Structural Change and Economic Dynamics 55 (2020) 49–58

Contents lists available at ScienceDirect

Structural Change and Economic Dynamics

journal homepage: www.elsevier.com/locate/strueco

The role of non-oil exports, tourism and renewable energy to achieve sustainable economic growth: What we learn from the experience of Saudi Arabia

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ARTICLE INFO

Article history:
Received 4 March 2020
Revised 18 May 2020
Accepted 28 June 2020
Available online 29 August 2020

JEL classification:
C32
E43
L83
Q42
Q43

Keywords:
Non-oil exports
Tourism
Renewable energy
ARDL
Saudi Arabia

ABSTRACT

This study attempts to examine the theoretical and empirical impacts of non-petroleum exports and tourism on the economic growth of Saudi Arabia. In doing so, the author's use the quarterly data of studied variables covering the period of 1980q1-2017q4 and used the ARDL bound test, Johansen cointegration and Gregory-Hansen cointegration methods. The empirical findings mention that the non-oil exports and tourism have positive effects on the economic growth. The results suggest that enhancing the non-petroleum exports might be a good strategy for sustainable growth and as alternative for petroleum products. Further, the empirics mention long run cointegration between tourism, renewable energy, capital, and economic growth in Saudi Arabia. The detailed findings imply that capital formation can be utilized to enhance the investments on renewable energy and tourism facilities, as the tourism and renewable energy are very crucial for the economic growth of Saudi Arabia. As a concluding remark, the study argues that Saudi Arabia should enhance the investments on tourism and renewable energy in the objective of reducing oil-dependence and for sustainable economic growth.

1. Introduction

The economy of Saudi Arabia is predominantly dependent on natural resources, petroleum, and oil-based products, which face several externalities and challenges during the period of recession, crisis, and oil price shocks in the international market along with an absolute pressure on the economic growth of the country. The risk of economic dependence on one source is acute and very high when petroleum products are depleting because the price in the international market is contingent on geopolitical and economic factors beyond the control of the Organization of the Petroleum Exporting Countries (OPEC) or other producing countries. Saudi Arabia being the largest oil producing countries with a GDP of $684 billion and 16 percent of the world's petroleum reserves, play a critical role in the OPEC region for economic policies. According to Forbes magazine reports, petroleum products account for 87 percent of budget revenue, 42 percent of total GDP, and 90 percent of total exports (Barbuscia, 2019; International Trade Administration, 2019). According to the perception of IMF, Saudia Arabia is witnessing a budget deficit of 7.8 percent in 2019, due to decrease in oil prices, while the growth of non-oil exports is 2.6 percent. These facts are very interesting and surprising, but somehow point a weakness of income dependence on oil exports. These main motive of selecting Saudi Arabia is to examine its response after oil price crisis of 2014; does Saudi government need to restructure its economic dynamics?

In view of curret economic challenges that Saudi govenent is facing, we try to propose significnat measures to control the economic degradation process. Howevre, the present study contributes to the existing literarture with multipoints: firstly, as per our studies, this paper is the pioneer to investigate the impact of non-petroleum exports on the economy of Saudi Arabia, by taking the concepts and idea of export led growth hypothesis. One plausible explanation for this is justified from the reason that the Saudi economy is almost 80 percent oil-dependent, which also creates environmental degradation issues and affect the overall economic progress (Alshammari and Sarathy, 2017). Though, we propose that Saudi government has to change the structure of its economic

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https://doi.org/10.1016/j.strueco.2020.06.005
0954-349X/

grounds, such as to reduce its dependence on exports of oil products and promote the exports of non-oil products which makes it able to absorb oil price shocks. Similarly, the extensive efforts for the growth of non-petroleum exports might be helpful in achieving the strategic economic goals.

The second contribution of given study relates to openess the Saudi Arabia for tourism; Saudi Arabia have great potential to generate significnat portion of its GDP throug relegious and cultural tourism. Currently, according to World Travel Market report, the tourism sector of Saudi Arabia could contribute up to $70 billion into the country's total GDP, which accounts for 9.3 percent of the country's GDP (World Travel Market, 2019; Siddiqui, 2019). At still, the Saudi government has to introduce tourism policies to increase its share in GDP.

The tourism industry affect the economy by several channels; (i) tourism sector create new jobs and enhance tax income, (ii) tourism industry push the government and relevant authorities to make investments in infrastructure, technology, and human capital. (iii) Further, the tourism sector improves the efficiency of local companies by generating competition and facilities the economy of scale narrative (Shahzad et al., 2017; Mitra, 2019). The toursim sector is considered as an alternative way of exports and the main source of foreign exchange revenues, which minimize the balance of payments deficit. Due to this reason, the literature have proposed the tourism led growth hypothesis and it has been examined for the case of developed, developing and emerging economies (Parrilla et al., 2007; Matarrita-Cascante, 2010; Tang and Tan, 2013; Yang and Fik, 2014; Bassil et al., 2015; Jones and Li, 2015; Fahimi et al., 2018). For case of Saudi Arabia, current study is the pioneer one that highlights the importance of tourism, especially for after 2014 oil price crisis period.

The third important strand of this article is to explore the heterogeneous impacts of renewable energy on the economic growth of Saudi Arabia. Currently, Saudi Arabia is generating its all electricity by using crude oil and fossil fuels, which consumes most of the oil resources domestically, as well as becoming the source of greenhouse emissions. However, according to the "The Saudi Vision 2030" the country will generate 20 percent power from the use of renewable sources e.g. solar and wind (Al-Saleh, 2009; Allhibi et al., 2019). According to the reports of the Saudi government, the country is striving to reduce energy consumption by 2 million barrels of oil equivalent per day till 2030. To achieve this target, the country has initiated 12 projects of renewable energy in 2019, which can change the overall energy structure of the country (Gamal, 2019). Recently, the research initiatives have been taken by several projects with the government that aims to reduce crude oil consumption, which helps to decrease the burden on Saudi economy, and to control carbon emissions. The Saudi Vision 2030, is primarily putting attention on renewable energy (solar and wind sources etc.) (Alshammari and Sarathy, 2017; International Atomic Energy Agency, 2018), however, as per these facts, the current study is motivated to investigate the role of renewable energy in the Saudi economy and how it can be twisted for future economic goals (Antonakakis et al., 2015).

The prime objective of this study is to examine the impacts of non-oil exports on economic development of Saudi Arabia, which helps to reduce its dependence on oil related exports. Secondly, the current study explores the validity of tourism led growth hypothesis for the Saudi economy by taking the tourism industry as a key policy variable, especially in recent years. The tourism sector accounts for 9% of Saudi Arabia's total GDP in 2018. It is a well-known fact that Saudi Arabia has huge portion of religious and cultural tourism, while by taking proper measures and refining tourism policies might enhance the tourism contribution in total revenue. Further, the Saudi Arabia's economy mainly relies on the tourism and petroleum exports. The energy related exports of Saudi Arabia are relatively high as compared to other exports. For instance, total natural resource rents of Saudi Arabia were 54% in 2014, in which 51% is from oil and 3% accounts for natural gas (Alshehry and Belloumi, 2015). Hence, the present study aims to provide new solutions and implications to enhance the tourism growth and non-petroleum exports of Saudi Arabia in objective to achieve the sustainable economic growth. The investigation into tourism led growth and non-oil exports is logical and in line with the recent studies Yang et al., (2014), Shahzad et al., (2017), Ben Jebli et al. (2019). For the case of Saudi Arabia, tourism, non-oil exports and renewable energy are very important. This is due to the reason the Saudi Arabia's economy is mainly dependent on the exports of oil and petroleum products and tourism industry. On the other side, the country consumes abundant resources of non-renewables. Such a study can unveil new windows for economic stability. These policies can include the tourism development, use of renewable energy and non-oil exports. The non-oil exports can also decline the oil monopoly. The domestic and international tourism is considered as important factor to induce economic growth and employment in developing and developed countries (Fareed et al., 2018). The tourism sector and exports together contribute to the economic growth, while there is dearth of literature on such research issues, specifically in the context of GCC countries or Saudi Arabia. The third objective of given study is to examine the contribution of renewable energy in economic growth, as it lessens the dependence on fossil fuels for energy generation. Lastly, we distribute the dataset in two periods; pre-reforms and post-reforms. Pre-reform period is before 2014 oil price crisis, while post-reform periods accounts the economic restructuring and reforms that have introduced after the economic crisis. The purpose is to analyze the results of economic reforms, either the plans are beneficial or there is a need of modifications to achieve the 2030 objectives. On the basis of findings, the study provides fruitful implications concerning non-oil exports, tourism, and renewable energy in order to achieve the goals of Saudi Vision 2030.

2. Review of literature

The beneficial effects of exports and tourism on economic development has been long identified by several existing studied for developed, developing and emerging economies using a variety of econometric techniques (Marin, 1992; Medina-Smith, 2001; Tang and Tan, 2013; Bassil et al., 2015; De Vita and Kyaw, 2016; Jetter, 2016; Faisal et al., 2017; Shafiullah et al., 2017; Shahzad et al., 2017; Fahimi et al., 2018). The present study has mainly two strands; non-oil exports-economic growth nexus and tourism led growth investigation. Marin (1992) studied the casual links between exports, productivity and economic growth for four developed countries (Germany, Japan, United Kingdom and the United States) by using the cointegration analysis. The findings concluded that productivity and exports enhance the economic developed of countries. Medina-Smith (2001) examined the validity of export-led growth hypothesis for the case of Costa Rica by using the annual data from 1950 to 1997. After applying multiple cointegration techniques and time-series regressions, the paper concluded that the neoclassical theory of production and explore led growth are valid for developing countries, and related economies policies can be reshaped for the long run and short-run economic goals. Squalli (2007) mentioned that economic growth of OPEC countries mainly relies on the electricity consumption, which is primary source of trade and manufacturing.

Jetter (2016) researched the relationship between total exports and economic growth for international market form by using global data of 157 countries. In empirical analysis, the study gathered the data from 2000 to 2010, and applied a multivariate OLS regression technique as full panel and regional anal-

ysis. After an in-depth empirical investigation, the study concluded that higher average export concentration index (AEC) leads towards better economic progress in international markets. Shafiullah et al. (2017) conducted an empirical investigation into export-led growth hypothesis by using the sectoral level data for agriculture, mining and fuels, manufacturing and, others for the case of Australia. The empirical results argue that the mining and fuel sector exports of Australia act as crucial contributors for positive economic growth of the country.

Faisal et al. (2017) researched the dynamic linkages between exports, imports, and economic growth by studying the data from 1968 to 2014 for the case of Saudi Arabia. For empirical analysis, the article mainly employed Auto Regressive Distributed Lag (ARDL) and Granger causality techniques. Based on the empirical findings, the study concluded that exports of Saudi Arabia positively contribute to the GDP of Saudi Arabia, leading towards the validity of export led growth hypothesis. Tang and Tan (2013) researched the relationship between 12 tourism markets and the economic growth of Malaysia by using the recursive Granger causality technique. The paper concluded that the tourism-led growth hypothesis is valid in Malaysia in 8 out of 12 studied markets. Bassil et al. (2015) studied the role of the tourism sector for the economic growth of Lebnan. The authors argued that there is positive uni-directional causality between tourism and economic growth in the short run, while in the long run tourism does not support economic performance due to frequent terrorist attacks in the country. Vita and Kyaw (2016) revisited the debated question about the relationship between tourism development and economic growth by using global data of 129 countries over the period of 1995–2011. The authors concluded that tourist arrivals positively contribute for high-income and middle-income countries, while this effect is slightly less for the case of low-income countries. Shahzad et al. (2017) studied the validity of tourism led growth hypothesis for the top ten tourist destinations in the world using the quarterly data from 1990Q1 to 2015Q4. The study concluded that tourism reforms and policies can attract capital and induce to increase the economic performance of tourist destination economies. Fahimi et al., (2018) explored the heterogeneous impacts of the human capital and tourism industry on the economic growth of 10 micro-state countries. The paper utilized the annual data of countries spanning the period of 1995–2015 and employed panel cointegration and panel Granger causality techniques to conduct an in-depth empirical investigation. In summary, the study provides strong evidence in support of tourism-induced growth and human capital development-induced growth hypothesis.

Narayan and Doytch (2017) studied the impacts of renewable energy and non-renewable energy on the economic growth of low-income, low middle-income and high-income countries. The authors gathered the data for 89 countries from 1971 to 2011 and applied the fixed effects and GMM methods. The study found that the use of renewable energy drives economic growth positively in the case of low-income and low middle-income. Meanwhile, the paper found a feedback hypothesis for the case of non-renewable energy and economic growth.

For the case of Saudi Arabia, Alsumairi and Hong Tsui (2017) examined the effects of low cost carriers on tourism demand. The study further reported understanding between air transport and tourism development in Gulf region. The empirical finding s suggested that airline capacity, religious tourism and competition will increase the tourist arrivals to Saudi Arabia, which further improves the air transport development and tourism development. In a more comprehensive study, Ahmad et al. (2018) examined the effects of tourism sector on environmental pollution for five provinces of China spanning the period of 1991-2016. The empirical findings of fully modified ordinary least squares (FMOLS) approach and Gregory-Hansen test highlighted that tourism sector negative affects the environment in Ningxia, Qinghai, Gansu, and Shanxi provinces, while improve the environment quality of Xinjiang.

For the case of high-income countries, Khan et al. (2019) explored the nexus between financial development, tourism, renewable energy, and greenhouse gas emissions as regional analysis. The empirical results of Augmented Mean Group estimator indicated that tourism, international trade and financial development and induce to affect renewable energy in high income countries. Ben Jebli et al. (2019) reported the casual linkages between tourism, trade, economic growth, foreign direct investment (FDI), and carbon dioxide emissions for the case of 22 Central and South American nations. The empirical conclusions of Granger causality analysis illustrated that there is bidirectional causal relationships between renewable energy, tourism and FDI. Further, the study reported positive casual links from tourism to trade and FDI. For the case of Bulgaria, Can and Korkmaz (2019) explore the role of renewable energy consumption and renewable electricity output for economic growth. The detailed empirics of Autoregressive Distributed Lag (ARDL) test mentions that renewable energy projects positively influence the economic progress of Bulgaria.

Rehman et al. (2019) reported the economic impacts of technology and internet in tourism sector for Belt and Road Initiative (BRI) countries. The research used the annual data covering the period of 1990 to 2017 and utilized Autoregressive-Distributed Lag (ARDL) technique for empirical examination. The empirical results concluded that tourism revenue is low across those BRI countries having technological inaccessibility and underdeveloped infrastructure. The researcher's recommended that suffered economies should upgrade the technologies to enhance sustainable economic growth. In the same line, Shehzad et al. (2019) investigated the role of communication and technology for China and explored the validity of tourism-led growth hypothesis. The empirical findings of ARDL methodology mentioned that tourist arrivals in China positively influence the economic growth.

Lee (2019) argued that the use of renewable energy sources in European Union member countries induces to enhance economic growth and minimize carbon emissions. This article is motivated from the recent changes in energy and tourism-related policies of Saudi Arabia and, more specifically from "The Saudi Vision 2030",thus aims to provide more relevant and conclusive implications to achieve the strategic economic goals.

3. Data and methodology

3.1. Data sources and model

Annual time series data on economic growth, capital formation, tourist arrivals and renewable energy, covering the period of 1980q1-2017q4, was gathered from World Development Indicators (2019) a reliable and authentic database of World Bank. While, the data for non-oil exports taken as good exports (current US $) was drawn from the balance of payment of the International Monetary Fund (IMF) database (IMF, 2019). The reason for selecting the non-oil exports is justified from the reason that the economy of Saudi Arabia mainly relies on the exports of petroleum related products. While, the share of non-oil exports in the total economy is $4.5 billion and this share declined[1] from 23% to 20% from 2018 to 2019. As a matter of fact, the Saudi economy need enhance the share of non-petroleum exports as alternatives to meet the economic and sustainability goals (IMF, 2019). Eco-

[1] The facts and information is accessed from https://english.aawsat.com//home/article/1771591/saudi-arabia%e2%80%99s-non-oil-exports-amount-45bn-april.

nomic growth is expressed in GDP current US dollars; capital formation is represented by gross fixed capital formation current US dollars, the tourism factor as a number of tourist arrivals and renewable energy is taken as renewable energy as share of total energy consumption for Saudi Arabia. The prime reason for studying the role of renewable energy and tourism is justified from the facts the economy of Saudi Arabia relies on tourism sector for revenues. For instance, religious and cultural tourism contributes to $65.2 billion in total revenues of Saudi Arabia. Furthermore, to fulfill the energy needs, Saudi Arabia is still utilizing the fossil fuels and non-renewable sources. Although, in the recent years, the country has made investments on renewable energy sources to reduce pollutant emissions. Following the recent literature, the data of variables was transformed into quarterly frequency using the quadratic match-sum method. More recently, also employed similar strategy for their studies on time series data (Lahiani, 2018; Shahbaz et al., 2018: Sharif et al., 2020).

$$GDP_t = f(non - Oil_t, Tour_t, REC_t, Cap_t) \tag{i}$$

$$\ln GDP_t = \rho_0 + \rho_1 \ln non - Oil_t + \rho_2 \ln Tour_t + \rho_3 \ln REC_t + \rho_4 \ln Cap_t + \varepsilon_{it} \tag{ii}$$

In equation (i) and (ii), GDP_t shows the economic growth, $non - Oil_t$ refers to non-oil exports, $Tour_t$ is number of tourist arrivals, while REC_t denotes use of renewable energy sources and Cap_t shows the capital. Whereas, in equation (i) the data for our primary variables of interest (economic growth, non-oil exports, tourism, renewable energy consumption and capital have transformed into natural logarithm to avoid any mathematical concerns (Sarwar, 2019; Sarwar and Alsaggaf, 2019; Shahzad et al., 2020). The equation (i) was first estimated by applying the ordinary least square (OLS) method, while to check the short run and long run empirics we further apply ARDL methodology.

3.2. Unit root testing and auto regressive distributed lag (ARDL) Approach

We begin our empirical analysis by applying the unit root tests on time series data; first, we apply the Augmented Dickey Fuller test introduced by Dickey and Fuller (1979). It is important to mention here the traditional unit root tests does not consider the structural breaks and shocks in the data. Due to such reason, the researcher's further employ the (Zivot and Andrews, 1992) and Clemente, and Reyes two-stage structural break test (Clemente et al., 1998). The null hypothesis of these tests indicates that "there exists unit problem at one stage or two stage breaks". While, the alternative hypothesis assumes that there is no unit problem in the data.

After confirming the cointegration properties in data, th findings direct us to apply the ordinary least square (OLS) and Auto Regressive Distributed Lag (ARDL) techniques to know the in-depth and robust relationship of variables. The ARDL method proposed by Pesaran (2001) offers certain advantages over traditional time series cointegration techniques. Firstly, the ARDL model not require the studied variables to be cointegrated at the same order and ARDL method can be applied when the variables are stationary at level and first difference or first difference (Shahzad et al., 2018). Secondly, the ARDL method is relatively more suitable in case of small or finite. Finally, the ARDL technology can report the unbiased estimates in the long run and short-run periods (Waheed et al., 2018; Zafar et al., 2019). The ARDL model used in this article can be expressed as follows;

$$\begin{aligned} D(\ln GDP_t) &= \partial_0 + \beta_1(\ln GDP_{t-1}) + \beta_2(\ln non - Oil_{t-1}) \\ &+ \beta_3(\ln Tour_{t-1}) + \beta_4(\ln REC_{t-1}) + \beta_5(lnCap_{t-1}) \\ &+ \sum_{j=1}^{p} a_{1j} D(\ln(GDP_{t-1})) \\ &+ \sum_{j=1}^{q} a_{2j} D(\ln(non - Oil_{t-1})) \quad + \sum_{j=1}^{q} a_{3j} D(\ln(Tour_{t-1})) \\ &+ \sum_{j=1}^{q} a_{4j} D(\ln(REC_{t-1})) + \sum_{j=1}^{q} a_{5j} D(Cap_{t-1}) + \mu_{1t} \end{aligned} \tag{iii}$$

In equation (iii), the variables are same as per our preferred model, while D shows the first difference (or other lag) as the ARDL method undertakes automatic lag of variables as per AIC criteria and μ_t shows the error term in model. The ARDL technique outcomes mainly relies on the joint F- statistics, t-test and its diagnostics in case of strong cointegration.

3.3. Johansen cointegration analysis

After checking the ARDL findings, we further employ the Johansen multivariate cointegration introduced by Johansen (1991). The unit root empirics mention that variables are stationary at level and first difference, which direct us to apply the Johansen multivariate cointegration. The Johansen cointegration is based on error correction represented by the VAR model. The VAR model is presented as;

$$\Delta GDP_t = \alpha_t + \phi Z_t + \sum_{i=1}^{n-1} \Delta GDP_{t-i} + \pi GDP_{t-n} + \varepsilon_t \tag{iv}$$

Whereas, ΔGDP_t and ΔGDP_{t-i} shows the logarithm of GDP, Δ is the first difference operator, α_t shows the intercept value, Z_t is the trend term, n is the order of model, π is the matrix of other variables and ε_t shows the error term. The number of cointegrations that exist between variables is determined by the rank of matrix π, based on the trace value and maximum eigenvalue statistics. Notably, if the trace statistics value is higher than the 5% critical value, it indicates the presence of cointegration between variables and rejects the null hypothesis. The null hypothesis indicates that there is no cointegration between variables. Recently, Alshehry and Belloumi (2015) also employed the Johansen multivariate cointegration analysis for their study on the nexus between energy consumption, carbon dioxide emissions and economic growth for the case of Saudi Arabia. In addition, we further utilize the Gregory and Hansen cointegration introduced by Gregory and Hansen (1996) as a robustness check of Johansen cointegration.

4. Empirical analysis and discussion

4.1. Descriptive and unit root testing

Table 1 reports the descriptive statistics of all studied variables, which mentions that there are no outliers in data. To analyze the empirical results, we used the equation (i) as a preferred model in this study.

Table 2 reports the empirical findings for Augmented Dickey and Fuller (ADF) unit root test at the level and first difference. The ADF unit root statistics mention that capital formation and tourist arrivals are stationary at level. While, interestingly, our all studied variables are cointegrated at first difference which validates the narrative to apply the ARDL methodology. In extension to the ADF unit root test, we use the Zivot–Andrews Structural break, which also reports the structural breaks in the data. Table 3 mentions the empirical outcomes for Zivot–Andrews's structural break unit root test. While, the results state that tourism, renewable energy, and

Table 1
Descriptive statistics.

Variables	Obs	Mean	S.Dev	Min	Max	p1	p99	Skew	Kurt
GDP_t	152	26.144	.71	25.155	27.37	25.17	27.36	.489	1.819
$non-Oil_t$	152	25.2	.885	23.698	26.69	23.70	26.68	.191	1.802
$Tour_t$	152	15.267	1.106	12.643	16.738	12.64	16.73	-.428	2.126
REC_t	152	0.009	.01	-.006	.044	-.004	.042	1.702	5.683
Cap_t	152	24.627	.795	23.527	26.014	23.53	26.01	.509	1.747

Table 2
Augmented Dickey and Fuller unit root test.

	At level		At first Difference	
Variables	ADF statistics	critical value	ADF statistics	critical value
GDP_t	-3.640	-3.443	-4.756***	-4.024
$non-Oil_t$	-3.332*	-3.143	-4.597**	-3.433
$Tour_t$	-4.158***	-4.023	-9.851***	-4.027
REC_t	-3.313	-3.443	-5.147***	-4.029
Cap_t	-4.267***	-4.023	-5.223***	-4.0261

Notes: Superscripts ***, **, *denote statistical significance at the 1 and 5% and 10% levels, respectively.

Table 3
Zivot–Andrews structural break test.

Variables	At level		At first Difference	
	t-Statistic	Time break	t-Statistic	Time break
GDP_t	-3.430	1986q2	-6.970***	2005q2
$non-Oil_t$	-4.426	2009q2	-7.009***	1986q4
$Tour_t$	-5.172**	1988q3	-13.587***	1986q1
REC_t	-5.289***	1991q3	-7.291***	1989q4
Cap_t	-4.178*	1997q4	-6.806***	1989q3

Notes: Superscripts ***, **, *denote statistical significance at the 1 and 5% and 10% levels, respectively.

Table 4
Clemente–Montanes–Reyes test (multiple breaks).

Variables	At level		At first Difference	
	t-Statistic	Time breaks	t-Statistic	Time break
GDP_t	9.754***	2009q1, 2012q1	3.358***	1997q3,2008q3
$non-Oil_t$	4.859***	1991q1, 2005q2	5.292***	1997q3,2008q3
$Tour_t$	10.351***	1994q3, 2006q2	-1.320***	1984q4, 1987q4
REC_t	-14.519***	1990q2, 1996q2	1.104***	1989q3, 1993q3
Cap_t	9.584***	2009q1, 2012q1	5.292	1987q3,1993q3

Notes: Superscripts ***, **, *denote statistical significance at the 1 and 5% and 10% levels, respectively.

capital formation are stationary at level. While, remaining variables show the stationarity at first difference. Table 4 illustrate the unit root empirics of Clemente and Reyes test with multiple structural breaks. The findings highlight that the variables economic growth, non-oil exports, tourism and renewable energy are stationary at level and first difference with multiple breaks. While, the variable capital is stationary at level. The structural breaks in the studied variables can also be observed from the Fig. 1(a,b,c,d). Overall, we find that all the variables have mix order of integration, which is in consistent to apply the long run cointegration analysis. Hence, based on our unit root tests, we conclude that the variables have mixed outcomes as level I(0) and first difference I(I), which direct us to apply the ARDL bound test technology to draw detailed findings and new conclusions for sustainable economic growth .

4.2. Empirical findings and discussion

Table 5 depicts the OLS regression outcomes of our specified model. In most of the variables, we note the p-value as less than 1 percent, which indicates strong significance. The estimated

Table 5
Empirical findings for OLS regression.

Variable	Coefficient	P-Value	t-statistic
$non-Oil_t$	0.2654***	0.0000	9.3700
$Tour_t$	0.1592***	0.0000	13.3300
REC_t	1.5223*	0.0810	1.7600
Cap_t	0.4206***	0.0000	14.3100
Constant	6.6547***	0.0000	23.4500
R-Squared	0.9814	-	-
Adjusted R-Squared	0.9809	-	-
Root MSE	.09803	-	-
Sum squared reside	1.4127	-	-
F-statistic	1943.7	-	-

Notes: Superscripts ***, **, *denote statistical significance at the 1 and 5% and 10% levels.

coefficients of OLS regression illustrate that our primary variables of interest namely; non-oil exports and tourism are positively contributing to enhance economic growth, which further supports the economic theories. The empirical results are consistent with the findings of Jetter (2016), Faisal et al. (2017), Shahzad et al. (2017), Mitra (2019) for their study on developing and developed countries. Similarly, we note that renewable energy and capital formation have a significant and positive impact on economic growth at 10 percent and 1 percent level, respectively. This is indicative that capital formation and renewable energy has positive effects on the economic growth of Saudia Arabia. Considering the role of renewable energy, it is significant at ten percent with a magnitude of 1.5 percent. This result is very important and surprising, implying that Saudi Arabia might need to enhance the investments on renewable energy projects, which can also attain to achieve the "Saudi Vision 2030" (Al-Saleh, 2009; Allhibi et al., 2019). Meanwhile, the F-test and diagnostics of OLS regression indicate the validity of outcomes.

In our extension of empirical analysis, we apply the ARDL technique on our preferred specification. Table 6 reports the empirical outcomes of the ARDL method and also explains the diagnostics to check the validity of estimates. The estimated coefficients of the two indicators, lagged GDP, and non-oil exports, are positive and statistically significant at 1 percent level in short-run empirics, implying that export-led growth hypothesis can be valid in Saudi Arabia. On other side, tourism, renewable energy, and capital investments are unable to prove its significance in short period of time.

Interestingly, in our long-run estimates of ARDL we observe that capital formation, tourism, and non-oil exports are significant at 1 percent level, while renewable energy has a positive and significant response at 10 percent level. Overall, the empirical results of ARDL are in line with our OLS findings and demonstrate interesting outcomes. First, we can conclude that the role of non-petroleum exports is significantly positive, and it can be a good policy for Saudi Arabia to reduce economic dependence on the trade of oil and petroleum products. The empirical finding further supports the narrative of environmental protection and Saudi Vision 2030, on which the non-oil exports can boost the economy and reduce greenhouse emissions by reducing oil consump-

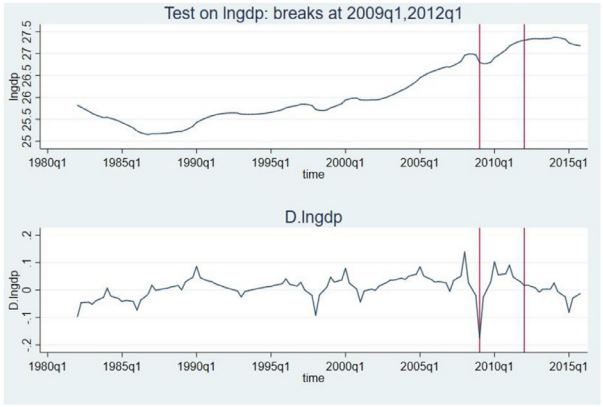

Figure 1(a): Structural breaks in GDP

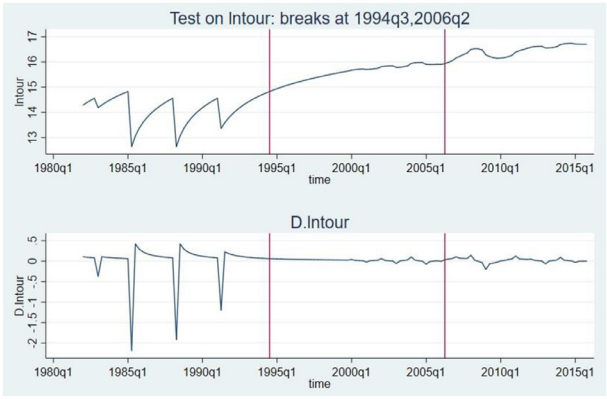

Figure 1(c): Structural breaks in Tourism

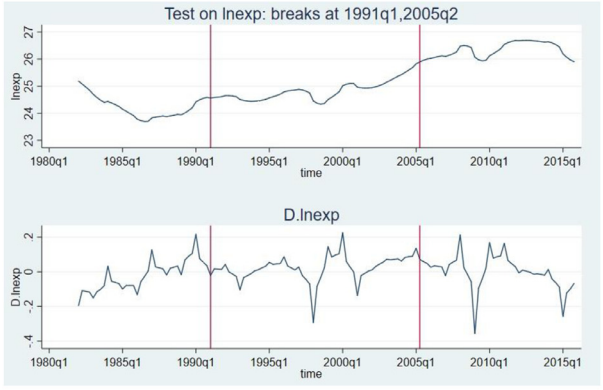

Figure 1(b): Structural breaks in non-oil exports

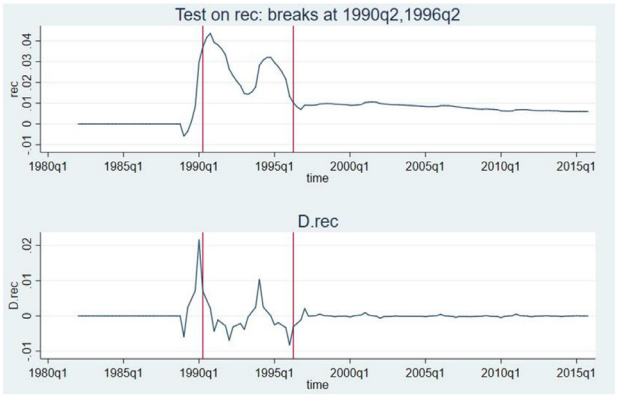

Figure 1(d): Structural breaks in renewable energy

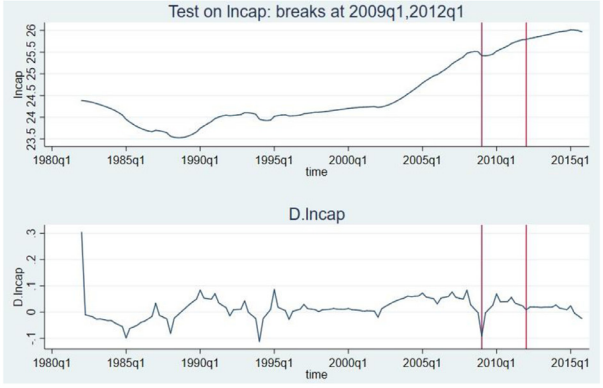

Figure 1(e): Structural breaks in capital

Fig. 1. (**a**): Structural breaks in GDP. (**b**): Structural breaks in non-oil exports. (**c**): Structural breaks in Tourism. (**d**): Structural breaks in renewable energy. (**e**): Structural breaks in capital.

tion and oil trading (Shahzad et al., 2018). This is in line with the findings of Aljebrin (2017), Parvin Hosseini and Tang (2014), Raheem (2016) who concluded a positive relationship between exports and economic growth. In the short-run empirics of ARDL the error correction term (ECT) is significant at 1 percent, and its value is between 0 and -1, implying that error correction procedure is monotonic, and it quickly leads the convergence toward equilibrium path. The significance of ECT confirms that any deviation from the equilibrium point of real GDP over the current period might be adjusted by 35% in the future. In addition, the OLS and ARDL empirics highlight significant and positive effects on economic growth. It means that capital formation might be more effective in establishing the new industries with latest technologies (cleaner and renewable sources) in Saudi Arabia. The findings of this study are in consistent with the Destek (2016) for the case of newly industrialized economies.

Furthermore, the long-run association between tourism and economic growth indicates a positive relationship, with one percent increase in tourist arrivals the real GDP can be improved by on average of 0.10 percent, which also support the tourism led growth hypothesis in Saudi Arabia. The result implies that the government and relevant authorities need urgent reforms in tourism sector, especially, to attract religious tourism by providing better facilities. The empirical finding is in accordance with the conclusions of Shahzad et al. (2017), Fahimi et al. (2018) for their study on developed and emerging economies.

Concerning the role of renewable energy, ARDL long run empirics mention that renewable energy can improve the economic

Table 6
ARDL empirics.

Regressors	Coefficient	Standard error	t-statistic	P-value
Short-run estimates				
$\Delta\, GDP_{t-1}$	0.5260***	0.0859	6.1200	0.0000
$\Delta\, non-Oil_t$	0.4088***	0.0115	35.7000	0.0000
$\Delta\, Tour_t$	-0.0022	0.0026	-0.8400	0.4030
$\Delta\, REC_t$	-0.1787	0.2639	-0.6800	0.4990
$\Delta\, Cap_t$	0.0141	0.0131	1.0700	0.2840
ECT	-0.0357***	0.0113	-3.1700	0.0020
Long-run estimates				
$non-Oil_t$	0.3601***	0.1023	3.5200	0.0010
$Tour_t$	0.1051***	0.0395	2.6600	0.0090
REC_t	3.7158*	2.3322	1.5900	0.0930
Cap_t	0.4475***	0.1050	4.2600	0.0000
Constant	0.1603**	0.0682	2.3500	0.0200
Diagnostics:			**Decision**	
F-bound test	Validity of ARDL	3.429	Model is valid	
T-test statistic	Test for hypothesis	3.170	Cointegration exists	
CUSUM test	Stability	-	Model is stable	
CUSUMSQ test	Stability	-	Model is stable	
Jarque–Bera test	Normality	0.4020	Residuals are normal distributed	

Notes: Superscripts ***, **, *denote statistical significance at the 1 and 5% and 10% levels, respectively. ARDL is applied as per AIC selection criteria. Diagnostics indicate validity of model.

performance, while the coefficient is significant at 10 percent, implying that there is more than urgent need for Saudi Arabia to make investments on renewable energy projects. In short run analysis, renewable energy is insignificant while positive and significant in long run analysis which indicate that in short period of time the transformation of energy mix from non-renewable energy to renewable energy increase the expenses, in term of importing and installing of required materials. Notably, the investigation into renewable energy-growth for Saudi Arabia is important due to two reasons; (i) the Saudi Arabia's economy heavily consume non-renewables and petroleum products for energy demand, which creates environmental externalities, (ii) and the renewable energy sources can act as alternative to non-renewables for cleaner growth and sustainable economic growth. The positive coefficients of renewable energy for economic growth attracts the attention of researchers. The findings suggest that increase in renewable energy consumption might enhance the economic growth in Saudi Arabia. Our study argues that with the rising amount of capital flows in Saudi Arabia, the country should enhance the investments on technological change and renewable energy sources. Such innovative policies can help to achieve the sustainable economic growth and cleaner production objectives of the country. The findings and conclusions of this research are also in line with the Saudi Vision 2030 and sustainable development goals of countries.

However, in this scenario, the transition of energy mix is unable to contributes in economy prosperity. In long run, higher utilization of renewable energy, instead of oil, helps the Saudi economy to reduce domestic consumption of oil which further reduce the burden on Saudi economy. For such reason, we conclude that transformation of energy mix leads towards sustainable economy. The long-run empirics denote that there is a strong relationship between studied variables, which is also determined by t-test, F-statistic, and lagged GDP values. Overall, the diagnostic tests mention the validity of ARDL outcomes and allow us to draw fruitful implications. Overall, the empirical results of non-oil exports and renewable energy can be generalized in context of oil exporting countries (GCC, OPEC etc.). However, tourism might have different implications depending on the level of economy.

4.3. Robustness check with cointegration methods

To examine the cointegration between non-oil exports, tourism, renewable energy, capital and economic growth, we further employ the Gregory and Hansen and Johansen multivariate cointegration technique. In doing so, we choose the optimal lag length criteria based on the AIC and SC by the estimations of unconstrained VAR model. The study assume that level data has trends and cointegrations have intercepts. In the Johansen multivariate cointegration, the cointegration rank is estimated by using the maximum

Table 7
Johansen cointegration test.

Hypothesized No	Eigen value	Trace statistic	5% critical value	P-value
None*	.	99.0864	47.21	0.0000
At most 1*	0.30724	44.0267	29.68	0.0000
At most 2*	0.16457	17.055	15.41	0.0000
At most 3*	0.10667	0.1343*	3.76	0.970
At most 4*	0.0009			
Hypothesized No	Eigen value	Trace statistic	5% critical value	P-value
None*	.	55.0597	27.07	0.0010
At most 1*	0.30724	26.9716	20.97	0.0000
At most 2*	0.16457	16.9207	14.07	0.0000
At most 3*	0.10667	0.1343	3.76	0.7510
At most 4*	0.0009			0.0930

Notes: Superscripts ***, **, *denote statistical significance at the 1 and 5% and 10% levels, respectively. The higher trace value from the critical values indicates to reject the null hypothesis of no cointegration.

Table 8
Findings for Gregory-Hansen cointegration.

	Cointegration for Economic Growth		
Gregory-Hansen Models	*ADF*Statistic	Z_t Statistic	Z_a Statistic
Intercept shift	-5.78** (1985q3)	-7.61***(2010q2)	-44.62* (2010q2)
Intercept shift with trend	-5.42 *(2010q3)	-11.77**(2002q3)	-48.07* (2002q3)
Intercept shift-regime and trend	-5.04* (2010q3)	-9.49***(2010q3)	-40.12* (2010q3)

Notes: ***,**,* represents the significance at 1%, 5% and 10% respectively. Parenthesis shows the structural break point year.

eigenvalue and trace test statistics. Table 7 outlines long run empirics of Johansen cointegration. Notably, the empirics of trace statistics are 99 and 44, which are higher the 5% critical values and rejects the null hypothesis of no cointegration. Overall, the null hypothesis is rejected at three ranks in first and second portion of table. The empirics of Johansen cointegration validates the empirical findings of ARDL and indicates that there is strong cointegration between tourism, non-oil exports, renewable energy and economic growth for the case of Saudi Arabia. The empirical findings of this study are in line with the conclusions of Nguyen et al. (2020).

In our empirical analysis, we further employed the Gregory Hansen Cointegration technique developed by Gregory and Hansen (1996), which identifies the presence of cointegration among studied variables. Table 8 outline the empirics for Gregory-Hansen Cointegration methodology as per our preferred specification. The cointegration method is applied as an intercept shift, intercept shift with the trend, and intercept shift with trend and regime. The findings indicate the presence of strong cointegration among studied variables, as the*ADF*Statistic, Z_t Statistic and Z_a Statistic, are significant. The Gregory-Hansen Cointegration empirics validate the empirical outcomes of ARDL technique and indicate that export led growth and tourism led growth hypothesis are strongly existing in the case of Saudi Arabia.

5. Conclusion and implications

In this empirical study, we mainly analyze the export-led growth hypothesis and tourism led growth hypothesis by using the quarterly data from 1980q1 to 2017q4 of Saudi Arabia. Within this context, the paper uses non-petroleum exports as a proxy of exports and tourist arrivals as an indicator of tourism. The existing literature of Saudi Arabia has primarily focused on tourism-led growth on total exports and economic growth nexus, while Saudi Arabia economy is highly dependent on oil. In comparison of existing studies, this article contributes to analyze the role of non-petroleum exports for economic development and propose fruitful implications. To test the primary hypothesis of study, we used unit root testing to confirm the stationarity of series, while in order to establish the reliability and valid empirical findings of time series data the study utilized ordinary least square (OLS), autoregressive distributed lag (ARDL) bound test, Johansen multivariate cointegration and Gregory Hansen Cointegration methods, as these techniques are sensitive to linear data characteristics and time attribution.

The cointegration analysis suggests the presence of a long-term relationship between economic growth, non-oil exports, tourism, renewable energy, and capital formation. Furthermore, the significance of the error correction term indicates that there is strong linkage between our primary variables of interest (tourism and non-oil exports and renewable energy) towards economic growth in the long term. In the empirical analysis, we also find the short-term impacts of non-oil exports and lagged economic growth which guide us that previous year's economic growth, tradable goods and non-oil exports has positive heterogeneous effects on overall economic progress. The value of non-oil exports to economic growth implies that 1 percent increase in non-oil exports contribute to enhance the economic growth with 0.41%, which guide us to draw new conclusions.

The empirical findings suggest that tourism, non-oil exports and renewable energy have positive effects on the sustainable economic growth of Saudi Arabia. The conclusions of non-oil exports and renewable energy are very innovative in context of Saudi Arabia, which allow us to draw new implications. Notably, our study argues that capital formation in Saudi Arabia can be positively used to enhance investments on renewable energy, tourism policies, establishing of new industries. It is important to mention here that the increase in non-petroleum exports might reduce the oil dependency and create new windows for economic stability. Given the current crisis of oil prices, such results are very encouraging and helpful to in policy making.

Further, due to the importance of the tourism sector for Saudi Arabia, we note that tourist arrivals positively contribute to the economic growth, this finding is very interesting and in line with existing literature. In this context, it is more than urgent need for the country to make tourism reforms and new policies in such a way that it facilitates the religious and cultural tourist arrivals. A caveat of the present study is that the study only focused on the role of renewable energy, tourism, and non-oil exports. However, the future research can conduct an in-depth and more wide analysis by using the data on non-renewable energy sources, domestic and international tourism, and industrial contribution. In this context, the future research can also focus on the data of oil exporting and importing countries such as OPEC and GCC etc.

5.1. Practical implications

Based on the detailed empirical analysis, the study proposes three fruitful implications. Firstly, the policy makers and economists should divert their attention on trade regulations, trade policies such as export diversification or import diversification. In doing so, the economic dependence of Saudi government from oil and petroleum products can be reduced. While, promoting the industry of non-oil exports might also be helpful in achieving the sustainable development goals (SDG's) and can be favorable for green environment. Secondly, it is more than urgent need for Saudi Arabia to make tourism reforms and new policies in such a way that it facilitates the religious and cultural tourist arrivals. In doing so, the government of Saudi Arabia may give more attention to the economic and structural transformation. Last but not the least, the Saudi government should encourage the investments on renewable energy and advanced technology. The investments on renewable infrastructure can reduce the fossil fuels dependence and protect environment. In addition, the innovative policies on overall energy mix can help in economic and structural transformation and might help to achieve sustainable economic growth. Overall, the empirical findings might allow the researchers, economists, and policymakers to draw new conclusions and to devise structural policies for overall energy structure.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.strueco.2020.06.005.

CRediT authorship contribution statement

Rida Waheed: Formal analysis, Writing - original draft. **Suleman Sarwar:** Conceptualization, Methodology, Formal analysis, Writing - original draft, Writing - review & editing. **Ashwaq Dignah:** Writing - review & editing.

References

Ahmad, F., Draz, M.U., Su, L., Ozturk, I., Rauf, A., 2018. Tourism and environmental pollution: evidence from the one belt one road provinces of western China. Sustain 10, 1–23 https://doi.org/10.3390/su10103520.

Al-Saleh, Y., 2009. Renewable energy scenarios for major oil-producing nations: the case of Saudi Arabia. Futures 41, 650–662 https://doi.org/10.1016/j.futures.2009.04.005.

Aljebrin, M.A., 2017. International journal of economics and financial issues impact of non-oil export on non-oil economic growth in Saudi Arabia. Int. J. Econ. Financ. Issues 7, 389–397.

Allhibi, H., Chowdhury, H., Zaid, M., Loganathan, B., Alam, F., 2019. Prospect of wind energy utilization in Saudi Arabia: a review. Energy Procedia 160, 746–751 https://doi.org/10.1016/j.egypro.2019.02.184.

Alshammari, Y.M., Sarathy, S.M., 2017. Achieving 80% greenhouse gas reduction target in Saudi Arabia under low and medium oil prices. Energy Policy 101, 502–511 https://doi.org/10.1016/j.enpol.2016.10.027.

Alshehry, A.S., Belloumi, M., 2015. Energy consumption, carbon dioxide emissions and economic growth: the case of Saudi Arabia. Renew. Sustain. Energy Rev. 41, 237–247 https://doi.org/10.1016/j.rser.2014.08.004.

Alsumairi, M., Hong Tsui, K.W., 2017. A case study: the impact of low-cost carriers on inbound tourism of Saudi Arabia. J. Air Transp. Manag. 62, 129–145 https://doi.org/10.1016/j.jairtraman.2017.04.001.

Antonakakis, N., Dragouni, M., Filis, G., 2015. How strong is the linkage between tourism and economic growth in Europe? Econ. Model. 44, 142–155 https://doi.org/10.1016/j.econmod.2014.10.018.

Bassil, C., Hamadeh, M., Samara, N., 2015. The tourism led growth hypothesis : the Lebanese case. https://doi.org/10.1108/TR-05-2014-0022

Barbuscia, D., 2019. Saudi GDP could surprise on the upside, higher budget deficit seen in 2019: IMF. [Online] Available at: https://www.reuters.com/article/us-saudi-economy-imf/saudi-gdp-could-surprise-on-the-upside-higher-budget-deficit-seen-in-2019-imf-idUSKCN1S509O [Accessed 25 September 2019].

Ben Jebli, M., Ben Youssef, S., Apergis, N., 2019. The dynamic linkage between renewable energy, tourism, CO2 emissions, economic growth, foreign direct investment, and trade. Lat. Am. Econ. Rev. 28 https://doi.org/10.1186/s40503-019-0063-7.

Can, H., Korkmaz, Ö, 2019. The relationship between renewable energy consumption and economic growth: the case of Bulgaria. Int. J. Energy Sect. Manag. 13, 573–589 https://doi.org/10.1108/IJESM-11-2017-0005.

Clemente, J., Montañés, A., Reyes, M., 1998. Testing for a unit root in variables with a double change in the mean. Econ. Lett. 59, 175–182 https://doi.org/10.1016/s0165-1765(98)00052-4.

De Vita, G., Kyaw, K.S., 2016. Tourism development and growth. Ann. Tour. Res. 60, 23–26 https://doi.org/10.1016/j.annals.2016.05.011.

Destek, M.A., 2016. Renewable energy consumption and economic growth in newly industrialized countries: evidence from asymmetric causality test. Renew. Energy 95, 478–484 https://doi.org/10.1016/j.renene.2016.04.049.

Dickey, D.A., Fuller, W.A., 1979. Distribution of the estimators for autoregressive time series with a unit root. J. Am. Stat. Assoc. 74, 427 https://doi.org/10.2307/2286348.

Fahimi, A., Akadiri, S.Saint, Seraj, M., Akadiri, A.C., 2018. Testing the role of tourism and human capital development in economic growth. A panel causality study of micro states. Tour. Manag. Perspect. 28, 62–70 https://doi.org/10.1016/j.tmp.2018.08.004.

Faisal, F., Tursoy, T., Resatoglu, N.G., 2017. Is export-led growth hypothesis exist in Saudi Arabia? Evidence from an ARDL bounds testing approach. Asian J. Econ. Model 5, 110–117 https://doi.org/10.18488/journal.8/2017.5.1/8.1.110.117.

Fareed, Z., Meo, M.S., Zulfiqar, B., Shahzad, F., Wang, N., 2018. Nexus of tourism, terrorism, and economic growth in Thailand: new evidence from asymmetric ARDL cointegration approach. Asia Pacific J. Tour. Res. 23, 1129–1141 https://doi.org/10.1080/10941665.2018.1528289.

Gamal, R. E., 2019. Saudi Arabia sees domestic energy use falling, plans renewables push. [Online] Available at: https://www.reuters.com/article/us-saudi-energy-reforms/saudi-arabia-sees-domestic-energy-use-falling-plans-renewables-push-idUSKCN1P918N [Accessed 25 September 2019].

Gregory, A.W., Hansen, B.E., 1996. Residual-based tests for cointegration in models with regime shifts. J. Econometr. 70 (1), 99–126.

IMF, 2019. Balance of Payments Data. [Online] Available at: http://data.imf.org/?sk=A093DF7D-E0B8-4913-80E0-A07CF90B44DB [Accessed 25 July 2019].

International Atomic Energy Agency, 2018. IAEA Annual Report for 2017. [Online] Available at: https://www.iaea.org/opic/annual- report- 2017 [Accessed 25 September 2019].

International Trade Administration, 2019. Saudi Arabia - Market Overview. [Online] Available at: https://www.export.gov/article?id=Saudi-Arabia-Market-Overview [Accessed 20 September 2019].

Jetter, M., 2016. The impact of exports on economic growth: it's the market form. World Econ. 40, 1040–1052 https://doi.org/10.1111/twec.12461.

Johansen, S., 1991. Estimation and hypothesis testing of cointegration vectors in Gaussian vector. Econometrica 59, 1551–1580 https://doi.org/10.1017/CBO9781107415324.004.

Jones, C., Li, S.N., 2015. The economic importance of meetings and conferences: a satellite account approach. Ann. Tour. Res. 52, 117–133 https://doi.org/10.1016/j.annals.2015.03.004.

Khan, M.T.I., Yaseen, M.R., Ali, Q., 2019. Nexus between financial development, tourism, renewable energy, and greenhouse gas emission in high-income countries: A continent-wise analysis. Energy Econ. 83, 293–310 https://doi.org/10.1016/j.eneco.2019.07.018.

Lahiani, A., 2018. Revisiting the growth-carbon dioxide emissions nexus in Pakistan. Environ. Sci. Pollut. Res. 25, 35637–35645 https://doi.org/10.1007/s11356-018-3524-7.

Lee, J.W., 2019. Long-run dynamics of renewable energy consumption on carbon emissions and economic growth in the European union. Int. J. Sustain. Dev. World Ecol. 26, 69–78 https://doi.org/10.1080/13504509.2018.1492998.

Marin, D., 1992. Is the Export-Led Growth Hypothesis Valid for Industrialized Countries ? Author (s): Dalia Marin Source : The Review of Economics and Statistics, Vol . 74, No . 4 (Nov ., 1992), pp . 678-688 Published by : The MIT Press Stable URL : http://www.jstor. Rev. Econ. Stat. 74, 678–688.

Matarrita-Cascante, D., 2010. Beyond growth. Reaching tourism-led development. Ann. Tour. Res. 37, 1141–1163 https://doi.org/10.1016/j.annals.2010.05.004.

Medina-Smith, E.J., 2001. Is the export-led growth hypothesis valid for developing countries? A case study of Costa Rica, Policy Issues in International Trade and Commodities.

Mitra, S.K., 2019. Is tourism-led growth hypothesis still valid? Int. J. Tour. Res. 1–10 https://doi.org/10.1002/jtr.2285.

Narayan, S., Doytch, N., 2017. An investigation of renewable and non-renewable energy consumption and economic growth nexus using industrial and residential energy consumption. Energy Econ. 68, 160–176 https://doi.org/10.1016/j.eneco.2017.09.005.

Nguyen, T.T., Pham, T.A.T., Tram, H.T.X., 2020. Role of information and communication technologies and innovation in driving carbon emissions and economic growth in selected G-20 countries☆. J. Environ. Manage. 261, 110162 https://doi.org/10.1016/j.jenvman.2020.110162.

Parrilla, J.C., Font, A.R., Nadal, J.R., 2007. Tourism and long-term growth a Spanish perspective. Ann. Tour. Res. 34, 709–726 https://doi.org/10.1016/j.annals.2007.02.003.

Parvin Hosseini, S.M., Tang, C.F., 2014. The effects of oil and non-oil exports on economic growth: a case study of the Iranian economy. Econ. Res. Istraživanja 27, 427–441 https://doi.org/10.1080/1331677X.2014.967534.

Pesaran, m.H., et al., 2001. Bounds Tesing Approcahes to the Analysis of Level Relationships. J. Appl. Econometr. 16, 289–326.

Raheem, I., 2016. Analysis of the effects of oil and non-oil export on economic growth in Nigeria. Work. Pap..

Rehman, O.U., Liu, X., Rauf, A., Slama, M.Ben, Amin, W., 2019. Internet tradition and tourism development: a causality analysis on BRI listed economies. Tour. Econ. 135481661984625. https://doi.org/10.1177/1354816619846251.

Sarwar, S., 2019. Role of urban income, industrial carbon treatment plants and forests to control the carbon emission in China. Environ. Sci. Pollut. Res. 26, 16652–16661 https://doi.org/10.1007/s11356-019-04854-3.

Sarwar, S., Alsaggaf, M.I., 2019. Role of urbanization and urban income in carbon emission: regional analysis of China. Appl. Ecol. Environ. Res. 17, 10303–10311 https://doi.org/http://dx.doi.org/10.15666/aeer/1705_1030310311.

Siddiqui, S., 2019. Can the tourism sector in Saudi Arabia prove to be sustainable?. [Online] Available at: https://www.alaraby.co.uk/english/indepth/2019/10/18/is-the-saudi-tourism-industry-sustainable [Accessed 28 September 2019].

Shafiullah, M., Selvanathan, S., Naranpanawa, A., 2017. The role of export composition in export-led growth in Australia and its regions. Econ. Anal. Policy 53, 62–76 https://doi.org/10.1016/j.eap.2016.11.002.

Shahbaz, M., Lahiani, A., Abosedra, S., Hammoudeh, S., 2018. The role of globalization in energy consumption: a quantile cointegrating regression approach. Energy Econ. 71, 161–170 https://doi.org/10.1016/j.eneco.2018.02.009.

Shahzad, S.J.H., Shahbaz, M., Ferrer, R., Kumar, R.R., 2017. Tourism-led growth hypothesis in the top ten tourist destinations: new evidence using the quantile-on-quantile approach. Tour. Manag. 60, 223–232 https://doi.org/10.1016/j.tourman.2016.12.006.

Shahzad, U., Sarwar, S., Amin, W., 2018. The relationships among economic growth, renwable eenergy consumption, CO2 Emissions and Agriculture production: empricial evidence for China and India. Glob. Local Econ. Rev. 22.

Shahzad, U., Sarwar, S., Farooq, M.U., Qin, F., 2020. USAID, official development assistance and counter terrorism efforts: pre and post 9/11 analysis for South Asia. Socioecon. Plann. Sci. 69 https://doi.org/10.1016/j.seps.2019.06.001.

Sharif, A., Baris-tuzemen, O., Uzuner, G., Ozturk, I., Sinha, A., 2020. Revisiting the role of renewable and non-renewable energy consumption on Turkey's ecological footprint: Evidence from Quantile ARDL approach. Sustain. Cities Soc. 57, 102–138 https://doi.org/10.1016/j.scs.2020.102138.

Shehzad, K., Liu, X., Rauf, A., Arif, M., Mazhar, S., Sohail, N., Amin, W., 2019. Revolutionising tourism development in China: an effective role of ICT and Western silk road project. Asia Pacific J. Tour. Res. 24, 965–977 https://doi.org/10.1080/10941665.2019.1653334.

Squalli, J., 2007. Electricity consumption and economic growth: bounds and causality analyses of OPEC members. Energy Econ. 29, 1192–1205 https://doi.org/10.1016/j.eneco.2006.10.001.

Tang, C.F., Tan, E.C., 2013. How stable is the tourism-led growth hypothesis in Malaysia? Evidence from disaggregated tourism markets. Tour. Manag. 37, 52–57 https://doi.org/10.1016/j.tourman.2012.12.014.

Waheed, R., Chang, D., Sarwar, S., Chen, W., 2018. Forest, agriculture, renewable energy, and CO2 emission. J. Clean. Prod. 172, 4231–4238 https://doi.org/10.1016/j.jclepro.2017.10.287.

World Development Bank, 2019. World Development Indicators. [Online] Available at: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#[Accessed 15 July 2018].

World Travel Market, 2019. Saudi tourism sector worth over $70 billion in 2019. [Online] Available at: https://news.wtm.com/saudi-tourism-sector-worth-over-70-billion-in-2019/ [Accessed 14 September 2019].

Yang, Y., Fik, T., 2014. Spatial effects in regional tourism growth. Ann. Tour. Res. 46, 144–162 https://doi.org/10.1016/j.annals.2014.03.007.

Zafar, M.W., Zaidi, S.A.H., Khan, N.R., Mirza, F.M., Hou, F., Kirmani, S.A.A., 2019. The impact of natural resources, human capital, and foreign direct investment on the ecological footprint: the case of the United States. Resour. Policy 63, 101428 https://doi.org/10.1016/j.resourpol.2019.101428.

Zivot, E., Andrews, D.W.K., 1992. Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis. J. Bus. Econ. Stat. 10, 251–270.