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## Article

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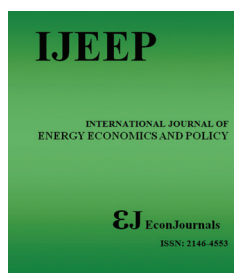
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# The Economic Impacts of Natural Resource Dependency in Gulf Countries

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## ABSTRACT

Natural resources serve as useful inputs and vital raw materials for domestic industries, which stimulate and secure sustained economic growth and development. However, the notion that the richness of natural resources can be translated into a curse rather than a blessing has long been an overarching topic of research for both academics and policymakers. Natural resources wealth has noticeable socioeconomic and political impacts that vary among resource-rich countries. Given the importance of the Gulf Countries and their dependency on income from natural resources, this study examines the economic impacts of natural resource dependency by taking per capita GDP and total factor productivity as dependent variables. This study applied the autoregressive distributed lag and error correction model by using time-series data from 1984 to 2014. The results indicate that, in the long-run, dependency on natural resources has a positive impact on per capita GDP in Saudi Arabia and United Arab Emirates, but the relationship is insignificant in Kuwait. Then, it is found that natural resource dependency shows a positive impact on TFP in Saudi Arabia and a negative impact in Kuwait, while the relationship is insignificant in the case of United Arab Emirates.

**Keywords:** Natural Resource Dependency, Institutional Quality, Human Capital, Total FACTOR productivity, Per Capita GDP

**JEL Classifications:** B15, E02, E24, I25, O47, Q32, Q38

## 1. INTRODUCTION

Several countries in the Middle East and North Africa are blessed with non-renewable natural resources, and yet they show low levels of productivity and poor development outcomes and economic growth when compared with resource-poor countries, such as East Asian economies (Oyinlola et al., 2015; Arezki and Nabli, 2012; Frankel, 2012). This condition is known as the “natural resource curse” (Auty, 1993), which encompasses a set of social, economic, and political challenges that are unique to countries that are rich in oil, gas, and minerals (Ross, 2015).

There is now a vast body of literature on this phenomenon and multiple explanations for how, why, and when a resource curse is likely to occur. Influential studies by Sachs and Warner (1995, 1997) supported the resource curse phenomenon by confirming that economic growth was negatively correlated with natural

resource wealth. Although a universally accepted theory of the resource curse is lacking, most explanations of the resource curse apply a crowding-out logic. This concept was simplified by Sachs and Warner (2001), who characterized it as the process in which natural resources crowd out growth-enhancing economic activities.

New approaches and explanations for the resource curse have been added to the literature (Badeeb et al., 2017). Although it is of great significance to study the relationship between natural resources and overall growth, there is a need to identify the different aspects, mechanisms, or transmission channels through which the curse works (Pendegast et al., 2011; Papyrakis and Gerlagh, 2004). In other words, natural resources can affect growth through their effect on the determinants of growth, such as productivity (Farhadi et al., 2015), institutional quality (Pendegast et al., 2011), and human capital (Akpan and Chuku, 2014).

A sizable number of studies have emphasized the impacts of the resource curse on economic growth. However, this paper focuses on productivity as a transmission channel for the resource curse, following studies such as Farhadi et al. (2015), Gylfason and Zoega (2006), and Papyrakis and Gerlagh (2004). Productivity is considered to be a key determinant of economic growth, so high productivity means the high-growth performance of GDP. It has been observed that the differences in total factor productivity (TFP) between countries explain the differences in GDP growth rates (Dasgupta et al., 2005; Easterly and Levine, 2001).

The resource curse hypothesis was initially discussed in the context of the Dutch disease mechanism: productivity plays an important role in explaining this mechanism and its effect on growth (Harding and Venables, 2013; Ismail, 2010). Therefore, TFP has been regarded as a significant transmission channel since the resource curse was first hypothesized. It has been observed that the over-reliance on natural resources causes productivity differences between different sectors of the economy. Over-investment in the resource sector causes neglect of the tradable sectors that are more beneficial for long-term growth, leading to a decline in TFP and, consequently, diminished growth (Corden, 1984; Corden and Neary, 1982).

Additionally, it is apparent under the resource curse hypothesis that institutional quality and human capital also affect productivity because of the existence of natural resources (Arezki et al., 2012; Arezki et al., 2011; Gylfason et al., 1999). Institutional quality is a concept that captures the effectiveness of the law, individual rights, and government regulations and services (Hodgson, 2006; Knack and Keefer, 1995). Human capital is the skills and knowledge that individuals build, maintain, and practice (Armstrong, 2006; Romer, 1990). Furthermore, four main sources of human capital were distinguished by Becker (1962): on-the-job training, schooling, information, and health. These four factors develop the mental and physical abilities of individuals, thus fostering their productivity as well as their wages.

A particular problem in resource-rich countries is that governments commonly neglect institutions and human capital because of a false sense of security imbued by high resource revenues (Gylfason, 2001). Huge windfalls of resource revenues discourage the need for education and distort investments in human capital since jobs in the resource sectors are accessible and require lower-skilled and lower-qualified human capital compared with the tradable sector (Stijns, 2006; Bravo-Ortega and De Gregorio, 2005). Moreover, these huge windfalls could pave the way for corruption and bribery (Faria et al., 2016; Tebaldi and Elmslie, 2013; Dias and Tebaldi, 2012). As a result of these factors, TFP is negatively affected and, in turn, reduces GDP growth (Papyrakis and Gerlagh 2004).

This raises the question of whether human capital or institutional quality have any effect on TFP and per capita GDP (PGDP) in resource-rich countries, a topic that has received relatively little attention. While some studies have investigated the separate effect of either natural resources (Badeeb and Lean, 2017; Farhadi et al., 2015), human capital (Alvi and Ahmed, 2014), or institutional quality (Tebaldi and Elmslie, 2013) on economic growth or the effect of natural resources on human capital and

institutional quality (Akpan and Chuku, 2014), no study has considered the possible effect of human capital or institutional quality on TFP, especially in resource-rich countries.

Furthermore, this paper focuses on resource-based economies that are located in the Gulf region; Kuwait (KWT hereinafter), the Kingdom of Saudi Arabia (KSA hereinafter), and the United Arab Emirates (UAE hereinafter). These Gulf Countries (GCs) are relatively oil-rich, and oil revenues generally account for almost half of their GDP and government income, which tends to make them over-reliant on petroleum production and export, vulnerable to the volatile global oil market (International Monetary Fund, 2019), and prime hosts for the resource curse (Appendix A). The present study is the first attempt to investigate the direct short-term and long-term impacts of natural resources, human capital, and institutional quality on total factor productivity and per capita GDP in Gulf Countries by using a time-series approach with data from 1984 to 2014.

The paper is organized as follows. Section 2 is related to methodology and data. Section 3 presents the results and discussions, and concluding statements are provided in section 4.

## 2. RESEARCH METHODOLOGY AND DATA

The autoregressive distributed lag (ARDL) framework (Pesaran et al., 2001; Pesaran and Shin 1999) is an appropriate choice in this study because, while other co-integration techniques require that all regressors be integrated of the same order, the ARDL approach has one advantage in this regard: it can be applied regardless of the regressors' order of integration (Pesaran et al., 2001). Thus, ARDL is perfect for dealing with variables that are integrated of different orders:  $I(0)$  or  $I(1)$  or a combination of both. Thus, it prevents the problems that are related to the standard co-integration test, which requires the classification of the variables into  $I(0)$  and  $I(1)$ . If there is one co-integrating vector, then the ARDL approach to co-integration or bound procedure for a long-run relationship should be selected because Johansen and Juselius's (1990) co-integration procedure is not applicable. In this circumstance, the ARDL approach to co-integration provides efficient and realistic estimates. In contrast to the co-integration procedure of Johansen and Juselius (1990), the ARDL model for co-integration facilitates the recognition of co-integrating vector(s). Namely, each of the underlying variables is regarded as a single long-run relationship equation.

Additionally, the ARDL model's popularity has increased in applied time-series econometrics because it appears that co-integration for nonstationary variables serves as an error-correction mechanism (ECM). The ECM model can be derived from the ARDL model through a simple linear transformation that integrates long-run equilibrium with short-run adjustments, without losing long-run information. The ECM incorporates sufficient numbers of 'lags' for the purpose of capturing the data that generate the progression in a general-to-specific modeling framework (Nkoro and Uko, 2016; Hassler and Wolters, 2006).

Differencing and generating a linear combination of nonstationary data convert all variables equally into an error-correction mechanism with stationary time-series only.

ARDL is also a preferred model when there is a single long-run relationship between variables in a small sample size. If the F-statistic (Wald test) determines that there is a single long-run relationship in a small or finite sample size, then applying the ARDL approach is more efficient.

## 2.1. Theoretical Model

The concept of “neutrality” in technological change has been found to be the most sophisticated and beneficial approach in economic growth models (Jones, 1965). According to this view, technological progress is neutral if it leaves the capital–output ratio unaffected at a certain rate of profit (Jones, 1965; Solow, 1962, 1956).

Solow (1956) presented a framework for analyzing the causes and dynamics of economic growth and then divided the growth rate of the aggregate output between factors of production and technological changes. Solow used the specification of the production function with Hicks-neutral technology because the change does not affect the balance of labor and capital; it only affects technological progress. Recently, this approach was used by Chen (2012) and Alvi and Ahmed (2014).

$$Y(t)=A(t).F[K(t),L(t)] \quad (1)$$

where  $Y(t)$  is the level of aggregate output,  $K(t)$  is the level of capital stock, and  $L(t)$  represents the labor force in the economy.  $A(t)$  represents the level of technology. To obtain the expression for per capita output, we use the Cobb–Douglas production function.

$$Y_t = AK_t^\alpha L_t^\beta \quad (2)$$

where  $\alpha$  and  $\beta$  represent the shares of capital and labor in total output. The production function is assumed to depict a constant return to scale. To obtain the per capita output form, we divide both sides of Equation (2) by  $L_t$ :

$$\frac{Y_t}{L_t} = AK_t^\alpha L_t^\beta \frac{1}{L_t} \quad (3)$$

Next, by multiplying and dividing  $L_t^\alpha$  and  $L_t^\beta$ , respectively, in Equation (3), we get the following form:

$$\frac{Y_t}{L_t} = A \left( \frac{K_t^\alpha}{L_t^\alpha} \right) L_t^\alpha \left( \frac{L_t^\beta}{L_t^\beta} \right) L_t^\beta \frac{1}{L_t} \quad (4)$$

where,  $\frac{Y_t}{L_t} = Y_t, \frac{K_t^\alpha}{L_t^\alpha} = K_t^\alpha, \frac{L_t^\beta}{L_t^\beta} = 1$

$$y_t = Ak_t^\alpha L_t^\beta \frac{1}{L_t} \quad (5)$$

By imposing the condition of  $\alpha+\beta=1$  in Equation (5), we are left with

$$y_t = Ak_t^\alpha \quad (6)$$

where  $y_t$  represents output per capita, and  $k_t$  represents physical capital stock per worker. Now, by taking the natural logarithm of both sides of Equation (6), we are left with

$$\ln(y_t)=\ln(A)+\alpha\ln(k_t) \quad (7)$$

where  $A$  represents the Solow residual or total factor productivity, which explains the unexplained part of the output. “ $A$ ” can be any economic or non-economic variable, which explains the output. This paper develops the traditional approaches by introducing resource rents (RR), human capital (HC) as social development, and institutional quality (IQ) in the form of law and order and corruption in place of  $A$ .

The novelty of this study is that it adds resource rents (RR), law and order (LO), corruption (CRP), and human capital (HC) to Solow’s original frameworks:

$$\ln(y_t)=\alpha \ln(k_t)+\theta_1 RR_t+\theta_2 LO_t+\theta_3 CRP_t+\theta_4 HC_t \quad (8)$$

As indicated earlier, much of the literature has argued that the resource curse means that resource rents will have a negative impact on countries that are relatively resource-rich. This study tests the indirect impact of resource rents on growth via total factor productivity. Therefore, this study adopts the most widely accepted and commonly applied method to calculate the TFP, namely, the Cobb–Douglas production function (Cole and Neumayer, 2006; Miller and Upadhyay, 2000; Hall and Jones, 1999; Bernard and Jones, 1996). Thus, the total factor productivity from Equation (7) can be explained as follows.

$$\ln A=\ln y_t-\alpha\ln(k_t) \quad (9)$$

$$\ln A=tfp \quad (10)$$

The central determinants of TFP in this study are RR, LO, CRP, and HC. Thus,

$$tfp=f(RR,LO,Crp,HC) \quad (11)$$

or

$$tfp=\theta_1 RR_t+\theta_2 LO_t+\theta_3 Crp_t+\theta_4 HC_t \quad (12)$$

### 2.1.1. Empirical model and estimation procedure

In this section, we present the dilemma of natural resource abundance empirically. We can write Equations (8) and (12) as follows:

$$\ln(y_t)=\alpha_o+\alpha \ln(k_t)+\theta_1 RR_t+\theta_2 LO_t+\theta_3 CRP_t+\theta_4 HC_t+\mu_t \quad (13)$$

and

$$tfp_t=\alpha_o+\theta_1 RR_t+\theta_2 LO_t+\theta_3 Crp_t+\theta_4 HC_t+\mu_t \quad (14)$$

where  $\alpha_o$  is the intercept,  $\mu_t$  is the error term, and the subscript  $t$  is used to indicate that the data form a time series.

### 2.1.2. Autoregressive distributed lag model

To derive the short-run and long-run results, this study applies the autoregressive distributed lag model (ARDL). The general form of the ARDL model of Equation (2.13) and (2.14) is as follows:

$$\begin{aligned}\Delta PGDP_t = & \alpha_0 + \sum_{i=1}^t \delta_i \Delta PGDP_{t-i} + \sum_{i=1}^t \vartheta_i \Delta k_{t-i} + \sum_{i=1}^t \rho_i \Delta RR_{t-i} \\ & + \sum_{i=1}^t \phi_i \Delta LO_{t-i} + \sum_{i=1}^t \omega_i \Delta Crp_{t-i} + \sum_{i=1}^t \varphi_i \Delta HC_{t-i} + \lambda_1 PGDP_{t-1} \\ & + \lambda_2 k_{t-1} + \lambda_3 RR_{t-1} + \lambda_4 LO_{t-1} + \lambda_5 CRP_{t-1} + \lambda_6 HC_{t-1} + \mu_t\end{aligned}\quad (15)$$

and

$$\begin{aligned}\Delta TFP_t = & \alpha_0 + \sum_{i=1}^t \delta_i \Delta TFP_{t-i} + \sum_{i=1}^t \rho_i \Delta RR_{t-i} + \sum_{i=1}^t \phi_i \Delta LO_{t-i} \\ & + \sum_{i=1}^t \omega_i \Delta Crp_{t-i} + \sum_{i=1}^t \varphi_i \Delta HC_{t-i} + \lambda_1 TFP_{t-1} + \lambda_2 RR_{t-1} \\ & + \lambda_3 LO_{t-1} + \lambda_4 CRP_{t-1} + \lambda_5 HC_{t-1} + \mu_t\end{aligned}\quad (16)$$

where  $\alpha_0$  is the drift component,  $\mu_t$  is a residual term in period  $t$ , and the terms  $\delta_i$ ,  $\vartheta_i$ ,  $\omega_i$ ,  $\phi_i$ ,  $\rho_i$ , and  $\varphi_i$  are the parameters used for short-run analysis, while  $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$ ,  $\lambda_4$ ,  $\lambda_5$ , and  $\lambda_6$  are used to estimate long-run parameters. The Wald restriction test is used to test the long-run relationships or co-integration between the dependent and the independent variables. The value of the F-test is determined by applying the coefficient diagnostic Wald restriction test on long-run variable parameters. The hypothesis for the co-integration test is

$$H_0 = \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = 0 \text{ (Absence of co-integration).}$$

$$H_1 = \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq 0 \text{ (Presence of co-integration).}$$

The F-test is based on the number of regressors in the model (Pesaran et al., 2001). The estimated F-statistic value is compared with the two sets of critical values of the lower and upper bounds. If the F-stat value is greater than the value of the upper bound, then the null hypothesis is rejected, which indicates that co-integration and a long-run relationship exist between the dependent and independent variables. If the value of the F-stat is lower than the value of the lower bound, then the null hypothesis is not rejected, which shows that there is no co-integration, meaning that no long-run association exists between the regressors. Finally, if the F-stat is between the lower bound and upper bound, then the result is inconclusive.

The appropriate lag length in the ARDL model was selected through the Akaike Information Criterion (AIC). The AIC is considered to be a useful model (Profillidis and Botzoris, 2018; Burnham and Anderson, 2004), so it was employed to determine the ideal lag length incorporated in the model. Co-integration and the error correction econometric method were employed for the estimation of the stated models. The co-integration analysis was performed within an autoregressive distributed lag (ARDL) framework since it is a more statistically significant method that aims to identify the cointegrating relationships in a small sample. ARDL is a major dynamic model.

If the co-integration is statistically significant, then the values of the long-run parameters are found by normalizing the long-run Equation and estimating the error correction model for short-run analysis.

### 2.1.3. Error correction model

When a long-run relationship exists between variables, then there is an error correction representative model, so the following error correction model is estimated in the third step.

$$\begin{aligned}\Delta PGDP_t = & \alpha_0 + \sum_{i=1}^t \delta_i \Delta PGDP_{t-i} + \sum_{i=1}^t \vartheta_i \Delta k_{t-i} + \sum_{i=1}^t \rho_i \Delta RR_{t-i} \\ & + \sum_{i=1}^t \phi_i \Delta LO_{t-i} + \sum_{i=1}^t \omega_i \Delta Crp_{t-i} + \sum_{i=1}^t \varphi_i \Delta HC_{t-i} + \gamma ECM_{t-1}\end{aligned}\quad (17)$$

and

$$\begin{aligned}\Delta TFP_t = & \alpha_0 + \sum_{i=1}^t \delta_i \Delta TFP_{t-i} + \sum_{i=1}^t \rho_i \Delta RR_{t-i} + \sum_{i=1}^t \phi_i \Delta LO_{t-i} \\ & + \sum_{i=1}^t \omega_i \Delta Crp_{t-i} + \sum_{i=1}^t \varphi_i \Delta HC_{t-i} + \gamma ECM_{t-1}\end{aligned}\quad (18)$$

The coefficient of  $ECM_{t-1}$  determines the speed of adjustment of the short-run shocks toward the long-run equilibrium in the case of any disturbance.

## 2.2. Description of the Data and Variables

A description of the variables and the rationale for their inclusion in the model are presented below.

Per capita GDP (PGDP) (constant 2010 USD) is the dependent variable, as used in previous studies that considered PGDP as a proxy for the degree of development in a country (Kakanov et al., 2018; Olayungbo and Adediran, 2017; Akpan and Chuku, 2014; Busse and Groening, 2013; Arezki and Van der Ploeg, 2011). PGDP is measured by dividing the gross domestic product by the midyear population, and the natural logarithm was taken for this variable. Data on PGDP are from the world development indicators (WDI) provided by the World Bank (2017) for the period of 1984-2014.

Real capital stock per worker is denoted by  $K$ . Capital stock includes infrastructure such as the ports and roads, buildings, machines, and vehicles that are used in the process of producing goods and services. It is required in this model because it is the model formation, so capital stock per worker is an independent variable in the model; however, the data were absent. Therefore, a base period capital stock was estimated by following a method called the perpetual inventory method (Berlemann and Wesselhoft, 2016) as follows:

$$K_0 = \frac{GFK_0}{\delta + g_{GFK}} \quad (19)$$

where  $k_0$  is the capital stock,  $GFK_0$  is the level of gross fixed capital formation,  $g_{GFK}$  is average growth in gross fixed capital formation for 1984-2014, and  $\delta$  is the rate of depreciation, which is assumed to be 5% per year because it is the standard percentage (Berlemann and Wesselhoft, 2016; Cole and Neumayer, 2006). To calculate



the data for the targeted years, we used the procedure given by the following Equation.

$$K_t = K_{t-1} - \delta K_{t-1} + GFK_t = (1 - \delta) K_{t-1} + GFK_t \quad (20)$$

where  $k_t$  is a capital stock in the current year,  $k_{t-1}$  is the capital stock in the previous year,  $GFK_t$  is the gross fixed capital formation, and  $\delta$  is the rate of depreciation, as indicated above. The data on gross fixed capital formation (constant 2010 USD) are from the World Bank (2017).

Total factor productivity (TFP) is a dependent variable in the second empirical model of this study. TFP is the portion of output that is not explained by the volume of inputs used in production (Comin, 2017). The source of TFP data for KWT and KSA is the Penn World Tables v9.0 (Feenstra et al., 2015), which provide the TFP data for 182 countries. However, TFP data for the UAE were not available, so TFP was calculated by using the Cobb–Douglas production function, and the results are given in Appendix A., Table A2.

The labor force is the number of persons employed in a country. The labor force is a major factor of production. It was used in the model to estimate the production function, along with capital stock, to get the TFP. The data are from the Penn World Table (PWT) (Feenstra et al., 2015).

Human capital (HC) is viewed as the accumulation of education (Sun et al., 2018). Human capital theory explains that education is a significant source of human capital, which, in time, is an important component of the economic growth of any country (Acevedo, 2008). Earlier studies have highlighted that economic growth and productivity are noticeably influenced by educational attainment (Gennaioli et al., 2013; Ciccone and Papaioannou, 2009) and that a well-educated workforce increases TFP and thus economic growth (Nachega and Fontaine, 2006). Thus, this study included the human capital index, following Kim and Lin (2017), to test the impact of human capital on TFP and PGDP. The data source is the Penn World Table (PRS group) (Feenstra et al., 2015), in which it is referred to as the human capital index. PWT v9.0 introduced the human capital index based on the average years of schooling (Barro and Lee, 2013) and weighted by the respective return on schooling in each year (Psacharopoulos, 1994).

Institutional quality (IQ) is included using corruption (CRP) and law and order (LO) as a proxy of IQ (Herzfeld and Weiss, 2003). Corruption was defined by Aidt (2003) as the use of public power for individual interest, so it negatively affects the economy (Aidt et al., 2008; Lambsdorff, 2007; Meon and Sekkat, 2005; Mo, 2001). Corruption is presented in the International Country Risk Guide, 2017 (ICRG) as the “control of corruption,” which is measured using a scale from 0 to 6. The measure of control in corruption is inverted to “corruption” in this paper which is a similar approach to that used by Okada and Samreth (2017).

As stated in Knack and Keefer (1995), LO reflects “the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes.”

The data were obtained from the ICRG by the PRS Group for the period between 1984 and 2014. The ICRG explained that LO is two measures that constitute one risk component. Each subcomponent equals half of the total (thus, a scale of 0–3 is used for each). Higher scores indicate “sound political institutions, a strong court system, and provisions for an orderly succession of power.” Lower scores indicate “a tradition of depending on physical force or illegal means to settle claims” (Knack and Keefer 1995). Good institutional quality enhances productivity, economic growth, and development in the country (Olayungbo and Adediran, 2017; Haapanen and Tapio, 2016; Perera and Lee, 2013; Acemoglu and Robinson, 2010).

The resource rents (RR) variable is defined as the sum of oil, natural gas, coal, mineral, and forest rents (World Bank, 2017). It is used as an independent variable, and the natural logarithm was taken for this variable. RR is the variable of interest to evaluate the impact of nonrenewable natural resources on PGDP and TFP. The total natural resource rents (% of GDP) data were taken from the World Development Indicators (WDI) provided by the World Bank following an approach used by Okada and Samreth (2017), Elbadawi and Soto (2015), Farhadi et al. (2015), Bhattacharyya and Hodler (2014), and Anthonsen et al. (2012).

The descriptive analysis of the variables under study is given in Appendix A., Table A1.

### 3. RESULTS AND DISCUSSION

#### 3.1. Unit Root Test

Checking the order of integration of variables is a precondition for any co-integration technique. For this purpose, the augmented Dickey–Fuller (ADF) and Phillips–Perron (Appendix A., Table A3) unit root tests were applied. The probability values are given in parentheses, and the results of (ADF) unit root test are reported in Table 1. In the case of KWT, the results from both tests are consistent, except for the variable LO. For PGDP, HC, TFP, and CRP, the null hypotheses of a unit root could not be rejected at the 5% level of significance. All these variables are integrated of order one,  $I(1)$ . The other variables under consideration, such as RR, are stationary at levels,  $I(0)$ . For LO, the reported results of augmented Dickey–Fuller indicate the rejection of the null hypothesis at level, while results of Phillips–Perron indicate non-stationarity at level, while the series is stationary with first difference transformation.

For KSA, the null hypotheses of a unit root at level could not be rejected at the 10% level of significance for PGDP, TFP, HC, CRP, and LO, but these variables are stationary at first difference. However, RR and K are stationary at level. For the UAE, the null hypotheses of a unit root at level could not be rejected at the 10% level of significance for PGDP, HC, TFP, LO, CRP, and K, but these variables are stationary at first difference. However, the variable RR was shown to be stationary at level.

#### 3.2. The ARDL and Bound Test

Table 1 reports two very important features regarding the univariate characteristics of variables used in this study. First,

**Table 1: Results of the augmented dickey–fuller unit root test**

| Variable       | Country           |                            |                             |                            |                          |                            |
|----------------|-------------------|----------------------------|-----------------------------|----------------------------|--------------------------|----------------------------|
|                | Kuwait            |                            | The Kingdom of Saudi Arabia |                            | The United Arab Emirates |                            |
|                | Level             | 1 <sup>st</sup> Difference | Level                       | 1 <sup>st</sup> Difference | Level                    | 1 <sup>st</sup> Difference |
| Per capita GDP | -2.131(0.234)     | -4.714*** (0.000)          | -1.866(0.342)               | -8.618*** (0.000)          | -1.684 (0.428)           | -3.845*** (0.006)          |
| Human capital  | -2.418(0.145)     | -3.027** (0.045)           | 0.833(0.993)                | -4.037** (0.004)           | -0.318 (0.910)           | -3.546** (0.013)           |
| Resource rents | -3.223** (0.028)  |                            | -3.577** (0.049)            |                            | -2.888** (0.058)         |                            |
| TFP            | -2.256(0.191)     | -4.786*** (0.000)          | -1.247(0.640)               | -7.219*** (0.000)          | -2.150 (0.227)           | -4.052*** (0.004)          |
| Law and order  | -5.990*** (0.000) |                            | -1.656 (0.440)              | -3.721*** (0.000)          | -2.392 (0.152)           | -5.661*** (0.000)          |
| Corruption     | -2.352(0.163)     | -5.430*** (0.000)          | -2.581(0.290)               | -5.257*** (0.000)          | -0.631 (0.290)           | -4.025*** (0.004)          |
| Capital stock  | -3.451(0.016**)   |                            | -2.955 (0.050**)            |                            | -0.465(0.979)            | -3.254* (0.093)            |

The values in the parentheses represent the P-value. \* is 10% significance, \*\* is 5% significance; and \*\*\* is 1% significance

all variables follow different orders of integration: I(1) and I(0). Second, all proposed dependent variables are integrated of order one (stationary at level). These two characteristics of variables allowed for the application of ARDL because they are also important prerequisites. The other prerequisite for ARDL is the existence of co-integration between I(0) and I(1) variables. This is done by a co-integration bound test (Pesaran et al., 2001), and the bound testing procedure is based on the Wald test (F-test). Two critical values are given by Pesaran et al. (2001) for the co-integration test. The lower critical bound assumes that all the variables are I(0), which means that there is no co-integration relationship between the examined variables. The upper bound assumes that all the variables are I(1), which means that there is co-integration among the variables. If the computed F-statistic is greater than the upper bound critical value, then the null hypothesis that the variables are co-integrated is rejected. If the F-statistic is below the lower bound critical value, then the null hypothesis cannot be rejected.

The bound test results for KWT in Table 2 show that the values of the F-statistics are higher than the upper bound at the 95% confidence interval. The values are (4.43) for PGDP and (5.37) for TFP. With these results, it can be assumed that, for all equations, there is at least one short- or long-run cointegrating relationship between I(0) and I(1) variables. All preconditions to apply ARDL are fulfilled for KWT. In the table, K is the degree of freedom, and it shows the independent variables in the selected model.

The results for KSA as given in Table 2 show that all values of the F-statistics are higher than the 95% confidence interval. The values are (7.22) for PGDP and (4.73) for TFP, which prove the existence of a long- and short-run co-integration. Hence, all prerequisites for applying ARDL are met for KSA.

For the UAE, the values are (18.48) for PGDP and (4.23) for TFP. Hence, these results in the UAE confirm a long and short-run co-integration. All prerequisites for applying ARDL are now met, so we can proceed to the next step for obtaining regression results.

### 3.3. Impact of Resources Rents, Institutional Quality, and Human Capital on Per Capita GDP

The first regression equation (15) captures the impact of resource rents (RR) on per capita GDP (PGDP) while controlling for corruption (CRP), law and order (LO), human capital (HC), and capital stock (K). The appropriate lag length of ARDL was selected using the Akaike Information Criteria (Table 3).

**Table 2: Co-integration bound test results**

| Country            | Kuwait       |   | The Kingdom of Saudi Arabia |   | The United Arab Emirates |   |
|--------------------|--------------|---|-----------------------------|---|--------------------------|---|
| Dependent Variable | F-statistics | K | F-statistics                | K | F-statistics             | K |
| PGDP               | 4.43         | 5 | 7.22                        | 5 | 18.48                    | 5 |
| TFP                | 5.37         | 4 | 4.73                        | 5 | 4.23                     | 4 |

The upper part of Table 3 shows the short-run estimates from the error correction model, while the bottom part presents the long-run estimates. The error correction term highlights the short-run dynamics of the model. In KWT, the error correction term is negative with a value of 0.71, which means that 71% of the error is corrected every year successively. The negative sign represents the stability of the model. The simultaneous significance of long-run and short-run estimates indicates the strong and persistent causal relationship between variables. In the KSA model, the error correction term is significant at 1% with a negative value of 0.91, meaning that 91% of the error is corrected every year successively and that the model is stable. Moreover, in the UAE model, the error correction term is significant at the 1% level with a negative value of 0.48, meaning that 48% of the error is corrected every year successively and that the model is stable.

#### 3.3.1. Results in kuwait

Resource rents have a short-run positive effect on PGDP of 0.2% per 1% increase in the proportion of resource rents in KWT GDP. This is significant at the 1% level, while all lags for resource rents are statistically insignificant. This result suggests that resource rents have a 1-time effect on PGDP.

Institutional quality measured as corruption reduces PGDP by 0.10% in the long-run per 1% increase in corruption, while short-run estimates for both level and first lag are not statistically significant for PGDP. Results show that the law and order situation and human capital measured as education are useful predictors of PGDP in both the long and short-run. Improvement in law and order, as the other measure of institutional quality, increases PGDP by 0.21% and 0.18% in the short and long-run respectively, relative to a 1% increase in law and order. The effect of human capital is even more pronounced: a 1% increase in human capital increases the PGDP significantly by 0.73% in the short-run and 0.63% in the long-run. Additionally, a 1% increase in the 1-year lag of human capital has a positive effect on PGDP by 0.1%. Capital stock is

**Table 3: Impact of resources rents, institutional quality, and human capital on per capita GDP**

| Short-run results   |             |              |                             |              |                          |              |
|---------------------|-------------|--------------|-----------------------------|--------------|--------------------------|--------------|
| Country             | Kuwait      |              | The Kingdom of Saudi Arabia |              | The United Arab Emirates |              |
| Variable            | Coefficient | t-statistics | Coefficient                 | t-statistics | Coefficient              | t-statistics |
| Resource rents      | 0.218***    | 4.309        | 0.024                       | 0.715        | 0.177***                 | 7.222        |
| Resource rents (−1) | 0.009       | 1.230        | −0.083*                     | −1.920       | −0.042*                  | −1.768       |
| Resource rents (−2) | 0.038       | 0.925        |                             |              |                          |              |
| Corruption          | −0.006      | −0.152       | −0.281**                    | −2.140       | 0.002                    | 0.091        |
| Corruption (−1)     | 0.057       | 1.059        |                             |              |                          |              |
| Law and order       | 0.212***    | 7.650        | −0.028                      | −1.169       | −0.001                   | −0.040       |
| Law and order (−1)  |             |              |                             |              | −0.082**                 | −2.757       |
| Human capital       | 0.738***    | 6.611        | −0.262***                   | −3.829       | 0.369***                 | 4.803        |
| Human capital (−1)  | 0.101**     | 2.348        | −0.335***                   | −3.223       |                          |              |
| Capital stock       | 0.116*      | 1.796        | 1.456**                     | 2.891        | 0.638***                 | 9.986        |
| Coint Eq. (−1)      | −0.711***   | −6.280       | −0.918***                   | −5.371       | −0.488***                | −4.553       |
| Long-run results    |             |              |                             |              |                          |              |
| Variable            | Coefficient | t-Statistics | Coefficient                 | t-Statistics | Coefficient              | t-Statistics |
| Resource rents      | 0.098       | 0.056        | 0.179***                    | 3.107        | 0.486***                 | 3.588        |
| Corruption          | −0.100**    | −2.521       | −0.126                      | −0.794       | 0.005                    | 0.089        |
| Law and order       | 0.181***    | 11.048       | −0.030                      | −1.094       | 0.225*                   | 1.715        |
| Human capital       | 0.630***    | 4.632        | 0.083***                    | 3.127        | 0.756***                 | 4.423        |
| Capital stock       | 0.058       | 0.925        | 0.016                       | 0.069        | 1.306                    | 0.069        |
| C                   | 10.847***   | 19.676       | 9.402***                    | 26.378       | 7.284***                 | 6.262        |

\*\*\*, \*\*, and \* denote the significance at the 99%, 95%, and 90% confidence interval respectively

marginally significant in the short-run, but long-run estimates of capital stock for PGDP are insignificant.

Further, to evaluate the stability of the model, the cumulative sum control chart (CUSUM) and CUSUM of squares tests were applied, and the results of both tests indicate that model is stable (Appendix B., Figures B1 and B2).

### 3.3.2. Results in the kingdom of Saudi Arabia

The short-run results show that current resource rents (% of GDP) have no effect on PGDP, but the first lag is statistically significant for PGDP, with a negative effect of 0.08% per 1% increase in the 1-year lag of resource rents. However, in the long-run, a 1% increase in resource rents (as a proportion of GDP) increases PGDP by 0.17%. Corruption and law and order show different effects in KSA. A 1% increase in corruption reduces PGDP by 0.28% in the short-run, and the effect of law and order is statistically insignificant in both periods. A 1% increase in the 1-year lag of human capital shows a negative relationship with PGDP by 0.33%. Moreover, a 1% increase in human capital has a negative effect on PGDP by 0.26% in the short-run and a positive effect in the long-run by 0.08%. Lastly, capital stock has a significant positive effect in the short-run on PGDP by 1.45% following a 1% increase in capital stock, but long-run estimates are insignificant.

Further, the CUSUM and CUSUM of Squares tests were applied to confirm the stability of the model and the relationship between the dependent and the independent variables (Appendix B., Figures B3 and B4).

### 3.3.3. Results in the United Arab Emirates

In the UAE, natural resource rents (% of GDP) have a positive impact on PGDP both in the short and long-run by 0.17% and 0.48%, respectively, per 1% increase in the proportion of resource rents in the UAE's GDP. However, a 1% increase in the 1-year lag

form of resource rents (as a proportion of GDP) shows a negative impact on PGDP by 0.04%. Then, a 1% increase in the 1-year lag form of law and order in the short-run shows a negative impact on PGDP by 0.082% at the 95% confidence interval. Nevertheless, law and order, in the long-run, show a positive impact on PGDP at the 90% confidence interval, so a 1% increase in law and order increases PGDP by 0.22%. The impact of human capital in the form of education on PGDP is positive by 0.36% and 0.75% in both the short and long-run following a 1% increase in human capital at the 99% confidence interval. Similarly, the model is 99% confident that capital stock has a positive effect on PGDP by 0.63% in the short-run per 1% increase in capital stock.

Additionally, the CUSUM and CUSUM of squares tests were applied to this model to prove the stability of the model and the association between the dependent and the independent variables (Appendix B., Figures B5 and B6).

## 3.4. Discussion- Per Capita GDP

The results differ for each country, and this variation reflects the fact that every country has its own experiences, settings, and features that can change its economy's response to changes in an independent variable. The aim of the following section is to discuss the results of the impact of natural resources, institutional quality, and human capital on PGDP in the three countries and link these results to the literature to derive explanations for every significant situation.

The positive relationship between natural resource rents and PGDP in KWT and the UAE in the short-run is an indication that natural resource wealth contributes significantly to the standard of living, as well as the development, in KWT and the UAE since PGDP is seen as a proxy for development (Olayungbo and Adediran, 2017; Akpan and Chuku, 2014). The results for these countries could possibly be the result of their governments' distributing these



revenues to their citizens in the form of pensions, cash payments, high wages, and a reduction in costs for households and local businesses through government subsidies, such as subsidized fuel and subsidized water prices and electricity, as discussed by Hvidt (2013). These results contradict the resource curse theory (Arezki and Van der Ploeg, 2011; Sala-i-Martin et al., 2004) but confirm the results of Smith (2015) and Alexeev and Conrad (2009).

However, the findings of the negative impact of the 1-year lag of resource rents (% of GDP) on PGDP in KSA and the UAE support the resource curse theory (Sala-i-Martin et al., 2004; Sala-i-Martin, 1997), which means that resource rents can lead to high public consumption and can reduce the incentives for investment projects (Ben-Salha et al., 2018; Baland and Francois, 2000). Moreover, the world prices of natural resources are highly volatile, which triggers extreme PGDP volatility (Poelhekke and Van der Ploeg, 2009), and a country's volatile revenues impose welfare loss for risk-averse investors (Loayza et al., 2007). Conversely, the long-run results show a positive impact of resource rents (% of GDP) on PGDP in KSA and the UAE. These results align with Mehar et al. (2018) and Alexeev and Conrad (2009) and contradict the resource curse hypothesis.

Corruption appears to have a negative impact on PGDP in the short-run in KSA and in the long-run in KWT, but no results are significant in the UAE. The causes of the negative relationship have been explained at length in the literature (Gyimah-Brempong, 2002). This finding is consistent with many studies that have confirmed a strong statistically significant negative impact of corruption on PGDP (Hassaballa, 2017; Mustapha, 2014; Ugur, 2014; Aidt, 2009; Gyimah-Brempong, 2002; Mauro, 1997; 1995).

Law and order's positive effect on PGDP in this model—in the short-run in KWT and in the long-run in the UAE and KWT—has been highlighted by many studies that have concluded that good institutions improve PGDP (Butkiewicz and Yanikkaya, 2006; Dollar and Kraay, 2001; Knack and Keefer, 1995). The reason has been clarified by different studies: when a country adheres to law and order—which is demonstrated by the maintenance of property rights, a stronger court system, and absence of corruption—people start to understand and respect the legal system and follow the rules, resulting in higher PGDP (Sala-i-Martin, 1997; Knack and Keefer, 1995; Mauro, 1995). These results agree with the findings of Butkiewicz and Yanikkaya (2006) and Dollar and Kraay (2001). Nevertheless, the insignificant impact of law and order on PGDP in KSA and the negative effect of the 1-year lag of law and order on PGDP in the UAE contradict the common rule of a positive impact (Nawaz et al., 2014; Faruq and Taylor, 2011). One possibility is that institutional quality in both countries started at high levels in the studied period, which explicitly show that there is less room for improvement; hence, no impact on PGDP is found for the short-run in the UAE and KSA and for the long-run in KSA. Another apparent reason is related to the findings of Acemoglu and Robinson (2010), who reported that institutions vary among societies because of their different economic institutions (security of property rights), different formal systems of collective decision making (dictatorship versus democracy), and different levels of development (Nawaz et al., 2014). Accordingly, institutions are

expected to function differently, so institutions that perform well in one country may not be suitable in a different country.

For instance, institutions in KWT are highly influenced by politics, although KWT is considered to be the more democratic country compared with the other GCs. The economy in KWT has benefited from the openness to foreign investment, but there are sectors that are not open to foreign investment, which, along with poorly developed legal systems, creates obstacles to foreign investors (The Heritage Foundation, 2019). Although the UAE is considered to be a liberal country in the Gulf region, its liberal side is stained by institutions that are dependent on and heavily influenced by the political leadership. Nonetheless, the UAE is upholding the rule of law, and it is one of the least corrupt countries in the region. Finally, KSA is an absolute monarchy that upholds the Shari'ah law. Institutions are under the guidance of the executive branch, which is known to be slow and sometimes nontransparent, and the monarchy is considered to be above the law (The Heritage Foundation, 2019).

The importance of human capital to growth and productivity reported in the literature is confirmed by the results of our model. Starting with the short-run, human capital shows a positive impact on PGDP in KWT and the UAE, and the 1-year lag of human capital is positive in KWT as well, indicating that the knowledge and skills acquired through education are essential for enhancing human capital and good standards of living, thus promoting PGDP (Delalibera and Ferreira, 2019; Appiah, 2017; Ali and Jabeen, 2015; Hanushek and Woessmann, 2010; Aghion et al., 2009; Ozturk, 2001). When it comes to the long-run, human capital is more important, as revealed by the results for KWT, KSA, and the UAE. One possible reason that drives the positive relationship between human capital and PGDP is that knowledge and skills attained through education are conducive to the improvement in workers' productivity and facilitate the absorption of superior technologies from other leading countries, which is essential for enhancing human capital and ensuring good standards of living, thus promoting PGDP (Ali and Jabeen, 2015; Hanushek and Woessmann, 2010; Aghion et al., 2009; Ozturk, 2001). Our findings agree with the findings of several studies, such as those by Delalibera and Ferreira (2019), Appiah, (2017), Faruq and Taylor, (2011), Keller (2006), Bauer et al. (2006), Bensi et al. (2004), Petrakis and Stamatakis (2002), and Krueger and Lindahl (2001). However, the results are different in KSA, which is revealed to experience the negative effects of human capital and the 1-year lag of human capital on PGDP in the short-run. One possibility is that human capital accumulation is taking time, i.e., it grows cumulatively over a long period (Cervellati and Sunde, 2002; Garavan et al., 2001); thus, no benefits are documented in the short-run, while disadvantages are apparent. The negative effect becomes positive in the long-run because the education attained by the populace is advantageous to the economy (Appiah, 2017) and productivity (Kampelmann et al., 2018).

Finally, capital stock shows an important short-run effect in all three countries. Moreover, the same positive impact is found in the long-run only for the UAE. The possible reasons for the positive relationship are related to the fact that capital stock improves

investments, production, and employment, as well as raises the purchasing power and national income and hence PGDP. This finding has been proved in previous studies (Nawaz and Alvi, 2017; Cole and Neumayer, 2006; King and Levine, 1994).

### 3.5. Impact of Resources Rents, Institutional Quality, and Human Capital on Total Factor Productivity

Table 4 shows the impact of resource rents (RR) on total factor productivity (TFP) while controlling for human capital (HC), law and order (LO), and corruption (CRP). The orders of lag lengths in the ARDL were selected using the AIC. The error correction term is negative and significant, indicating the stability of the three models. The rate at which the variables readjust to equilibrium once they deviate from equilibrium in the case of any short-term shocks is 65% in KWT, 48% in KSA, and 58% in the UAE.

#### 3.5.1. Results in Kuwait

Similar to the PGDP results for KWT, in the short-run, a 1% increase in the percentage of resource rents of KWT GDP increases TFP significantly by 0.10% (at the 5% level of significance). However, in the long-run, a 1% increase in resource rents (as a proportion of GDP) reduces TFP by 0.33% at the 5% level of significance.

Corruption has no statistically significant effect on TFP in the short-run. However, in the long-run, a 1% increase in corruption reduces TFP by 0.24%. Law and order increase TFP by 0.04% in the short-run and 0.07% in the long-run. It is observed that human capital in both its level and lag form is positively significant, and its long-run effect is remarkably high: with a 1% increase in human capital, TFP increases by 0.36%, 0.13%, and 0.56%, respectively.

For the purpose of checking the stability of the model, the CUSUM and CUSUM of squares tests were applied, and the

results of both tests indicate that the model is stable (Appendix B., Figures B7 and B8).

#### 3.5.2. Results in the Kingdom of Saudi Arabia

The results are notable for the relationship between resource rents (% of GDP) and TFP. The current and the past resource rents show no impact on TFP in KSA, but the negative effect of resource rents on TFP is noticeable after 2 years (2-year lag of resource rents), so a 1% increase in the percentage of resource rents in KSA GDP decreases TFP by 0.13%. Nevertheless, in the long-run, as resource rents increase (as a proportion of GDP) by 1%, TFP increases by 0.4%.

The results reveal that corruption affects TFP negatively in the short-run by 0.41% and in the long-run by 0.8% following a 1% increase in corruption. Moreover, in the short-run, the law and order variable negatively affects TFP in the current and 2-year lag form by 0.06% and 0.04%, respectively, per 1% increase in law and order, while it is insignificant in the long-run. In addition, human capital in its level and 2-year lag form is significant, but it has a negative effect on TFP in the short-run. However, a 1% increase in human capital improves TFP by 0.35% in the long-run.

Then, the CUSUM and CUSUM of squares tests were applied, and the results of both tests confirm the stability of our model (Appendix B., Figures B9 and B10).

#### 3.5.3. Results in the United Arab Emirates

The short-run results show that TFP depends on its lag. The coefficient is 0.46, which indicates that a 1% change in the lag of TFP causes a change in the current TFP by 0.46%. There is a significant positive impact of resource rents (% of GDP) on TFP in the short-run; as the percentage of resource rents in GDP increases by 1%, TFP increases by 0.12%. Significantly, corruption

**Table 4: Impact of resources rents, institutional quality, and human capital on total factor productivity**

| Short-run results   |             |              |                             |              |                          |              |
|---------------------|-------------|--------------|-----------------------------|--------------|--------------------------|--------------|
| Country             | Kuwait      |              | The Kingdom of Saudi Arabia |              | The United Arab Emirates |              |
| Variable            | Coefficient | t-statistics | Coefficient                 | t-statistics | Coefficient              | t-statistics |
| TFP (−1)            |             |              |                             |              | 0.462***                 | 4.083        |
| Resource rents      | 0.102*      | 1.812        | 0.010                       | 0.338        | 0.129***                 | 4.424        |
| Resource rents (−1) | 0.046       | 0.978        | −0.013                      | −0.264       |                          |              |
| Resource rents (−2) |             |              | −0.136***                   | −3.239       |                          |              |
| Corruption          | −0.069      | −1.306       | −0.410***                   | −4.015       | −0.086***                | −2.868       |
| Corruption (−1)     | 0.075       | 1.156        |                             |              |                          |              |
| Law and order       | 0.048**     | 2.730        | −0.062*                     | −2.115       | −0.051                   | −1.157       |
| Law and order (−1)  |             |              | −0.042                      | −1.593       |                          |              |
| Law and order (−2)  |             |              | −0.044*                     | −1.916       |                          |              |
| Human capital       | 0.367*      | 1.846        | −0.128*                     | −1.935       | 0.109*                   | 1.739        |
| Human capital (−1)  | 0.138**     | 2.341        | −0.081                      | −0.732       |                          |              |
| Human capital (−2)  |             |              | −0.284**                    | −2.643       |                          |              |
| Coint Eq. (−1)      | −0.646***   | −3.353       | −0.486***                   | −3.023       | −0.583***                | −3.853       |
| Long-run results    |             |              |                             |              |                          |              |
| Variable            | Coefficient | t-statistics | Coefficient                 | t-statistics | Coefficient              | t-statistics |
| Resource Rents      | −0.327**    | 2.074        | 0.413**                     | 3.034        | 0.042                    | 0.849        |
| Corruption          | −0.244***   | −3.043       | −0.844***                   | −2.948       | −0.148***                | −5.899       |
| Law and Order       | 0.075**     | 2.173        | 0.042                       | 0.789        | −0.088                   | −1.409       |
| Human Capital       | 0.568**     | 2.663        | 0.356***                    | 4.308        | 0.187**                  | 2.347        |
| C                   | 0.075       | 0.078        | −1.063                      | −1.710       | 0.208                    | 1.220        |

\*\*\*, \*\*, and \* denote the significance at the 99%, 95%, and 90% confidence interval respectively

negatively affects TFP in both the short and long-run by 0.08% and 0.14%, respectively, in response to a 1% increase in corruption. However, human capital shows a positive impact on TFP in both the short and long-run by 0.1% and 0.18%, respectively, per 1% increase in human capital.

The results of both stability tests—the CUSUM and CUSUM of squares tests—confirm the stability of the model (Appendix B., Figures B11 and B12).

### 3.6. Discussion-Productivity

This section provides an interpretation of the results of the impact of natural resources, institutional quality, and human capital on total factor productivity in the three countries, and the results are compared with the results from previous studies.

First, the positive relationship between resource rents (% of GDP) and productivity in KWT and the UAE in the short-run contradict the resource curse theory (Corden and Neary, 1982). This is evidence that resource revenues in KWT and the UAE are advantageous to the country. The possible explanations are related to the huge resource windfalls that encourage productive projects and investments, together with the resource sector that adds well-paying jobs, and contribute little to technology transfer and productivity. This finding aligns with that of Brunnschweiler (2008). However, this positive relationship becomes negative in the long-run in KWT. This suggests a phenomenon that is similar to the resource curse theory of a negative relationship between resource rents and TFP (Corden and Neary, 1982); because the situation in these countries where the jobs and wages are secured in the public sector and especially the energy sector, lead to lower productivity, since these sectors have limited productivity; hence, it is alarming for KWT. The case in KSA is opposite that of KWT and the UAE. The percentage of resource rents in KSA GDP has a significant negative impact on TFP after 2 years, and it becomes positive in the long-run in KSA. One possible explanation of this situation has been provided in the resource curse literature is that resource-rich countries tend to overinvest in the energy sector and neglect of other tradeable sectors that are beneficial to productivity and long-run growth (Corden, 1984; Corden and Neary, 1982). However, in the long-run, resource-rich countries start diversifying their economy, building new projects, and creating more jobs as they get richer over time (Gelb, 2010), resulting in higher TFP.

Corruption, as a proxy of institutional quality, is harmful to productivity in all cases. The negative effect of corruption on TFP in the short-run in KSA and the UAE is as expected since this relationship has been confirmed in different studies (Boschini et al., 2013; Boschini et al., 2007; Mehlum et al., 2006). Most importantly, in the long-run, corruption reduces TFP in KWT, the UAE, and KSA, which supports an important principle that corruption renders governments capability of achieving efficiency and harms public welfare (Lambsdorff, 2002). Moreover, corruption causes wasteful rent-seeking activities, distorted public decisions, neglect of contracts' quality checks on governments' projects, and low-quality investments, consequently, lowering productivity (Haapanen and Tapio, 2016; Perera and Lee, 2013;

Acemoglu and Robinson, 2010). The same results were reported by Rose-Ackerman and Palifka (2016), Lambsdorff (2002), and Bardhan (1997).

However, when testing the second proxy of institutional quality—law and order—the only country that shows a positive impact on TFP in both the long and short-run is KWT. The higher the quality of institutions, the higher TFP, as proved in different studies (Boschini et al., 2013; Boschini et al., 2007; Mehlum et al., 2006). The results are insignificant in the UAE, although the results for KSA show that law and order, as well as the 2-year lag form of law and order, have a negative impact on productivity in the short-run. The results in KSA contradict the literature, and one probable cause for this effect in the case of KSA that the law is strictly enforced, and the local traditions, customs, and religions must always be obeyed in an approach or manner that could affect productivity (Fallatah et al., 2019).

Once again, important results are found for human capital. It affects TFP positively in KWT and the UAE in the short-run, while the 1-year lag of human capital shows the same impact in KWT. Over the long-run, human capital is found to improve TFP in KWT, KSA, and the UAE. This supports an important principle that states that human capital in the form of education, knowledge, and skills are essential for technology and innovation, which improve productivity, and that educated workers are more capable of carrying out jobs that need critical thinking, skills, and literacy, all of which lead to higher productivity (Gennaioli et al., 2013; Ciccone and Papaioannou, 2009). Several papers have revealed the same results, including Kumar and Chen (2013), Liberto et al. (2011), Nachega and Fontaine (2006), Bauer et al. (2006), Bensi et al. (2004), Aiyar and Feyrer (2002), and Benhabib and Spiegel (1994).

In KSA, the case is different in the short-run. The negative effect of human capital on TFP in the current and 2-year lag form is surprising, but according to Temple (1999), the effect of education has generally varied among the countries.

The possibilities for this negative relationship were questioned by Pritchett (2001), who then proposed a few possibilities that are mutually implicated and are likely to present in every country to a varying degree. One reason is the misguided educational expenditures that could go to piracy and private remuneration, but those activities are socially unproductive and thus harm productivity. Further, when the educational system suffers from failures, the outcomes are disappointing for participants who have no or few skills. Moreover, he explained that the demand for an educated workforce might be slow, so supply exceeds the demand. As a result, the number of individuals who return to school and productivity deteriorates rapidly. Then, in the long-run, these skills and knowledge attained by population begin to bear fruitful benefits to the country, thus increasing productivity (Kumar and Chen, 2013). This result regarding the positive relationship between human capital and TFP is aligned with studies by Kumar and Chen (2012), Liberto et al. (2011), Aiyar and Feyrer (2002), and Benhabib and Spiegel (1994).



## 4. CONCLUSION

The occurrence of the resource curse is related to the deteriorating development measures from the existence of natural resource wealth and especially the over-reliance on the revenues gained from the exportation and production of natural resources. Accordingly, this study is presented as an initial attempt to clarify the resource curse dilemma and identify the transmission channels that drive the resource curse; however, this study has focused on only the economic drivers, which highlight the negative relationship between natural resources and economic growth. Nevertheless, some scholars have debated whether the resource curse even exists or whether the economic outcomes are the result of other factors, such as poor institutional quality or neglected human capital.

To provide a precise answer to this debate, it was necessary to conduct this study that examined the existence of the resource curse in Gulf Countries, by studying the impact of natural resource rents (% of GDP) on per capita GDP and total factor productivity while taking institutional quality and human capital as covariates. The three questions examined in this study have focused on whether natural resource dependency increases PGDP and TFP; whether institutional quality increases PGDP and TFP, and whether human capital improves PGDP and TFP in the short-run and long-run in Gulf Countries. The study applied the ARDL model and co-integration technique by using time series data from 1984 to 2014.

The results indicate that, in the long-run, the natural resource rents (% of GDP) have a significant positive impact on per capita GDP in KSA and the UAE but no discernable impact in KWT. Moreover, resource rents (% of GDP) have a significant positive impact on TFP in KSA, a negative effect in KWT, and undetectable effects in the UAE. These findings indicate that huge windfalls from resources are not contributing to an increase in productivity or growth. Thus, high dependency on rents from natural resources could be harmful to Gulf Countries, especially KWT, in the long-run. Moreover, the results suggest that an increase in the level of human capital in the form of education increases productivity and PGDP in the three countries. According to Ozturk (2001), economic development is difficult without education; thus, human capital is a crucial factor to achieve long-term growth and productivity in the region. Further, corruption, as a measure of institutional quality, plays a vital role in the declining productivity in the long-run in the three countries and decreases PGDP in KWT. Law and order increase productivity in KWT and PGDP in KWT and the UAE. Since institutions and human capital are proved to be crucial to growth in the three countries, the governments have to tailor these two factors to the country's goals and circumstances.

The evidence in this study illustrates that natural resources by themselves are not a curse in the long-run for the UAE and KSA. However, for them to promote growth, they need to be combined with human capital and institutional quality, as supported by empirical and theoretical studies.

The findings are of particular importance for governments in resource-rich countries who aim to manage the huge revenues

generated from natural resources in a sustainable manner. This study supports the fact that TFP and PGDP can be increased by properly managing these revenues, investing in human capital, and maintaining a good institutional environment, as supported in previous studies, as well.

However, future analysis is needed to determine the different necessary policies and their impact on productivity and growth and, most importantly, to find an optimal approach to manage the resource rents and utilize these rents between sectors. If a resource-rich country perfects this activity, other advantageous outcomes will follow, and high productivity and growth can be realized.

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## APPENDICES

### Appendix A.

**Table A1: Descriptive analysis**

| Variable                  | Country |        |       |                             |         |         |                          |         |        |
|---------------------------|---------|--------|-------|-----------------------------|---------|---------|--------------------------|---------|--------|
|                           | Kuwait  |        |       | The Kingdom of Saudi Arabia |         |         | The United Arab Emirates |         |        |
|                           | Mean    | Max.   | Min.  | Mean                        | Max.    | Min.    | Mean                     | Max.    | Min.   |
| Per capita GDP (\$)       | 40927   | 49588  | 35051 | 18654                       | 21183   | 15608   | 56793                    | 86936   | 35049  |
| Capital stock (\$)        | 234524  | 480644 | 14698 | 2787272                     | 5214103 | 1928750 | 1303207                  | 2364226 | 760557 |
| Resource rents (% of GDP) | 38.54   | 60.58  | 7.19  | 33.49                       | 53.96   | 16.20   | 19.77                    | 32.58   | 9.04   |
| Corruption index          | 2.72    | 3.0    | 2.0   | 2.21                        | 3.33    | 2.0     | 2.51                     | 3.54    | 2.0    |
| Law and order index       | 4.36    | 6.0    | 1.75  | 4.68                        | 5.50    | 3.0     | 3.73                     | 4.0     | 2.66   |
| Human capital index       | 2.06    | 2.20   | 1.90  | 2.22                        | 2.60    | 1.83    | 2.40                     | 2.73    | 1.76   |

**Table A2: Results of production function**

| Variable      | Coefficient | t-statistic | Prob.  |
|---------------|-------------|-------------|--------|
| Capital stock | 0.832177    | 47.40277    | 0.0000 |
| Labor force   | 0.024527    | 1.499516    | 0.1445 |
| R-squared     |             |             | 0.90   |

**Table A3: Results of the Phillips–Perron unit root test**

| Variable       | Country          |                            |                             |                            |                          |                            |
|----------------|------------------|----------------------------|-----------------------------|----------------------------|--------------------------|----------------------------|
|                | Kuwait           |                            | The Kingdom of Saudi Arabia |                            | The United Arab Emirates |                            |
|                | Level            | 1 <sup>st</sup> Difference | Level                       | 1 <sup>st</sup> Difference | Level                    | 1 <sup>st</sup> Difference |
| Per capita GDP | -2.192(0.212)    | -4.810*** (0.000)          | -1.866(0.342)               | -8.718*** (0.000)          | -2.133 (0.233)           | -3.753*** (0.008)          |
| Human capital  | -1.362(0.587)    | -2.946*** (0.004)          | 0.638 (0.988)               | -4.093** (0.003)           | -0.480 (0.881)           | -2.761* (0.075)            |
| Resource rents | -3.181** (0.031) |                            | -3.577** (0.049)            |                            | -2.902** (0.056)         |                            |
| TFP            | -1.851(0.349)    | -4.769*** (0.000)          | -1.247(0.640)               | -7.219*** (0.000)          | -2.070(0.257)            | -3.974*** (0.004)          |
| Law and order  | -1.732(0.405)    | -3.649** (0.010)           | -2.118 (0.239)              | -5.375** (0.000**)         | -2.424 (0.143)           | -5.667** (0.000)           |
| Corruption     | -2.426(0.143)    | -5.435*** (0.000)          | -3.550* (0.051)             | -5.257*** (0.000)          | -0.968 (0.751)           | -4.025*** (0.004)          |
| Capital stock  | -3.253** (0.026) |                            | -3.395** (0.019)            |                            | 0.710 (0.999)            | -3.221* (0.090)            |

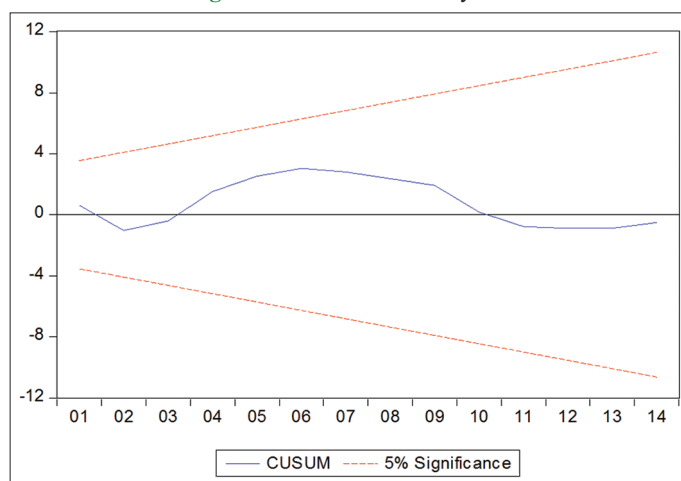
The values in the parentheses represent the P-value. \* is 10% significance, \*\* is 5% significance; and \*\*\* is 1% significance

### Appendix B.

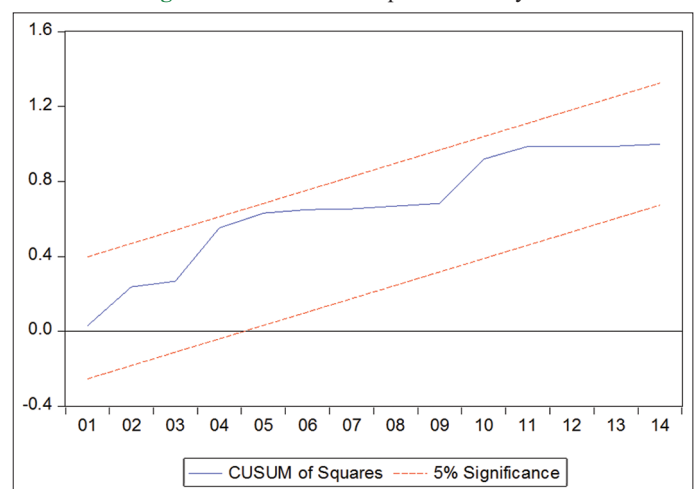
#### CUSUM Stability Test AND CUSUM of Squares Stability Test.

##### 1.1. Impact of Resource Rents on Per Capita GDP in Kuwait.

**Figure B1: CUSUM stability test**



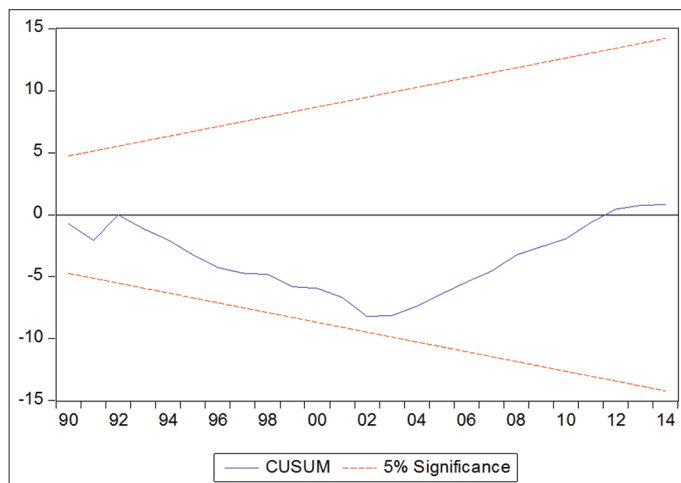
**Figure B2: CUSUM of squares stability test**



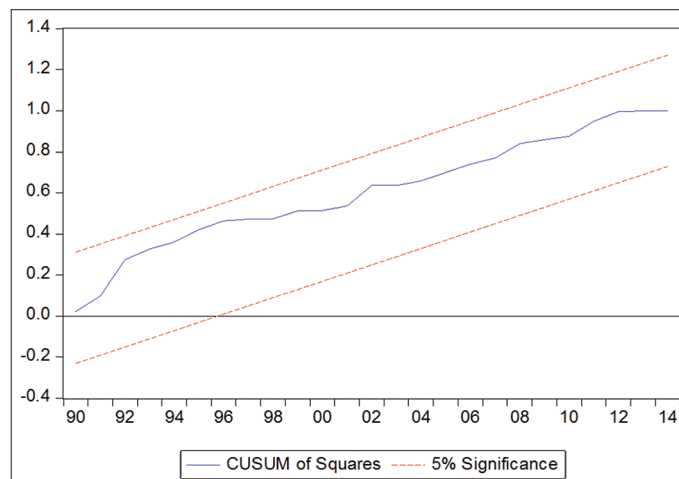


## 1.2. Impact of Resource Rents on Per Capita GDP in the Kingdom of Saudi Arabia.

**Figure B3:** CUSUM stability test

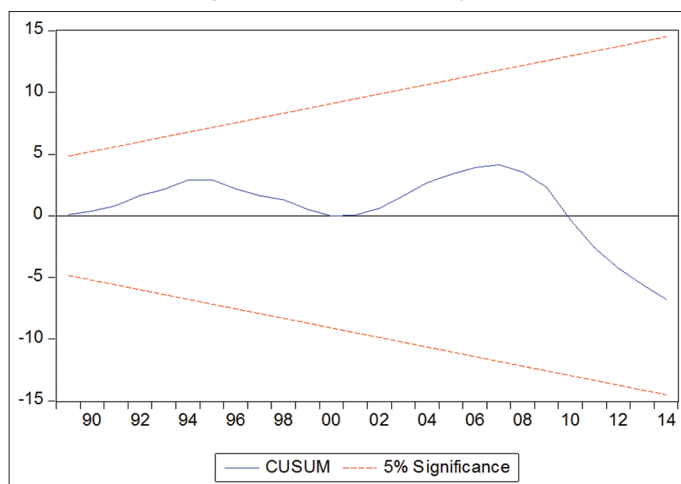


**Figure B4:** CUSUM of squares stability test

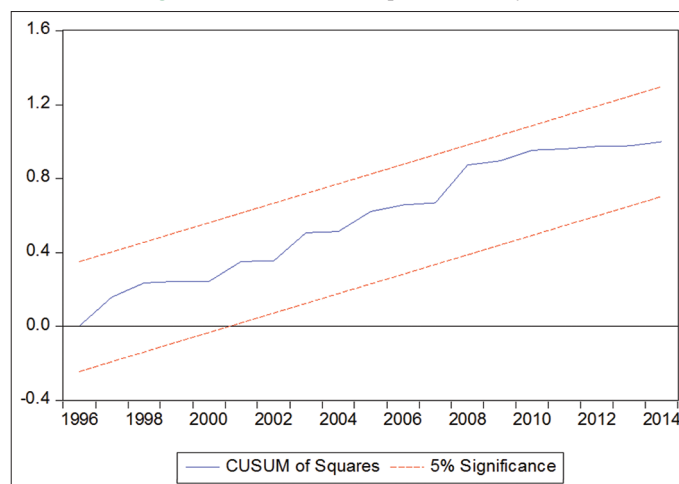


## 1.3. Impact Of Resource Rents on Per Capita GDP in the United Arab Emirates.

**Figure B5:** CUSUM stability test

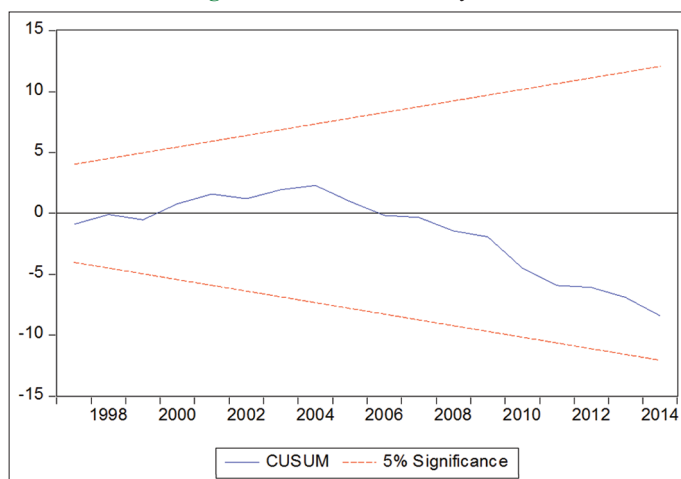


**Figure B6:** CUSUM of Squares stability test

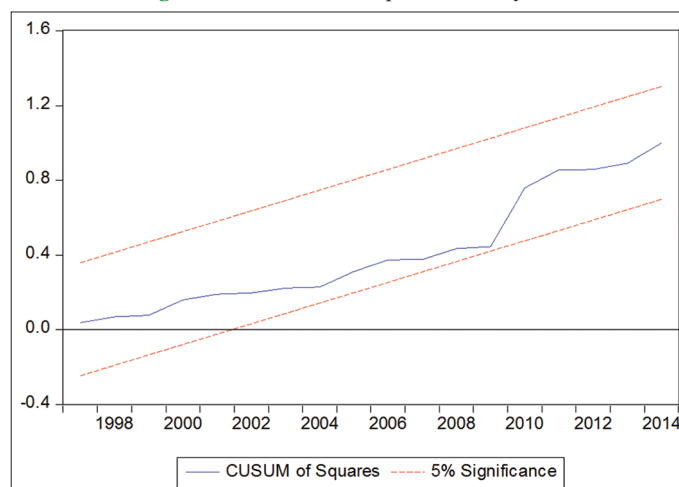


## 1.4. Impact of Resource Rents on Total Factor Productivity in Kuwait.

**Figure B7:** CUSUM stability test

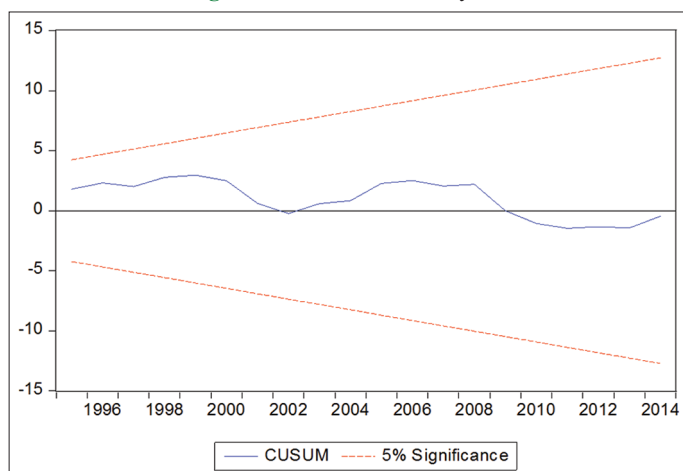


**Figure B8:** CUSUM of squares stability test

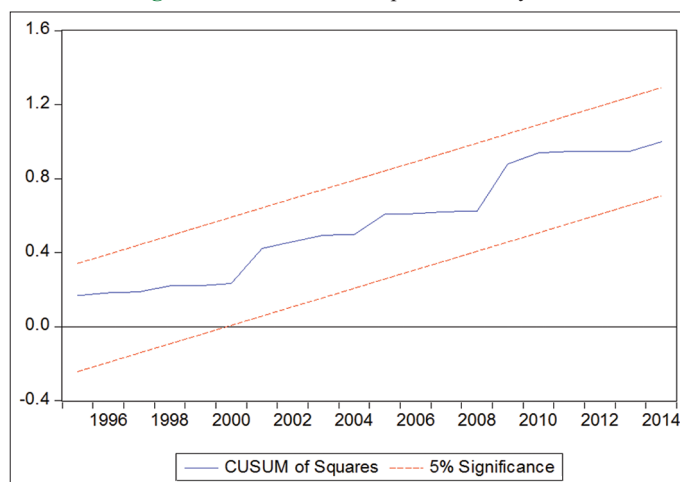


## 1.5. Impact of Resource Rents on Total Factor Productivity in the Kingdom of Saudi Arabia.

**Figure B9:** CUSUM stability test

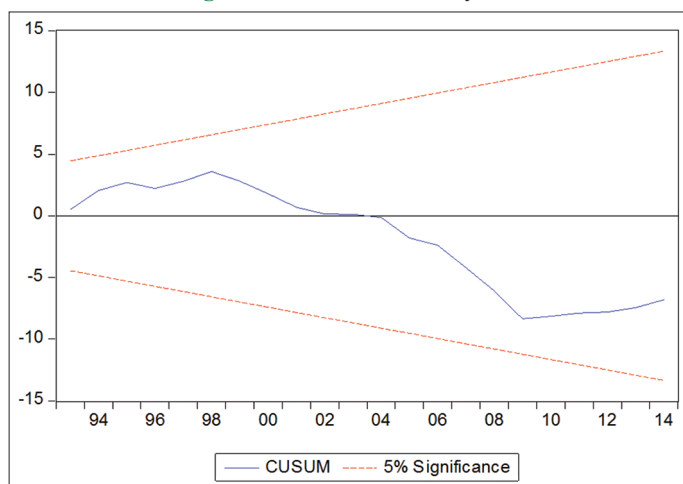


**Figure B10:** CUSUM of squares stability test



## 1.6. Impact of Resource Rents on Total Factor Productivity in the United Arab Emirates.

**Figure B11:** CUSUM stability test



**Figure B12:** CUSUM of squares stability test

