A panel analysis of the effects of oil consumption, international tourism, environmental quality and political instability on economic growth in MENA region

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Abstract
The aim of this study is to investigate whether oil consumption, international tourism, environmental quality and political instability affect economic growth in 18 MENA countries over the period 1995-2011 using both the static (POL, FE and RE) and dynamic (Diff-GMM and Sys-GMM) panel data approaches. The empirical results show that the increases in oil consumption and international tourist arrivals are the major drivers of economic growth in MENA countries indicating the presence of energy-led-growth (ELG) and tourism-led-growth (TLG) hypotheses in these countries. We also find that economic growth in MENA countries reacts negatively to the environmental degradation and political instability. These empirical insights are of particular interest to policymakers as they help build sound economic policies to sustain economic development.

Keywords: Economic growth, Static and dynamic panel data, MENA countries.

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1. Introduction
During the last decades, the analysis of economic growth has become increasingly popular in the macroeconomic literature (Abramovitz, 1986; Barro and Sala-i-Martin, 1995). The factors that determine economic growth are among the most extensively studied subjects in existing economics literature. Early contributions to these topics were based mainly on the neoclassical growth model and were concerned almost exclusively with strictly economic determinants of growth. Accordingly, identifying the factors affecting growth is critical for designing economic policies that lead to higher standards of living. Theoretically, energy, tourism and environmental quality are three important factors in promoting economic growth. Sharma (2010) noted that energy affects economic growth through its impact on production activities. In addition, tourism may contribute to the economic growth of a country by creating more employment opportunity, increasing investment in new infrastructure, and augmenting a country’s tax revenues and foreign exchange (Tang and Abosedra, 2014). Furthermore, Omri (2013) noted that economic growth is strongly linked to environmental quality. Therefore, growth may be limited because reductions in environmental quality call forth more intensive clean up or abatement efforts that lower the return to investment, or more apocalyptically, growth may be limited when humans do such damage to the ecosystem that it deteriorates beyond repair and settles on a new lower, less productive steady state.

However, previous empirical studies are not unanimous about the role played by tourism, energy and environmental quality in determining economic growth. Some of them showed that tourism, energy consumption and environmental pollutant would effectively affect economic growth (e.g. Al-mulali, 2011; Sharma, 2011; Saboori et al. 2012; Tang, 2013; Omri and Kahouli, 2014; Omri, 2014; Tang and Abosedra, 2014), whereas others works argued that economic growth is not affected by tourism, energy consumption and environmental quality (e.g. Anwar and Nguyen, 2010; and Anwar and Sun, 2011). Apart from that proposition, we also find that most studies ignore the role of institutional factors such as political instability on economic growth. According to Alesina et al. (1996), Jong-A-Pin (2009), and Aisen and Veiga (2013), political instability lead to a more frequent switch of policies, creating volatility and thus, negatively affecting macroeconomic performance. Similarly, Ingram et al. (2013) found that political instability is likely to affect the security of a country, which in turn has a negative impact on tourism.

In this paper special attention is paid to examine the influences of capital, labor, oil consumption, international tourist arrivals, environmental quality, and political instability on economic growth for 18 MENA countries using both static and dynamic panel data approaches. To the best of our knowledge, such an analysis has not been performed to study the relationship between all the six variables and economic growth in MENA countries. Several motivations led us to study this subject in the MENA region. First, while the region is trying to industrialize and modernize its economies, there are the challenges of the carbon emissions. Moreover, energy consumption is the most significant source of pollution and, in terms of particulate matter concentrations; MENA represents the second most polluted region in the world – after South Asia – and the highest CO2 producer per dollar of output (Omri, 2013). Second, though many studies have examined the impact of energy consumption on economic growth, there are only few studies which investigate the impact of oil consumption on economic growth in the MENA countries. According to the World Bank (2012), the MENA region covered approximately 57 per cent of the world oil reserves and approximately 41 per cent of natural gas resources. Finally, MENA has been named as a tourist paradise, owing to the rich history of its ancient civilisations, its unique cultural heritage and many religious sites. However, the UNWTO (2012) noted that, in 2011, the tourism sector in the region suffered a decline in international tourist arrivals owing to the Arab Spring Revolution and the on-going political instability in the region (Tang and Abosedra, 2014). All these
motivations led us to examine the impact of oil consumption, international tourist arrivals, CO₂ emissions, and political instability on economic growth for 18 MENA countries.

The algorithm of the article is as such: section 2 describes the data used and outlines the econometric modeling approach, section 3 depicts the empirical findings and the final section, being section 4, holds the concluding annotations and offers some policy implications.

2. Materials and Methods

2.1. Data and econometric methodology

The objective of this study is to examine the impact of oil consumption, tourism, CO₂ emissions and political instability on economic growth using data from 1995 to 2011 for 18 MENA countries; namely Algeria, Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Turkey, the United Arab Emirates, and Yemen. The selection of the starting period was constrained by the availability of data. Real GDP (in billion of constant 2005 US $), total labor force (in million), capital stock (in billion of constant 2005 US $), and the number of international tourists visiting are sourced from the World Development Indicators (WDI). The oil consumption (in thousand barrels daily) and CO₂ emissions (in million tonnes carbon dioxide) are collected from the British Petroleum Statistical Review of World Energy (BP, 2013). The political instability index is obtained from the Freedom in the World.

To understand the determinants of economic growth, we use the Cobb-Douglas production function. The general form of this function is materialized as follows:

\[ Y = AK^\alpha L^\beta \]  

Where \( Y \) is output, \( K \) is capital stock, \( L \) is labor force, \( A \) is technological progress and \( \alpha \) and \( \beta \) refer to output elasticities respectively of capital and labor.

In the last few decades, the introduction of energy in production function is emerged as an answer to its important effect on economic growth. The findings of Bozoklu and Yilanci (2013) and Omri (2013) showed that energy consumption appears as an essential factor of production and may be a relatively more important input than capital and labor. According to Al-mulali (2011), the positive impact of oil consumption on economic growth suggested that energy consumption plays an important role in the growth process both directly and indirectly as a complement to labor and capital. In addition, Tang and Abosedra (2014) criticized the traditional growth model for treating energy as a secondary factor and pointed out that for an engineer production is not possible without energy use and he included the technological progress as a complement to labor, capital and energy.

The modified form of the production function is as follows:

\[ Y = AK^{\alpha_1} L^{\alpha_2} E^{\alpha_3} \]  

Furthermore, other studies such as Modeste (1995), Katircioglu (2009), and Tang and Abosedra (2014) have incorporated the international tourist arrivals as determinant factor of economic growth. Moreover, environmental quality and institutional factors such as political instability have also been shown to affect the economic growth (e.g. Ang, 2008; Soytas and Sari, 2009; Omri, 2013; and Tang and Abosedra, 2014). Accordingly, we examine the impact of capital, labor, oil consumption, international tourist arrivals, CO₂ emissions, and political instability on economic growth for 18 MENA countries. Our basic model takes the following form:
By taking log, the linearized production function Eq. (3) can be given as follows:

\[ \ln Y_i = \alpha_0 + \alpha_1 \ln K_i + \alpha_2 \ln L_i + \alpha_3 \ln OC_i + \alpha_4 \ln T_i + \alpha_5 \ln C_i + \alpha_6 \ln PI + \varepsilon, \]  
\[ \text{(4)} \]

Since our empirical analysis involves a panel of countries, Eq. (4) can be written in a panel data form as:

\[ \ln Y_{it} = \alpha_0 + \alpha_1 \ln K_{it} + \alpha_2 \ln L_{it} + \alpha_3 \ln OC_{it} + \alpha_4 \ln T_{it} + \alpha_5 \ln C_{it} + \alpha_6 \ln PI_{it} + \varepsilon, \]  
\[ \text{(5)} \]

Where the subscript \( i=1, \ldots, N \) denotes the country (in our study, we have 18 countries) and \( t=1, \ldots, T \) denotes the time period (our time frame is 1995–2011), \( Y \) is the real gross domestic product (GDP), \( K \) is the capital stock, \( L \) is the labor force, \( OC \) is oil consumption, \( T \) is total number of international tourists visiting, \( C \) is indicator of CO\(_2\) emissions, \( PI \) is political instability index, and \( \varepsilon \) is error term. The impact of \( \alpha_1, \alpha_2, \alpha_3, \) and \( \alpha_4 \) are expected to be positive, while the impact of \( \alpha_5 \) and \( \alpha_6 \) on economic growth is expected to be negative.

Since we employ, in this study, both the static and dynamic panel estimation techniques, Eq. (5) can be rewritten in the following dynamic representation:

\[ \ln Y_{it} = \alpha_0 \ln Y_{it-1} + \sum_{j=1}^{6} \beta_j X_{it-j} + \mu_i + \varepsilon_{it} ; \quad i = 1, \ldots, N ; \quad t = 1, \ldots, T \]  
\[ \text{(6)} \]

where the subscript \( i=1, \ldots, N \) denotes the country and \( t=1, \ldots, T \) denotes the time period; \( \ln Y_{it-1} \) represents the log of lagged dependent variables of economic growth (\( \ln Y_{it} \)); \( \alpha_0 \) is the parameter to be estimated; \( X \) represents the vector of core control variables we detailed in Eq. (5); \( \mu \) is the country-specific effect; and \( \varepsilon \) is error term.

We use the generalised method of moments (GMM) to estimate our dynamic panel data model which also allows for the lagged level of economic growth. This method uses a set of instrumental variables to solve the endogeneity problem of the regressors. There are two types of GMM estimators (difference and system) and they can be both alternatively considered in their one-step and two-step versions. The set of instruments of the difference-GMM estimator (Diff-GMM) includes all the available lags in difference of the endogenous variables and the strictly exogenous regressors (Arellano and Bond, 1991). The system-GMM estimator (sys-GMM) includes not only the previous instruments but also the lagged values of the dependent variable (Blundell and Bond, 1998). It helps solve the endogeneity problem arising from the potential correlation between the independent variable and the error term in dynamic panel data models (Topcu, 2013). It also permits to deal with omitted dynamics in static panel data models, owing to the ignorance of the impacts of lagged values of the dependent variable (Bonds, 2002).

### 2.2. Panel unit root tests

Testing unit roots on time series data has become one of the important tests among economists, especially econometricians though testing unit roots on panel data is more recent. Panel unit root tests have become popular among economic researchers dealing with panel data structures because they are much more powerful compared to the normal unit root tests for individual time series. From among different panel unit root tests developed in the literature, Levin, Lin and Chu (LLC) (2002) and Im, Pesaran and Shin (IPS) (2003) are the most popular. Both of the tests are based on the ADF principle. However, LLC assumes homogeneity in the dynamics of the autoregressive coefficients for all panel members. In contrast, the IPS is more general in the sense that it allows for heterogeneity in these
dynamics. Therefore, it is described as a “Heterogeneous Panel Unit Root Test”. It is particularly reasonable to allow for such heterogeneity in choosing the lag length in ADF tests when imposing uniform lag length is not appropriate. In addition, slope heterogeneity is more reasonable in the case where cross-country data is used. In this case, heterogeneity arises because of differences in economic conditions and degree of development in each country. Levin et al. (2002) consider the the following basic ADF specification:

\[ \Delta y_{i,t} = \alpha_i + \beta_i y_{i,t-1} + \sum_{j=1}^{\mu_i} \mu_{i,j} \Delta y_{i,t-j} + \epsilon_{i,t} \]  (7)

where \( y_{i,t} \) (i=1, 2, ..., N; t=1,2,......,T) is the series for panel member (country) \( i \) over period \( t \), \( \mu_i \) is the number of lags in the ADF regression, and the error terms \( \epsilon_{i,t} \) is a white-noise disturbance with a variance of \( \sigma_i^2 \). Both \( \beta \) and the lag order \( \mu \) in Eq. (7) are allowed to vary across sections (countries). Hence, they assumed

\[
\begin{align*}
\beta_i &= 0 \quad \text{where alternative hypothesis corresponds to } Y_{i,1} \text{ being stationary.} \\
\beta_i &< 0
\end{align*}
\]

Levin et al. (2002) found that the panel approach substantially increases power in finite samples when compared with the single-equation ADF test. They also proposed a panel-based version of Eq. (8) that restricts \( \beta_i \) by keeping it identical across cross-countries as follows:

\[ \Delta Y_{i,t} = \alpha_i + \beta Y_{i,t-1} + \sum_{j=1}^{\mu_i} \mu_{i,j} \Delta Y_{i,t-j} + \epsilon_{i,t} \]  (9)

Accordingly, Levin et al. (2002) also assumed

\[
\begin{align*}
H_0 : \beta_1 = \beta_2 = \ldots = \beta = 0 \\
H_1 : \beta_1 = \beta_2 = \ldots = \beta < 0
\end{align*}
\]

where the statistic of test is \( t_{\beta} = \frac{\hat{\beta}}{\sigma(\hat{\beta})} \). \( \beta \) is the OLS estimate of \( \beta \) in Eq. (12) and \( \sigma(\beta) \) is its standard error.

Im et al. (2003) proposed a testing procedure based on the mean group approach. The starting point of the IPS test is also the ADF regressions given in Eq. (1). But, the null and alternative hypotheses are different from that of the LLC test, where the rejection of the null hypothesis implies that all the series are stationary. We now have

\[ H_0: \beta_1 = \beta_2 = \ldots = \beta_N = 0 \quad \text{vs.} \quad H_1: \text{Some but not necessarily all } \beta_i < 0 \]

IPS developed two test statistics and called them the LM-bar and the t-bar tests. The t-bar statistics is calculated using the average t-statistics for \( \beta_i \) from the separate ADF regressions in the following fashion:

\[ t = \frac{\sum_{i=1}^{N} t_{\beta_i}}{N} \]  (10)

where \( t \) is the calculated ADF statistics from individual panel members. Using Monte Carlo simulations, IPS show that the t-bar \( \tilde{t} \) is normally distributed under the null hypothesis, and it outperforms M-bar in small samples. They then use estimates of its mean and variance to convert \( \tilde{t} \) into a standard normal z-bar \( \tilde{z} \) statistic so that conventional critical values can be used to evaluate its significance. The \( \tilde{z} \) test statistic is defined as:
\[-z = \frac{\sqrt{N} (\hat{i} - E[\hat{i} | \beta_i = 0])}{\sqrt{\text{var}[\hat{i} | \beta_i = 0]}} \rightarrow N(0,1)\]  

where \( \hat{i} \) is as defined before, \( E[\hat{i} | \beta_i = 0] \) and \( \text{var}[\hat{i} | \beta_i = 0] \) are the mean and variance of \( t_i \), obtained from the Monte Carlo simulations with \( i = 1,2,\ldots,N \).

The LLC and IPS unit root tests are used in this paper to test for stationarity of the panel data obtained for MENA countries.

3. Results and Discussions

The objective of this study is to examine the impact of oil consumption, international tourism, CO2 emissions, and political instability on economic growth using both static and dynamic panel data methods for 18 MENA countries’ over the period from 1995 to 2011. The results of the two methods are given in Table 2.

We begin our analysis with the implementation of the panel unit root tests proposed by Levine et al. (LLC) (2002) and Im et al. (IPS) (2003). The null hypothesis of the above two unit root tests is that there exist unit root (i.e. the variables are non-stationary), and the alternative hypothesis is that no unit root exists in the series (i.e. the variables are stationary). Table 1 shows the results of panel unit root tests for levels of variables. It can be seen from Table 1 that all variables in first difference are statistically significant under the LLC and IPS tests, indicating that all variables are integrated of order one, I(1).

<table>
<thead>
<tr>
<th>Variables</th>
<th>LLC test</th>
<th>IPS test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>First difference</td>
</tr>
<tr>
<td>Y</td>
<td>4.2781 (0)</td>
<td>1.0000</td>
</tr>
<tr>
<td>K</td>
<td>2.1163 (0)</td>
<td>0.9985</td>
</tr>
<tr>
<td>L</td>
<td>-1.3562 (0)***</td>
<td>0.0019</td>
</tr>
<tr>
<td>OC</td>
<td>-2.2558 (3)**</td>
<td>0.0008</td>
</tr>
<tr>
<td>T</td>
<td>-5.4446 (1)***</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>-3.6095 (5)***</td>
<td>0.0611</td>
</tr>
<tr>
<td>PI</td>
<td>3.2471 (0)***</td>
<td>0.1223</td>
</tr>
</tbody>
</table>

Notes: All panel unit root tests were performed with restricted intercept and trend for all variables. In addition, Lag length of variables is shown in small parentheses. *, **, and *** indicate significance at the 1%, 5%, and 10% levels, respectively.

3.1. Results of static panel estimations

To examine the impact of oil consumption, international tourism, CO2 emissions and political instability on economic growth in MENA countries, we consider a set of static panel estimation techniques including cross-section pooled Ordinary Least Squares (OLS), Fixed Effects and Random Effects (RE) models. To choose between cross-section POLS and RE model, we use the Breusch–Pagan Lagrange Multiplier (LM) test to examine the null hypothesis that there are no random effects. This hypothesis, if rejected, would imply that cross-section POLS technique is inappropriate. In addition, in order to choose between FE and RE model, we use the Hausman specification test to examine the null hypothesis that random effects are consistent and efficient. Similarly, if this hypothesis is rejected, then the estimation results provided by FE model are found to be more robust than others (Tang and Aosedra, 2014).

Accordingly, the Breusch–Pagan LM test rejects the null hypothesis of no random effect, indicating that the estimation results with RE model are more robust than POLS. Then, the statistic of Hausman specification test rejects the null hypothesis of RE model is...
appropriate and more efficient. In this case, we can said that the results of FE model are more appropriate than RE model.

In FE model, we show that 79.2 per cent of the variation in real income of MENA countries can be explained by the level of oil consumption, international tourist arrivals and some other explanatory variables. As expected, we find that capital stock, labor force, oil consumption, and tourism have positive and significant impacts on economic growth in MENA countries, while the impacts of CO₂ emissions and political instability are negative. Therefore, we can see that oil consumption and the number of international tourist arrivals have the highest impacts on economic growth in MENA countries, followed by political instability, CO₂ emissions, capital stock, and labor force. The findings indicate that a 1% increase in capital stock and labor force increases real income by 0.19% and 0.16%, respectively. We also see that oil consumption has positive and statistically significant impact on economic growth at 1% level. The magnitude of 0.329 implies that a 1% increase in oil consumption increases real income of MENA countries by around 0.31%. The results are consistent with the findings of Zoua and Chaub (2006) and Al-mulali (2011). Our results also support the presence of ELG hypothesis in MENA countries. Similarly, the coefficient of tourism is positive and statistically significant at 1% level. The magnitude of 0.329 indicates that a 1% increase in the number of international tourist arrivals increases real income in MENA countries by 0.33%. This confirms the presence of TLG hypothesis in MENA countries. This is in line to those of Gunduz and Hatemi (2005), Katircioglu (2009), Akinboade and Braimoh (2010), Lee and Brahmaserene (2013), and Tang and Abosedra (2014).

Table 2
Results of the static and dynamic panel estimations.

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Economic growth</th>
<th>POLS</th>
<th>FE</th>
<th>RE</th>
<th>Diff-GMM</th>
<th>Sys-GMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln (Y_{it-1})</td>
<td>Static estimations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln (K_{it})</td>
<td>0.199^c (0.057)</td>
<td>0.189^b (0.022)</td>
<td>0.134 (0.109)</td>
<td>0.177^c (0.096)</td>
<td>0.215^b (0.019)</td>
<td></td>
</tr>
<tr>
<td>ln (L_{it})</td>
<td>0.094 (0.279)</td>
<td>0.161 (0.067)</td>
<td>0.069 (0.316)</td>
<td>0.155 (0.201)</td>
<td>0.091 (0.172)</td>
<td></td>
</tr>
<tr>
<td>ln (OC_{it})</td>
<td>0.278^a (0.004)</td>
<td>0.309^a (0.000)</td>
<td>0.297^a (0.000)</td>
<td>0.387^a (0.000)</td>
<td>0.501^a (0.000)</td>
<td></td>
</tr>
<tr>
<td>ln (T_{it})</td>
<td>0.208^b (0.033)</td>
<td>0.329^b (0.000)</td>
<td>0.287^a (0.006)</td>
<td>0.196^b (0.000)</td>
<td>0.294^a (0.003)</td>
<td></td>
</tr>
<tr>
<td>ln (C_{it})</td>
<td>-0.309^a (0.000)</td>
<td>-0.191^c (0.052)</td>
<td>-0.179 (0.110)</td>
<td>-0.181 (0.160)</td>
<td>-0.185^b (0.017)</td>
<td></td>
</tr>
<tr>
<td>ln (PL_{it})</td>
<td>-0.465^a (0.000)</td>
<td>-0.208^b (0.014)</td>
<td>-0.134 (0.153)</td>
<td>-0.197^c (0.000)</td>
<td>-0.305^b (0.000)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-3.444^a (0.000)</td>
<td>1.709^a (0.000)</td>
<td>4.222^a (0.000)</td>
<td>7.229^a (0.000)</td>
<td>-4.733^c (0.000)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>306</td>
<td>306</td>
<td>306</td>
<td>306</td>
<td>306</td>
<td></td>
</tr>
<tr>
<td>No. countries</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.699</td>
<td>0.723</td>
<td>0.792</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breusch–Pagan LM test (p-value)</td>
<td>197.007^a (0.000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hausman test (p-value)</td>
<td></td>
<td>55.269^a (0.000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR(1) test (p-value)</td>
<td>3.252^a (0.000)</td>
<td>2.907^a (0.000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR(2) test (p-value)</td>
<td>0.561 (0.461)</td>
<td>0.309 (0.557)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hansen j-test (p-value)</td>
<td>45.292^a (0.045)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22.311 (0.321)</td>
</tr>
</tbody>
</table>

Notes: Values in parenthesis are the estimated p-values.
Breusch–Pagan LM test for random effect
Hausman test is the Hausman specification test.
AR(1) and AR(2) are tests for autocorrelation in differences.
Hansen J-test refers to the over-identification test for the restrictions in GMM estimation.
^a Coefficient significant at the 1% level.
^b Coefficient significant at the 10% level.
^c Coefficient significant at the 5% level.
In addition, the findings indicate that CO\textsubscript{2} emissions significantly cause changes in economic growth at the 10\% level. The magnitude of 0.191 implies that a 1\% rise in CO\textsubscript{2} emissions decreases economic growth in MENA countries by 0.19\%. This result is consistent with the findings of Jayanthakumaran et al. (2012), Omri (2013), and Omri et al. (2014). Finally, regarding political instability variable, we find that political instability has negative impact on economic growth at 5\% level indicating that economic growth in MENA countries reacts negatively to political instability. The magnitude of 0.208 implies that a 1\% increase in political instability decreases economic growth by 0.21\%. This is in line to the findings of Alesina et al. (1996), Jong-A-Pin (2009), and Aisen and Veiga (2013).

Since the economic behavior is dynamic in nature and in order to explain its evolution over time, the economic growth model must be dynamic. In this context, we will also estimate a dynamic panel data model using both the difference and system generalised method of moments (GMM) estimators.

3.2. Results of dynamic panel estimations
In this study, we also have a dynamic panel specification where lagged levels of economic growth are taken into account by using both diff- and Sys-GMM estimators. Consistency of the GMM estimator depends on the validity of instruments. To address this issue, we consider two specification tests: the first is the Hansen test of over-identifying restrictions, which tests the overall validity of the instruments (the null is that the instruments are valid); second is the second-order autocorrelation test for error term, which tests the null according to which there is no autocorrelation. Table 2 shows that the Hansen test for diff-GMM estimation rejects the null hypothesis of over-identifying restrictions. Therefore, we conclude that the diff-GMM estimation may not be suitable in this context and we proceed to estimate our dynamic model using the sys-GMM estimator wherein both specification tests indicate that the used instruments are valid. Accordingly, we can conclude that the sys-GMM estimation is robust and appropriate.

Based on the sys-GMM estimation, we find that one period lagged value of GDP has a positive and significant impact on its current value at 1\% level. The result is in line with Omri et al. (2014). In addition, as we show in the static estimation, capital stock, labor force, oil consumption, and international tourism plays a pivot role in the process of economic growth of MENA countries, which in turn validate the presence of ELG and TLG hypotheses in these countries. These results are consistent with the findings of Katircioglu (2009), Akinboade and Braimoh (2010), Apergis and Tang (2013), and Tugcu (2014). By contrast, CO\textsubscript{2} emissions and political instability have negative and statistically significant impacts on economic growth for MENA countries at 5\% and 1\%, respectively. The magnitude of 0.185 and 0.305 indicate that a 1\% increase in CO\textsubscript{2} emissions and political instability decreases economic growth of MENA countries by 0.19\% and 0.31\%, respectively. These results are in line with Alesina et al. (1996), Jong-A-Pin (2009), Jayanthakumaran et al. (2012), Aisen and Veiga (2013), Omri (2013), and Omri et al. (2014).

The overall findings, for both static as well as dynamic estimations, show that economic growth of MENA countries is essentially very sensitive to the level of oil consumption, international tourism, environmental quality, and political instability. Accordingly, policymakers should take into account these phenomena in order to build sound economic policies to sustain economic development.

4. Conclusions and Policy Implications
Over the last two decades, the growth performance of the MENA region as a whole, despite its natural resources richness, has been unsatisfactory and not in line with other developing countries. Compared to the other region in the world, growth rates in the region countries’
have been remarkably volatile. This volatility is only partly due to environmental degradation, political and social instability, and to wars or to the marked fluctuations in oil prices that have characterized the history over the last few decades. For these reasons, we examine the impacts of oil consumption, international tourism, CO2 emissions, and political instability on economic growth for a panel of 18 MENA countries over the period 1995-2011 using both static (FE, RE and POLS) and dynamic (Diff- and Sys-GMM) estimations.

The empirical results, for both estimations techniques, show that increases in oil consumption and international tourist arrivals are the major drivers of economic growth in MENA countries indicating the presence of ELG and TLG hypotheses. We also find that economic growth of MENA countries reacts negatively to environmental degradation and political instability. The main policy implications arising from our study can be presented as follows. First, based on the impacts of oil consumption and CO2 emissions on economic growth of MENA countries, it is good for policymakers to develop energy policies considering environmental-friendly oil consumption technology. Thus, it will not harm economic growth. Then, these countries can use solar energy as the substitute of oil in order to protect environment and realize sustainable economic growth. Second, policymakers in MENA region need to take measures to enhance governance, including efforts to develop the quality of public services and to curb corruption as one of the main preconditions to create cooperation legally into their economies which is essential to create a better business and investment climate. This by enhancing good governance and better economic institutions including strengthening the effectiveness and predictability of judiciary, enforceable contracts and the rule of law, drying up the root causes of corruption and rent seeking, and developing an environment where fair and predictable rules form the basis for social and economic interactions. They also should take measures to promote political stability which will further attract more international tourist arrivals, which in turn can lead to accelerate the process of economic growth in the region.

References


