development and economic growth. *Journal of Development Studies, 40*, 142–163.
