

Article

# Implications of Oil Price Fluctuations for Tourism Receipts: The Case of Oil Exporting Countries

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**Abstract:** This study investigates the influence of oil prices on tourism income in countries that heavily relied on crude oil exports from 2000 to 2017. We found that oil prices and tourism receipts are cointegrated, revealing the existence of their long-run equilibrium relationship. Another significant finding to emerge from this study is the presence of a unidirectional Granger causality that runs from the oil prices to the tourism receipts. The results of the current study are of particular importance for policymakers who operate in oil-exporting countries. The implications provide a systematic understanding of the effect of oil price fluctuations on tourism income which can benefit investors greatly by enabling them to hedge against oil price fluctuations and plan for their tourism business and policymakers by enabling them to set policies to stabilize oil price fluctuations and plan for tourism development, correspondingly.

**Keywords:** oil price; tourism income; causality; SYS-GMM; MENA countries

**JEL Classification:** C23; F43; L83; O14; O52

## 1. Introduction

It is a well-known fact that oil-exporting countries, particularly the developing economies in the Middle East and North Africa (MENA), are exposed to fluctuations in oil prices. The sustained drop in oil prices in 2014 dramatically shifted the economic direction of the world's major oil exporters, forcing them to reform their economies in an attempt to be prepared for the post-oil era. While the markets experience a growing uncertainty regarding the oil prices, the tourism industry has the potential to reduce energy security risk in MENA countries and hedge the risk of high volatile energy markets. Tourism is among the most capable segments of an economy that can create added value, increase investment, and promote sustainable growth. In addition, the tourism industry can stimulate foreign trade, increase accessibility to global markets, and boost foreign direct investments, all of which lead to economic development. Considering the oil price-intensive nature of the tourism industry [1] and the high dependency of MENA countries on oil export revenues, the relationship between oil prices and tourist income remains a crucial topic of research.

Tourism income has a direct positive impact on the domestic economy as it affects a wide range of sectors such as transportation, accommodation services, and financial institutions [2]. In 2015, the share of the tourism industry in the global economy reached 9.8% which represents a value of approximately US \$7.2 trillion, while employment in the sector reached almost 284 million jobs which make up 9% of the jobs in the world [3]. In 2018, the tourism industry generated 319 million jobs that are equivalent to 10% of total employment and holds to be accountable for 10.4% of global GDP [4]. The United Nations World Tourism Organization forecasts to receive 1.8 billion international tourist arrivals by 2030 with 3.3% growth per year [5]. In 2017, out of US \$1340 billion global tourism receipts, the share of developing economies was US \$470 billion which accounts for almost 35% of total tourism receipts.

The current study contributes to the literature by deviating from the existing literature in different ways. First, in contrast with the existing tourism literature in which the focus is on the developed countries, this paper studies the developing MENA countries. Second, while there are many studies on the effect of oil prices on tourism income in oil-importing countries, the oil price-tourism receipts nexus is under-examined in the case of oil-exporting countries. Therefore, we aim to fill this gap, by examining the effect of oil price fluctuations on tourism receipts in the MENA region in which empirical analysis is relatively scarce. Furthermore, it is important to study the situations in the oil-exporting countries in the MENA region as illustrated in the present study, for several reasons.

First, the tourism industry is one of the leading job creators in the MENA region with 2.3 million direct employees [5]. It is estimated that tourism in the region will show annual growth of 4.6%, becoming the frontrunner in economic development in the following decade [3]. According to the World Tourism Organization from the United Nations, the number of tourist arrivals in emerging countries, including the MENA, is forecasted to achieve 57% of the entire market in the world with an increase of the rate that is double that of the advanced economies. In light of the above-mentioned predictions, the tourist arrivals in the MENA region are expected to grow faster than the rest of the world.

Second, MENA countries have the biggest proven energy reserves in the world. During recent decades, the main source of revenue and the key force behind the economic and financial development in the region has been oil income. Without any short-term feasible alternatives to crude oil for transportation and the industries, the region would preserve its importance as the top supplier of energy to the world. However, in the long run, the emerge of shell oil as a serious rival in the United States and Canada and public attitude toward renewable energies jeopardizes the traditional oil exporters' income. With the political and social conflicts currently taking place in some MENA countries, the sustainability of the energy supply is increasingly becoming a source of uncertainty.

Third, due to the limited variety of exports and a high dependency on oil exports, the MENA countries are exposed to the negative effects of oil price fluctuations which can threaten the economy [6]. As oil is a major contributor to the economy in oil-exporting countries, economic diversification is critical to guarantee continuous growth. That is to say, empirical evidence proposes a positive relationship between economic diversification and growth over time since an expanded economy and variability in exports decrease the risk [7]. Diversification is possible through government investment in non-oil sectors. Tourism has the potential of diversifying the economy and swapping its reliance on income from oil. Tourism can stimulate the economy due to inter-sectoral relations among the tourism industry and other sectors [8] and reduce the risk of oil price fluctuations. As discussed by [9], considering the inevitable fast growth of tourism and the ease of entrance into the global tourism market, it is a cost-effective and suitable policy for MENA countries to develop the tourism industry as a substitute for oil exports and achieve sustainable growth and economic diversification. By recognizing the importance of replacing the oil exports with other sources of income, our study investigates the relationship between oil prices and tourism for MENA countries, many of which are dependent on oil export revenues.

The objective of this paper is to conduct a preliminary analysis of the effects of oil prices on tourism income in countries that heavily rely on crude oil exports. Even though tourism is a very

important issue for the oil-producing countries, there are only very few studies, if there are any, in the literature. Thus, this study fills in the gap by studying the issue. Revealing any possible causality between tourist income and oil prices can potentially advance the tourist arrival forecasting and assist the policymakers in tourism planning and managerial choices [10]. While the tourism receipts and oil prices are the main variables under study, a set of control variables (instrumental variables) are also employed in line with the purposes of this study. These variables are namely gross fixed capital formation, inflation, government expenditure, and GDP per capita. Prior to the diagnostic statistical tests, the unit root test was conducted in an attempt to evaluate the stationarity of the variables under study. In addition to the above-mentioned, the study also sought to specify any possible long-run linkages and causality relationships that may exist between the tourism receipt and oil prices in the MENA countries. Finally, in order to examine the robustness of the results, the generalized method of moments (GMM) and more specifically, the system GMM estimation is conducted. This is to deal with the endogeneity which is known to be a common problem in dynamic panel data models. The sample includes data from 2000 to 2017 for Bahrain, Saudi Arabia, Algeria, Kuwait, Iran, Yemen, the United Arab Emirates, Qatar, and Oman.

The results of the current study are of particular importance to policymakers who operate in oil-exporting countries as the implications can assist the said policymakers in their quest to hedge against oil price fluctuations and help them better plan for tourism development. This section has attempted to briefly introduce the effects of oil prices on tourism income in countries that heavily rely on crude oil exports. Section 2 of this paper reviews literature related to tourism and oil. Data source, variable descriptions, and theory of the study are discussed in Section 3 whereas Section 4 provides the econometric methodology. Section 5 presents the empirical results and finally, the summary and conclusions of the study are presented in Section 6.

## 2. Literature Review

The link between tourism and macroeconomic variables is an attractive subject of research in both the tourism and economic literature. Several studies to date have examined the tourism GDP nexus [11–14]. Likewise, the topic of tourism and exchange rate has also received substantial attention in the literature [15–18]. For the MENA countries, the majority of studies on tourism-economy nexus investigate the relationship between tourism and economic growth. For example, Ref. [19] found a causal relationship between tourism and economic growth in Jordan. Another study by [20] revealed similar results for Lebanon. For a sample of all MENA countries, Ref. [21] confirmed a causal relationship from tourism to economic growth.

There is a strand of literature on the association between oil prices and tourism in net oil-importing countries. A comprehensive assessment of the current knowledge of “tourism and oil” in literature is carried out in a review article by [22]. Based on growing global demand and uncertainty of supply, the relatively high cost of production, and lack of feasible alternatives, oil prices will unavoidably rise [23]. Studies on oil-importing countries suggested that tourism is likely to suffer from high oil prices [1]. In another scenario, higher oil prices are expected to relate to negative income effects which may, in turn, reduce worldwide tourism and reduce tourism receipts [24].

A recent study by [25] used monthly data from 2000 to 2010 and applied a structural vector autoregressive (SVAR) model to investigate the link between oil prices and the tourism industry in the case of four Mediterranean countries, including Greece, Italy, France, and Spain. The said study differentiates types of oil shock and introduces three different types. The first type is the demand-side oil price shocks which are the result of increasing demand from the developing and developed countries, especially during the industrialization era. The second type is the supply-side shocks which take place when the oil exports are interrupted. Finally, the oil specific demand shock is related to the uncertainty about the future of the oil market. The results of the aforementioned study suggested that demand-side shocks have a significantly positive impact on tourism income with no lagged effect whereas supply-side shocks have no effect on the tourism industry in the sample countries. Moreover,

some studies have found that there is a significantly negative impact of the oil-specific demand shocks on the tourism sector. The limitation of this finding is that the authors ignore variables that could be correlated with the variables that reduce the projected economic shocks. The limitation can be circumvented by using the SVAR model [26].

Using the input-output analysis and the employment of the price and demand models to examine the impact from the peak of the oil price on the Spanish tourism industry, Ref. [27] found that there is a significant impact from high oil prices on the supply of the Spanish tourism, particularly in the transport sectors that are directly related to tourism activities. Hence, high oil prices are expected to cause higher prices of travel and to correspondingly reduce demand for tourism. This, in turn, may strongly affect economies like Spain that strongly depend on the tourism industry and oil imports. The pitfall of this model is the impractical assumptions of I/O as it does not contain any price mechanism and ignores the causality relationships among variables which may form the validity of results [28].

Ref. [29] used a two-stage modeling approach to study the effect of high oil prices in New Zealand. The study simulated a negative supply-side shock to increase the global oil prices by double and investigated its impact on tourism demand in New Zealand. The impact of the simulated shock was then analyzed using a purpose-made computable general equilibrium (CGE) model with respect to tourism supply and demand. The results suggested that increasing oil prices do not only harm the net oil-importing economies but also negatively affected international tourism. However, due to a lack of data and key factors such as elasticities, the CGE model is not able to reflect all aspects of the tourism industry [30].

A study by [31] investigated the causality between the oil price and tourist arrivals in the period from 1996 to 2015 in the US, as well as nine European countries including Austria, Italy, Germany, Greece, Netherland, Portugal, Spain, Sweden, and the UK. The domain Granger causality and frequency domain causality was unable to detect any causal relationship between tourist arrivals and oil prices regardless of the country. However, using the convergent cross-mapping (CCM), the authors indicate the existence of one-directional causality from oil prices to tourist arrivals for all countries. The pitfall of this model is that CCM fails to accurately conclude causality direction in strongly joined synchronized time-series [32].

Applying Johansen's cointegration analysis to the data from 1960 to 2017, Ref. [33] found that the effect of tourism on real income growth in Turkey is negatively influenced by the changes in oil prices. Authors claim that oil prices negatively moderate the effects of tourism on real income. Studying the impulse responses revealed that the response of the Tourism industry to the oil price shocks is positive during the initial periods but becomes negative in the subsequent periods. In other words, tourism activity in the short-run is positively affected by oil prices and negatively affected in the long-run.

More recent literature includes a study by [34] who revealed the relationship between tourism arrivals and oil price shocks in Malaysia. The authors examined the positive and negative impacts of oil price fluctuations on tourism arrivals between 2000 and 2016. Their results showed that positive oil price shocks have a more significant impact on tourism arrivals than negative shocks, both in the short term and the long term. In other words, when oil prices are going up, it induces a stronger influence on tourism arrivals than when oil prices are doing down. By using a nonlinear autoregressive distributed lag model, Ref. [35] examined the asymmetric relationship between exchange rate, oil prices, tourism demand, and inflation in Pakistan and observed long-running asymmetric causality among the variables. Applying the cointegration and causality model, Ref. [36] observe that fluctuations in energy price boost tourists' arrivals positively in Malaysia. They also reveal that real oil prices have a Granger causal effect on tourism demands. In addition, Ref. [37] found a cointegration relationship between tourism and energy consumption for some South Asian countries. Lastly, employing the non-linear autoregressive distributed lags model, Ref. [28] revealed a long-running asymmetrical effect of oil prices on tourism income for all the countries and a short-running asymmetrical causality in some countries.

### 3. Data and Methodology

#### 3.1. Data and Variables

The data from 2000 to 2017 for nine countries including Algeria, Kuwait, Qatar, United Arab Emirates, Yemen, Bahrain, Oman, Saudi Arabia, and Iran, is obtained from the World Bank Development Indicators [38], for the variables of gross fixed capital formation, government final consumption expenditures, GDP per capita, the tourism receipts, and inflation. In addition, we obtained data of economic freedom from the Heritage Foundation ([www.heritage.org/research/feature/index](http://www.heritage.org/research/feature/index)) and obtained the oil price from the Organization of the Petroleum Exporting Countries (OPEC) basket.

Tourist arrivals in Middle East countries have grown by 5.3% to a total of 58 million and international tourism receipts have increased by 13% to US \$68 billion. By the continued recovery and the solid growth in most destinations, North Africa observed a 15% increase in tourism arrivals and 10% in tourism receipts. We present the information on both international tourism receipts and tourist arrivals in the Middle East and North Africa in Table 1.

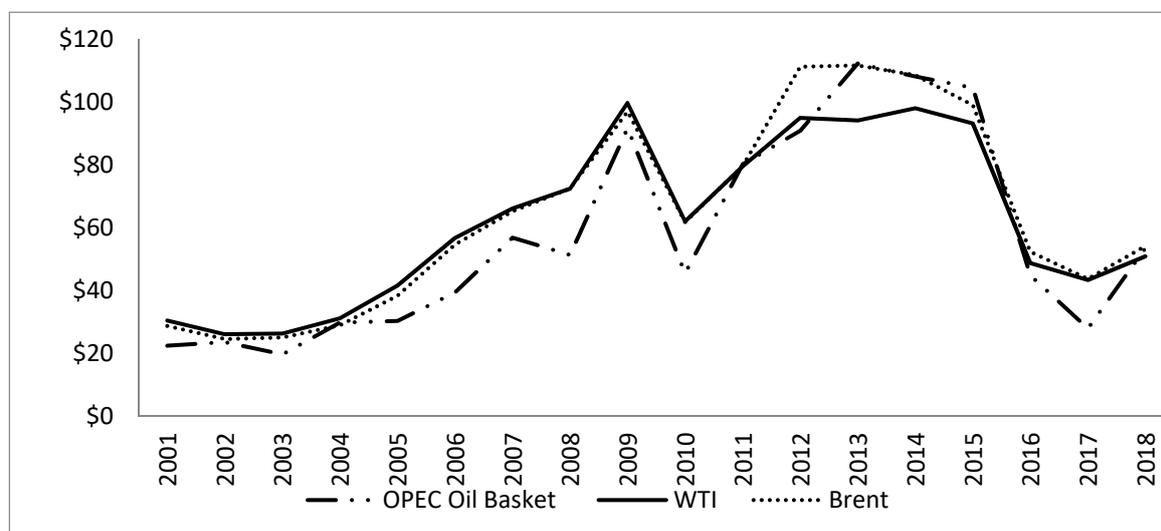
**Table 1.** International tourism receipts (in thousands) and tourist arrivals by region.

	International Tourist Arrivals (1000)			International Tourism Receipts				
	2010	2016	2017	Change (%)		(US\$ million)		
				16/15	17/16	2010	2016	2017
Middle East	55,442	55,556	58,113	−4.4	4.6	52,150	58,959	67,654
North Africa	19,682	18,895	21,717	5.0	14.9	9662	9003	10,009

Source: World Tourism Organization (UNWTO). (Data as collected by UNWTO September 2018).

Among Middle East countries, Oman achieved the highest increase with a 16% growth in international arrivals while Qatar showed steady growth with only a 4% increase. From the North Africa region, Tunisia sustained to rebound strongly in 2017 with a 23% growth in arrivals. We present the information on both international tourism receipts and tourist arrivals for different countries in Table 2.

Following a long-lasting rise, the price of oil reached its historical peak of US \$145 in 2008, benefitting booming economies in many oil-exporting countries (Figure 1). Oil prices began to fall in 2014 and dropped by 75% to US \$27 per barrel in 2016, putting oil producers into trouble [39].



**Figure 1.** Time-series plots for the prices of OPEC Oil Basket, WTI, and Brent.

**Table 2.** International tourism receipts (in thousands) and tourist arrivals by country of destination.

	2010	2011	2012	2013	2014	2015	2016	2017	Average
Algeria									
Int. Tourism receipts	324,000	300,000	295,000	326,000	316,000	347,000	246,000	172,000	290,750
Number of arrivals	2070	2395	2634	2733	2301	1710	2039	2451	2292
Bahrain									
Int. Tourism receipts	2,163,000	1,766,000	1,752,000	1,875,000	1,913,000	2,372,000	4,021,000	3,836,000	2,462,250
Number of arrivals	11,952	6732	8062	9163	10,452	9670	10,158	11,370	9695
Iran									
Int. Tourism receipts	2,631,000	2,489,000	2,483,000	3,306,000	4,197,000	4,771,000	3,914,000		398,714
Number of arrivals	2938	3354	3834	4769	4968	5237	4942	4867	4364
Kuwait									
Int. Tourism receipts	574,000	644,000	780,000	619,000	615,000	931,000	831,000	643,000	704,625
Number of arrivals	5208	5574	5729	6217	6528	6941	7055		6179
Oman									
Int. Tourism receipts	1,072,000	1,515,000	1,723,000	1,888,000	1,971,000	2,247,000	2,390,000	2,791,000	1,949,625
Number of arrivals	1441	1018	1241	1392	1611	1909	2335	2372	1625
Qatar									
Int. Tourism receipts		4,463,000	7,220,000	8,452,000	10,576,000	12,131,000	12,593,000	15,757,000	10,170,286
Number of arrivals	1699.5	2056.7	2323.5	2611.9	2839.2	2941.1	2938.2	2256.5	2458
Saudi Arabia									
Int. tourism receipts	7,536,000	9,317,000	8,400,000	8,690,000	9,263,000	11,183,000	13,438,000	14,848,000	10,334,375
Number of arrivals	10,850	14,179	16,332	15,772	18,260	17,994	18,044	16,109	15,943
UAE									
Int. tourism receipts	8,577,000	9,204,000	10,924,000	12,389,000	15,221,000	17,481,000	19,496,000	21,048,000	14,292,500
Number of arrivals									
Yemen									
Int. Tourism receipts	1,291,000	910,000	1,005,000	1,097,000	1,199,000	116,000	116,000		819,143
Number of arrivals	1025	829	874	990	1017	366.7			850

The tourism receipts are measured as expenditures by international arriving visitors. Oil price is the weighted average of oil prices from all the countries studied in our paper. We use gross fixed capital formation as a percentage of real GDP as a proxy for investment in physical capital including transportation constructions [40]. On the other hand, the inflation variable is used to assess the commitment of policymakers to economic stability [41–43]. The variable representing the government final consumption expenditures is expressed as a percentage of GDP measures representing the government final consumption expenditure for purchases of both services and goods. As recognized by others, GDP per capita is a proxy for economic development [44–48], and a key factor that impacts tourist arrivals to destinations [49]. The economic theory also presumes a positive correlation between GDP and demand for tourism [50]. GDP per capita denotes living standards and economic performance as a sign of the Government's affordability to invest in the tourism industry.

### 3.2. Methodology

In this section, we will discuss the econometric methodology used in this paper. The choice of this design is based on the literature and its advantages and applicability to the present research. Panel data analysis has many advantages that make it superior to other techniques; among these advantages, the following ones are discussed. First, it is well known that firms, individuals, states, and countries are heterogeneous. Second, we use panel data because it provides higher variability, more degrees of freedom, more information, more efficiency, and less collinearity among all the variables being studied in our analysis. Third, panel data can identify and measure the effects better that cannot be detected by using pure time-series and cross-section data. Fourth, panel data models enable us to use more complicated models. In addition, macro panel data overcome the limitation of nonstandard distribution encountered by performing unit root test [51]. We will examine both long- and short-run relationships between tourism receipt and oil prices. In order to fulfill this aim of the study, the panel cointegration test and causality test was performed.

In this paper, we investigate the effect of oil prices on tourism income by using the following model:

$$LTR_{i,t} = \beta LOIL_{i,t-n} + \Phi'(P)X_{i,t} + \eta_t + \varepsilon_{i,t}, \quad (1)$$

where  $i$  and  $t$  denote country and year, respectively,  $\beta$  is the coefficient that reflects the influence of oil price (LOIL) on tourism receipts (LTR),  $\eta_t$  is a random variable representing a time-specific effect that follows a normal distribution,  $X_{i,t}$  is the vector of our control variables, including GDP per capita (GDPPC), gross fixed capital formation (GFC), government expenditure (GEX), inflation (I), and economic freedom (EF).

### 3.2.1. Cross-Sectional Dependency Test

In order to investigate the influence of oil prices on tourism income for MENA countries, first and second-generation econometric methods were applied. Prior to the evaluation of panel stationarity, cross-sectional dependency tests were performed, as disregarding the cross-sectional dependence (CD) in the panel studies can lead to spurious results. The CD test by [52] with the null hypothesis of cross-sectional independence was valid for large  $N$  and fixed or short  $T$  and can be applied to a range of panel data models. Therefore, this study applied the CD test as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left( \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \right), \quad (2)$$

where  $\hat{\rho}_{ij}$  is the sample estimate of the pairwise correlation of the residuals.

This study also applied the Frees test [53] to test whether there was any or cross-sectional dependence in the panel data.

### 3.2.2. Panel Unit Root Tests

In order to avoid the spurious regression problem, the cross-sectional dependency test was followed by the unit root tests. From the first-generation panel unit root tests, Maddala and Wu (M and W) [54] Levin, Lin, and Chu (LLC) [55] and Im, Pesaran, and Shin (IPS) [56] were utilized. These tests assume no cross-sectional dependency and allow heterogeneity among time series in the panel. As part of the second-generation panel unit root tests, the cross-sectional augmented Dickey-Fuller (CADF) test proposed by [57] was applied. The null hypothesis is nonstationary in CADF and can be applied to a wide range of panel data models. The second-generation allows for cross-sectional dependency in the panel. The CADF expands the ADF regressions with the cross-section averages of lagged levels and first differences of the individual time series. The CADF regression is as follows:

$$\Delta Y_{i,t} = \alpha_i + \beta_i Y_{i,t-1} + \gamma_i \bar{Y}_{t-1} + \delta_i \Delta \bar{Y}_t + \varepsilon_{i,t}, \quad (3)$$

where  $\bar{Y}_t = \frac{1}{N} \sum_{i=1}^N Y_{i,t}$ ,  $\Delta \bar{Y}_t = \frac{1}{N} \sum_{i=1}^N \Delta Y_{i,t}$  and  $\varepsilon_{i,t}$  is the regression error.

Moreover, the CADF estimated cross-sectionally augmented Im, Pesaran, and Shin (CIPS) statistic was obtained by using the average of individual CADF test statistics for the entire panel. The CIPS statistic is displayed as follows:

$$CIPS(N, T) = N^{-1} \sum_{i=1}^N t_i CADF_i, \quad (4)$$

where  $CADF_i$  is the cross-sectionally statistic for the  $i$ th cross-sectional unit given by the t-ratio of  $\beta_i$  in the CADF regression in Equation (4).

### 3.2.3. Panel Cointegration Test

To examine whether there is any cointegration relationship among the variables being studied, we applied the residual-based, two-step Engle-Granger Kao test [58] to take into account a homogenous

cointegration. Dickey-Fuller (DF) tests and an augmented DF (ADF) test are used to test for cointegration with the homogenous assumption. Kao panel cointegration tests follow the classical Engle-Granger [59] two-step (residual-based) cointegration test.

$$Y_{i,t} = \alpha + \beta X_{i,t} + \gamma_i + \epsilon_{i,t}, \quad (5)$$

where  $Y_{i,t}$  is individual cross-sectional time series and  $X_{i,t}$  is a vector of the cross-sectional time series. Parameter  $\alpha$  denotes the constant in the model,  $\gamma_i$  represents the individual effects (can be set to zero if anticipated),  $\beta$  denotes cross-section specific regression parameters and  $\epsilon_{i,t}$  is the error term. The residuals acquired from the aforementioned equation are used for unit root through the secondary regression:

$$\epsilon_{i,t} = \delta \epsilon_{i,t-1} + u_{it}, \quad (6)$$

or

$$\epsilon_{i,t} = \delta \epsilon_{i,t-1} + \sum_{j=1}^p \Psi \Delta \epsilon_{i,t-1} + \theta_{i,t}, \quad (7)$$

where it is assumed that  $u_{it}$  and  $\theta_{i,t}$  are independent and identically distributed. The hypothesis of no cointegration is  $\delta = 1$  and the alternative hypothesis is  $\delta < 1$ .

As second-generation cointegration methods, Westerlund error correction based cointegration model [60] was used in this study, which eliminated cross-sectional dependency. The Westerlund test applied the structural dynamics to avoid the common factor restriction assumption. This test contains four statistics,  $G_t$ ,  $G_\alpha$ ,  $P_t$ , and  $P_\alpha$  in which  $G_t$  and  $G_\alpha$  are group-mean test statistics while  $P_t$  and  $P_\alpha$  are panel test statistics to test for no cointegration. The main error correction model of the test can be designed as follows:

$$\Delta Y_{i,t} = \theta'_i d_t + \vartheta_i Y_{i,t-1} + \vartheta'_i X_{i,t-1} + \sum_{j=1}^{p_i} a_{ij} \Delta Y_{i,t-1} + \sum_{j=q_i}^{p_i} \beta_{ij} X_{i,t-1} + \epsilon_{i,t}, \quad (8)$$

where  $d_t$  refers to the deterministic terms (with trend ( $d_t = 0$ ); with constant ( $d_t = 1$ ); and with a constant term and trend ( $d_t = (1, t)$ )) and,  $\vartheta_i$  determines the speed of adjustment.

### 3.2.4. Panel Granger Non-Causality Test

We investigate the homogeneous causal relationship between variables by applying Dumitrescu-Hurlin's panel causality test [61] which evaluates causality regressions for each cross-section separately. The null hypothesis for the Dumitrescu-Hurlin causality test is no-causality in any cross-section, and the alternative hypothesis assumes a causality relationship at least for one cross-section. Ref. [61] proposed the following linear model to test panel causality:

$$Y_{i,t} = \alpha_i + \sum_{k=1}^K \varphi^{(k)} y_{i,t-k} + \sum_{k=1}^K \beta^{(k)} x_{i,t-k} + \epsilon_{i,t}, \quad (9)$$

where  $\beta_i = \beta_i^{(1)}, \dots, \beta_i^{(k)}$ ,  $\alpha_i$  denotes individual fixed effects.  $K$  represents the lag length,  $\varphi_i^{(k)}$  and  $\beta_i^{(k)}$  denote lag and slope differences across groups. The hypotheses were as follows:

$$H_0 : \beta_i = 0, \forall i = 1, \dots, N;$$

$$H_1 : \beta_i = 0, \forall i = 1, \dots, N_1 \left( 0 \leq \frac{N_1}{N} < 1 \right);$$

$$H_1 : \beta_{ii} \neq 0, \forall i = N_1 + 1, N_2 + 2, \dots, N.$$

This test is appropriate to capture heterogeneity problems in the data. Dumitrescu-Hurlin is based on Wald statistics, to take average statistics of the test, and Zbar-statistics to identify a standard normal distribution [61]. The average statistic used to test the null homogeneous non-causality (HNC) hypothesis is:

$$W_{N,T}^{HNC} = \frac{1}{N} \sum_{i=1}^N W_{i,t}, \quad (10)$$

where  $W_{i,t}$  denotes the individual test  $H_0 = \beta_i = 0$ .

## 4. Empirical Findings

### 4.1. Descriptive Statistics

Tables 3 and 4 exhibit the descriptive statistics and correlation matrix, respectively, for all the variables being studied in our paper. The mean, standard deviation, minimum, and maximum values are exhibited in Table 3.

**Table 3.** Descriptive statistics.

Variable	Mean	SD	Min	Max
LTR	20.78	1.29	17.45	23.36
LOIL	4.04	0.54	3.19	4.65
GFC	27.37	14.83	15.49	33.78
GEX	$2.79 \times 10^{10}$	$3.09 \times 10^{10}$	$2.38 \times 10^9$	$1.67 \times 10^{11}$
GDPPC	21,907.78	21,456.27	538.2873	94,944.09
EF	61.579	9.814	35.9	77.7
I	5.977	6.703	−4.863	39.26

Note: LTR—natural logarithm of tourism receipts; LOIL—natural logarithm of oil price; GFC—gross fixed capital formation; QOI—quality of overall infrastructure; GEX—government expenditure; GDPPC—GDP per capita; EF—economic freedom; I—inflation.

**Table 4.** Correlation matrix.

	LTR	LOIL	GFC	GEX	GDPPC	EF
LOIL	0.264					
GFC	−0.458	−0.362				
GEX	0.519	0.385	−0.240			
GDPPC	0.601	0.131	−0.414	0.163		
EF	0.231	0.035	−0.291	−0.348	0.617	
I	0.036	0.172	0.135	0.142	−0.475	−0.517

The correlation matrix presented in Table 4 below reports that tourism receipts (LTR) have a positive relationship with all variables (LOIL, GEX, GDPPC, EF, and I), except with gross fixed capital formation (GFC). Closer inspection of the table shows that the oil price (LOIL) is negatively correlated with gross fixed capital formation (GFC). It has a positive relationship with government expenditure (GEX), GDP per capita (GDPPC), and economic freedom (EF).

### 4.2. Cross-Sectional Dependency Test Results

The CD test [52,53] was applied to investigate cross-sectional dependency in individual variables. The interpretation of the data presented in Table 5 indicates the rejection of the null hypothesis of cross-sectional independence in all variables. Therefore, there is no cross-sectional dependency among variables.

**Table 5.** Cross-section dependence test results.

Pesaran (2004)		
	Statistic	<i>p</i> -Value
LTR	7.460	0.000
LOIL	5.832	0.000
GDPPC	8.165	0.000
GFC	14.00	0.000
GEX	6.182	0.000
I	11.55	0.000
EF	8.177	0.000
Frees test of cross-sectional independence = 0.278		
<b>Note:</b> Critical values from Frees' Q distribution:		
	$\alpha$	Statistic
	0.10	0.3583
	0.05	0.4923
	0.01	0.7678

Furthermore, the Frees CSD test is applied to investigate cross-sectional dependency in individual variables. The interpretation of the data presented in Table 5 indicates that the test is not significant at 1%, 5%, and even at 10% critical values. Therefore, the cross-sectional dependency is not observed.

#### 4.3. Panel Unit Root Test

The next step involves the unit root testing which aims to identify the stationarity level of variables. The cross-sectional dependency among the variables under study is controlled to avoid false or spurious results. Accordingly, the stationarity and integration properties of variables should also be considered. Therefore, M and W [54], LLC [55], IPS [56], and CADF [57] that take into account the cross-section dependence and heterogeneous problems are applied. As presented in Table 6, the unit root tests confirm that all variables have a unit root of order one; that is, I(1).

**Table 6.** Panel unit root test results.

Levels	M and W		LLC		IPS		CADF	
	Statistic	<i>p</i> -Value	Statistic	<i>p</i> -Value	Statistic	<i>p</i> -Value	Statistic	<i>p</i> -Value
LTR	5.113	0.745	0.798	0.787	1.294	0.902	−0.039	1.000
LOIL	0.884	0.998	3.460	0.999	4.806	1.000	−0.991	0.944
GDPPC	0.265	1.000	1.387	0.917	6.814	1.000	−2.202	0.181
GFC	1.649	0.989	−1.026	0.152	1.993	0.976	−1.057	0.926
GEX	11.722	0.164	−1.233	0.108	−2.103	0.136	−1.998	0.312
I	10.248	0.248	−1.584	0.056	−1.205	0.114	−2.118	0.230
<b>First Differences</b>								
LTR	63.776 ***	0.000	−4.168 ***	0.000	−4.195 ***	0.000	−2.791 **	0.017
LOIL	27.260 ***	0.000	−11.273 ***	0.000	−2.663 ***	0.003	−3.158 ***	0.002
GDPPC	16.822 **	0.032	−2.351 ***	0.009	−1.738 **	0.041	−2.869 **	0.011
GFC	19.849 **	0.010	−3.435 ***	0.000	−1.633 *	0.051	−2.947 ***	0.007
GEX	−1.483 *	0.075	−4.147 ***	0.000	−1.564 *	0.058	−3.830 ***	0.001
I	58.141 ***	0.000	−6.942 ***	0.000	−4.239 ***	0.000	−2.912 ***	0.009

Note: \*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% significance level, respectively.

#### 4.4. Panel Cointegration Test Results

The order of integration of variables enables the application of the Kao residual cointegration test [58] to test for cointegration for panel data. The cointegration test is conducted in order to identify the presence of a long-running relationship between the tourism receipts and the oil prices. Kao's test confirms the tourism receipts and oil prices are cointegrated (at 1% for MDF and DF, and at the 5% level of significance for ADF), indicating a long-run relationship between the variables.

To confirm the Kao's cointegration test results, panel cointegration test statistics [59] is applied. In an attempt to obtain an accurate estimation and bootstrapped values, 400 repetitions were conducted. Results confirmed cointegration. Thus, it can be concluded that tourism receipts and oil prices move together in the long run. Table 7 exhibits the results of the Westerlund ECM panel cointegration tests and Kao residual cointegration.

**Table 7.** Panel cointegration test results.

Method		Statistic	p-Value
Kao	MDF	−5.713 ***	0.005
	DF	−2.041 ***	0.009
	ADF	−6.027 **	0.010
Westerlund	$G_t$	−4.639 ***	0.003
	$G_a$	−3.527 *	0.056
	$P_t$	−5.734 **	0.034
	$P_a$	−9.583 *	0.064

Note: \*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% significance level.

#### 4.5. Panel Causality Test

In order to test the possible causality and its direction, the test by [61] was employed. Dumitrescu–Hurlin is a homogeneous non-causality test and provides more accurate and reliable results by controlling cross-sectional dependency. As represented in Table 8, there was a causal relationship running from LOIL to LTR. That is, oil prices Granger cause tourism receipts at a 1% significance level. It can, therefore, be assumed that oil prices have predictive power over tourism receipts. The test results strongly indicated a one-directional causal link from oil price to tourist receipts. Regardless of the direction, these results confirm the findings of the existing literature on the close relationship between the two variables [29,30,32,33]. The results also reveal a bidirectional causal relationship between tourism receipts and GDP per capita and signify a feedback mechanism between growth in GDP per capita and growth in tourism receipts for the MENA countries. This, in turn, suggests that the two variables are strongly connected. According to the feedback hypothesis, investments in the tourism industry stimulate the overall economy and in return, economic growth stimulates further tourism development. In light of the above-mentioned results and implications, the findings of the current study are consistent with those of [62–65].

Table 8. Dumitrescu–Hurlin causality test.

Hypothesis	Wald Statistic	Z-Bar Statistic	p-Value	Causal Statistic
LOIL → LTR	4.626 ***	6.245	0.000	YES
LTR → LOIL	0.834	1.053	0.170	NO
GDPPC → LTR	3.126 ***	5.261	0.003	YES
LTR → GDPPC	2.031 **	2.988	0.016	YES
GFC → LTR	1.851 *	2.491	0.052	YES
LTR → GFC	4.173 ***	5.806	0.001	YES
GEX → LTR	1.895 *	2.351	0.072	YES
LTR → GEX	0.302	0.773	0.219	NO
I → LTR	1.086	1.536	0.103	NO
LTR → I	0.871	1.103	0.161	NO
EF → LTR	1.716 *	2.311	0.085	YES
LTR → EF	0.285	0.694	0.251	NO

\*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% significance level.

Other causality test results can be summarized as follows. Gross fixed capital formation as an indicator of investment within the tourism sector tends to Granger cause tourism receipts. This indicates that the GFC is increasing tourism capacity. Similar to the GDP per capita, the GFC and LTR causal relationships can be justified by the means of the feedback hypothesis. In other words, more investment in the tourism sector brings more income, and more income helps the tourism industry for more development.

#### 4.6. Robustness Check

In order to obtain the short-run estimates and to check the robustness of the results, the Generalized Method of Moments (GMM) was conducted. GMM is a common estimation method for panel data. It is used to explain any possible linkages between the explanatory variables and to solve the endogeneity problem by employing instrumental variables. Following [66,67], two specific diagnostic tests were conducted in order to control the reliability of the instrumental variable. First, the Hansen test with the null hypothesis of all instruments was uncorrelated with the error term and was applied to control the instruments' validity by assessing the over-identifying restrictions. This is followed by the second-order autocorrelation (AR) test which is applied to check for serial correlations of the error terms. The Arellano–Bond test is based on the null hypothesis of no second-order serial correlation in the first-differenced residuals. The test identifies the use of the lagged endogenous variable as an instrument.

The lagged LTR ( $LTR_{(t-1)}$ ) was positive in models and statistically significant. The speeds of adjustments ( $\lambda$ ) for models (1) and (2) are 15% and 8%, respectively. Low speed of adjustments in model 1 and 2 reveal that attaining the target tourism income is not the primary concern of countries heavily relying on crude oil exports.

As presented in Table 9, the Hansen test confirms the instruments' validity and the AR test shows the absence of the second-order serial correlation. Empirical findings obtained by one-step GMM and two-steps GMM estimations strongly suggest that the initial results are robust. According to the results, LOIL implies that the oil has been an important factor in explaining tourism receipt for oil-exporting countries under study. The coefficient of oil price was negative and statistically significant at the 1% significance level. This implies that variations in the level of oil price have a negative and significant impact on changes in tourist receipts for the countries studied. Hence, high oil prices would result in lower tourism income while low oil prices significantly increase tourism income.

**Table 9.** GMM estimation results (dependent variable: LTR).

	One-Step GMM (1)	Two-Step GMM (2)
LTR <sub>t-1</sub>	0.85 ** (0.02)	0.92 *** (0.007)
LOIL	-1.13 ** (0.04)	-0.35 *** (0.008)
GDPPC	0.64 * (0.06)	0.04 ** (0.04)
GFC	-0.11 * (0.09)	-0.12 ** (0.04)
GEX	1.05 ** (0.03)	2.3 *** (0.007)
I	0.03 *** (0.002)	0.08 * (0.09)
EF	-0.12 * (0.07)	-0.05 ** (0.03)
Constant	6.02 * (0.09)	10.82 * (0.08)
Time Dummy	Yes	Yes
Instruments	L1, L2	L1, L2
AR(1)	0.12	0.16
AR(2)	0.32	0.41
Hansen ( <i>p</i> -value)	0.21	0.16

Notes: Numbers in parentheses are  $\hat{\sigma}$ -values. \* indicates statistical significance at 10% levels. \*\* 5% levels and \*\*\* 1% levels.

## 5. Summary and Conclusions

Across the Middle East and North Africa, tourism is perceived as one of the most feasible tax-raising substitutes for oil-exporting countries as the revenues from exporting oil start to decline. Due to the importance of replacing the oil exports with other sources of income, this study investigates the relationship between oil prices and tourism for selected MENA countries in which most of them depend on oil export revenues. To do so, we examine the role of oil price fluctuations on tourism income in countries that heavily rely on crude oil exports in which the literature has particularly remained silent. This study applies recent panel methodology to investigate the short-run and the long-run dynamics and the Granger causal relationship between tourism receipts and oil price fluctuations in selected MENA countries over the period of 2000 to 2017. Besides, the system generalized moment method (SYS-GMM) was applied to check the robustness of the primary results.

This study makes an original contribution to the field as it represents, to the best of our knowledge, the first study that attempts to investigate the relationship between oil prices and tourism in oil-exporting countries by adopting advanced statistical methods. It contributes to a deeper understanding of the impacts of the oil price on tourist receipts in both the short and long run in MENA countries.

Our results suggest that oil-exporting countries should invest more in tourism and depend less on oil. This could then boost investments in tourism subsectors such as transport and infrastructure and create employment and business opportunities. The findings of the current study are in line with those proposed by [30], which claim that aggregate demand oil price shocks affect tourism generated income. Therefore, it can be concluded that apart from the main economic factors such as GDP per capita and fiscal activities by the Government, the effects of oil prices account for fluctuations in tourism income and have a marginally significant influence. Furthermore, the results suggest that tourism receipts have synergy with GFC. The coefficient of GFC appears negative and statistically

significant. An implication of this is that gross fixed capital formation is an ineffective tool in inducing tourism arrivals and an increase of tourism receipts which is in line with [68]. In addition, based on the findings the development of capital infrastructure and tourism receipts are not interconnected in the MENA countries. While our concern is on the effect of oil price on tourism receipts, other explanatory variables that are involved as controllers in the model specification have the expected sign. GEX shows a statistically significant positive correlation with tourism receipt. This result confirms the findings of [69]. Economic freedom reports a negative statistically significant coefficient. Since a higher value of economic freedom means less economic freedom, we conclude that less economic freedom in an economy decreases the flow of tourists' arrivals, leading to the inevitable drop in tourism receipts.

## 6. Policy Implication

In light of the study findings, oil is an important factor in explaining tourism receipt for selected oil-exporting countries. This suggests that governments and tourism managers should interpret oil price fluctuations carefully. In the short term, because of falling prices, oil producers face problems such as a dropping revenues, devaluation of local currency, and decline in living standards. To overcome these problems, oil exporting countries are enforced to apply constrained economic policies, to replace the lost income with other sources. One of the most significant implications to emerge from this study is that low oil prices should encourage oil-exporter countries to invest more in the tourism industry and to get a higher share from the international tourism market. Taken together, the findings of this study suggest that oil exporter countries should consider a strategy to develop the tourism industry's contribution to the economy as a non-oil sector. However, this shift in the policies may lead to paybacks in the long term.

A natural progression of this work is to examine the different sub-sectors of the tourism industry that may have a competitive advantage in these countries with a higher potential of economic diversification and income generation.

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