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RESEARCH NOTE

IS TOURISM IN LEBANON SUBJECT TO PERMANENT OR TRANSITORY EXOGENOUS SHOCKS?

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The tourism industry makes a significant contribution to Lebanese gross domestic product (GDP). Lebanon has been rocked by political instability and regional conflicts over the past several decades. These exogenous shocks can adversely affect visitor arrivals. Using monthly data from 2008 to 2013, this article attempts to identify some statistically significant shocks to visitor arrivals to Lebanon and their nature (i.e., whether or not the impact of the shocks was temporary). The empirical analysis based on univariate as well as panel unit root testing procedures, where structural breaks are endogenously determined, suggests that at least one exogenous shock has significantly affected tourist arrivals to Lebanon. However, in overall terms, the impact of these shocks on visitor arrivals has been temporary.

Key words: Structural breaks; Unit root tests; Tourism; Lebanon; Visitor arrivals

Introduction

The tourism and travel industry worldwide makes a significant contribution to the world economy through job creation. In 2013, the tourism and travel industry accounted for approximately 8.9% of worldwide employment (World Travel and Tourism Council [WTTC], 2014). The tourism and travel industry contributes to the economy through direct as well as indirect channels. The direct channel involves consumer spending on tourism and travel, whereas the indirect channel involves investment spending on travel and tourism as well as growth in supporting industries. While worldwide tourism has registered strong growth over time, its trajectory has not always been smooth. For example, the September 11 terrorist attacks in the US resulted in a 17% fall in the number of
determined, we attempt to evaluate whether the shocks to visitor arrivals are permanent or transitory. We test the hypothesis that exogenous shocks have transitory effect on the number of arrivals to Lebanon. We use both univariate and panel unit root testing procedures.

The rest of this article is organized as follows. Section 2 contains a brief review of the related literature. Section 3 includes a discussion of the methodology used. Empirical results are presented and discussed in section 4. Section 5 contains some concluding remarks and policy implications.

Literature Review

Using unit root testing procedures, a number of empirical studies have examined whether or not the impact of exogenous shocks on variables like visitor arrivals is transitory or permanent. Early studies such as Bhattacharya and Narayan (2005) used univariate and panel unit root tests to examine the presence of a random walk hypothesis on tourist arrivals to India. However, they ignored the possibility of structural breaks. Their work suggests that external shocks do not have a permanent impact on tourist arrivals to India. Lean and Smyth (2009) utilized the Lagrange multiplier (LM) unit root tests with 1–2 structural breaks to investigate the impact of shocks on tourist arrivals to Malaysia. They concluded that the impact of shocks on the number of visitor arrivals to Malaysia was transitory. Using Zivot–Andrews unit root test on monthly data, C. G. Lee (2010) examined the issue of shocks to tourist arrivals in Singapore and concluded that shocks to visitor arrivals in Singapore were permanent. In addition to using univariate tests, Smyth, Nielsen, and Mishra (2009) also used LM-based panel unit root tests with 1–2 structural breaks to test whether tourist arrivals to Bali were subject to permanent or transitory shocks. The univariate LM unit root tests with 1–2 structural breaks fail to reject the null hypothesis of a unit root. However, the LM test applied to a panel of Bali’s 11 major source markets support the alternative hypothesis of a joint trend-stationary series with transitory shocks. Saleh, Verma, and Ihalanayake (2011) used both univariate and panel unit root tests with structural breaks to determine the number and the location of structural breaks in visitor arrivals to...
Thailand. They found that shocks to tourist arrivals to Thailand were transitory.

As indicated earlier, despite the importance of the tourism industry in Lebanon, the issue of exogenous shocks and their effects on tourist arrivals has not received much attention. This article aims to investigate the effect of external shocks on tourist arrivals to Lebanon from its major sources (the Arab countries and expatriate Lebanese).

Earlier studies in this area used the traditional augmented Dickey–Fuller (ADF) univariate unit root test and Im, Pesaran, and Shin (2003) panel unit root tests. However, these methods ignore the possibility of structural breaks in visitor arrivals. Using univariate and panel unit root testing procedures, this article takes structural breaks into account.

Methodology

Most earlier studies in this area ignored the presence of structural breaks and used ADF, KPSS, Phillips–Perron, and Schmidt–Phillips unit root tests. However, it is well known that ignoring the presence of structural breaks in the intercept and/or the slope when testing for a unit root in a single time series can lead to significant loss of power (Perron, 1989). The literature on unit root tests with structural breaks has grown in different directions. Some tests allow for exogenous breaks (Perron, 1989), some allow for endogenous breaks but only under the alternative hypothesis of stationarity (Banerjee, Newbold, and Chu (2002) and Im et al. (2003) (hereafter IPS), and are panel versions of the Dickey-Fuller test. However, extensions of univariate unit root tests with breaks to the panel framework have been limited. Even in a panel setting ignoring the structural breaks leads to loss in power. The recent test proposed by Im, Lee, and Tieslau (2005) (hereafter ILT) is a panel version of the LM unit root test. The ILT allows for a finite number of level shifts. As simulations suggest that the ILT test is not only robust to the presence of structural shifts but is also relatively more powerful than the IPS test, we make use of the former test.

Univariate LM Unit Root Test: LS Test

The LM unit root test proposed by J. Lee and Strazicich (2003, 2004) allows for breaks under both the null and the alternative hypothesis in a consistent manner. It is based on a data generating process given by equation (1) as follows:

\[ y_t = \delta Z_t + \epsilon_t, \quad \text{with} \quad \epsilon_t = \beta \epsilon_{t-1} + \epsilon_t \]  

where \( Z_t \) is a vector of exogenous variables and \( \epsilon_t \) is an iid Gaussian error term.

In the following, we consider a model that allows for two changes in level and trend: \( Z_t = [1, t, D_{t}, D_{t-1}, D_{t-2}, DT_{t}, DT_{t-1}, DT_{t-2}] \), where \( D_{t} \) and \( DT_{j} \) for \( j = 1, 2 \) are dummies with \( D_{t} = 1 \) for \( t \geq T_{0} + 1 \) and 0 otherwise and \( DT_{j} = t - T_{bj} \) for \( t \geq T_{bj} + 1 \) and 0 otherwise. \( T_{bj} \) denotes the \( j \)th break date. The DGP given in equation (1) allows for breaks under the null (\( \beta = 1 \)) and the alternative (\( \beta < 1 \)). Lee and Strazicich (2003) use the following regression to obtain the LM unit root test statistic:

\[ \Delta y_t = \delta' \Delta Z_t + \phi \tilde{S}_{t-1} + \sum_{j=1}^{t} \gamma_j \Delta \tilde{S}_{t-j} + u_t \]  

where \( \tilde{S}_t = y_t - \bar{y} - Z_t \bar{S} \) for \( t = 2, \ldots, T \) is the detrended series. \( \bar{S} \) are the coefficients from the regression of \( \Delta y_t \) on \( \Delta Z_t \). \( \bar{y} = y_1 - \bar{Z} \bar{S} \) where \( y_1 \) and \( Z_t \) correspond to the first observations.

The lagged terms \( \Delta \tilde{S}_{t-j} \) are included to correct for serial correlation. The value of \( k \) is determined using the general to specific procedure assuming a maximum number of lags equal to 6. From equation (2), the LM unit root test statistic consists in
testing the null hypothesis $\phi = 0$; hence it is a standard student test.

**Panel LM Unit Root Test: ILT Test**

The panel unit root test proposed by Im et al. (2005) allows for breaks under both the null and the alternative hypotheses. It is based on a data generating process that is given by:

$$y_{it} = \delta'Z_{it} + e_{it}, \quad e_{it} = \beta_i e_{it-1} + \epsilon_{it}$$

where $i = 1, \ldots, N$ represents the cross section of countries, $t = 1, \ldots, T$ represents the time period, $Z_{it}$ is a vector of exogenous variables, and $\epsilon_{it}$ is an iid Gaussian error term that allows for heterogeneous variance structure across cross-sectional units but assumes no cross-correlations.

The parameter $\beta_i$ allows for heterogeneous measures of persistence. In the following, we consider a model that allows for two changes in level: $Z_{it} = [1, \ t, \ D1_{it}, \ D2_{it}]$, where $Dj_{it}$ for $j = 1, 2$ are dummies that, respectively, capture the first and second structural break with $Dj_{it} = 1$ for $t \geq T_{bj} + 1$ and 0 otherwise. Note that $T_{bj}$ denotes the $j$th break date.

The test for the unit root null hypothesis is based on the parameter $\beta_i$. The null hypothesis of unit root for all countries is given by $H_0: \beta_i = 0$ for all $i$, against the alternative $H1: \beta_i < 0$ for some $i$. The panel LM statistic is obtained by averaging the optimal univariate LM unit root test statistic for each country. ILT involves estimating equation (4) for each country as follows:

$$\tilde{\tau}_i = \frac{1}{N} \sum_{t=1}^{T} \bar{\tau}_{ij}$$

where $\bar{\tau}_{ij}$ denotes the $j$th break date. This allows one to estimate LM statistic as follows, where $E(\bar{\tau}_{i})$ and $V(\bar{\tau}_{i})$, respectively, are the expected value and variance of $\bar{\tau}_{i}$ under the null hypothesis.

$$LM = \frac{\sqrt{N[T - E(\bar{\tau}_{i})]}}{\sqrt{V(\bar{\tau}_{i})}}$$

Im et al. (2005) provide the numerical values for $E(\bar{\tau}_{i})$ and $V(\bar{\tau}_{i})$ and prove that the asymptotic distribution of equation (7) is a standard normal, which is not affected by the presence of structural breaks.

**Empirical Results**

The LM univariate and panel unit root tests with one and two breaks are applied to monthly international visitor arrivals to Lebanon from Yemen, Kuwait, Qatar, Algeria, Bahrain, Oman, United Arabs Emirates (UAE), Tunisia, Egypt, Jordan, Morocco, Syria, Iraq, Saudi Arabia, and expatriate Lebanese over the period January 2008 to December 2013. It is important to treat each source market separately as the tourism demand studies suggest that different source markets may respond differently to a particular shock (Narayan, 2004). However, we also test the presence of unit root in total arrivals and total Arab arrivals to Lebanon. All the data used in this article are converted to natural logarithm. The transformed data are presented in graphic form in Figures 1 and 2.

**Findings**

The univariate unit root tests proposed by J. Lee and Strazicich determine both the number and location of structural breaks in each time series. In stage 1, we conduct the J. Lee and Strazicich (2004) one-break minimum LM unit root test. If the null hypothesis of unit root with one break is rejected then we conduct the Lee and Strazicich (2003) two-break minimum LM unit root test to verify whether tourist arrivals to Lebanon are stationary with two
breaks. The optimal lag length is selected by using the general to specific procedure, where a maximum of six lags were allowed. The results of these tests are shown in Table 2.

The estimated results presented in Table 2 suggest that tourist arrivals to Lebanon from all 15 major sources are subject to structural breaks. Additionally, tourist arrivals are found to be stationary with two breaks. For instance, the unit root null hypothesis is rejected at the 1% level of significance for tourist arrivals to Lebanon from all 15 major sources. The structural break dates coincide with a series of bombings and assassinations that hit Lebanon. Most of these terrorist attacks occurred in and around the capital Beirut. This wave of bombings began with the assassination attempt on a member of parliament (Mr. Marwan Hamadeh) on October 1, 2004. This was followed up with the assassination of former Prime Minister Mr. Rafiq Hariri on February 14, 2005. Several more bombings struck Lebanon around the same time. A complete list of bombings and assassinations that occurred in Lebanon between 2008 and 2013 is included in the Appendix.

As indicated earlier, it is now well known that univariate unit root tests have low power when the sample size is small. The main advantage of the panel unit root tests with breaks is that they add the cross section dimension, which increases the sample size. The results of the panel unit root tests with one and two breaks applied to the full panel of 15 countries are shown at the bottom of Table 2.

Table 1
Notable Exogenous Shocks to the Lebanese Economy (2008–2013)

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 15, 2008</td>
<td>A US diplomatic vehicle was targeted. The bombing killed four civilians and injured 16.</td>
</tr>
<tr>
<td>January 25, 2008</td>
<td>Assassination of captain Wissam Eid who was a senior terrorism investigator of the Lebanese Internal Security Forces.</td>
</tr>
<tr>
<td>August 13, 2008</td>
<td>Sixteen people, including seven Lebanese soldiers, were killed by a bomb targeting a civilian bus in Tripoli.</td>
</tr>
<tr>
<td>September 10, 2008</td>
<td>A politician of the Lebanese Democratic Party, Saleh Aridi, was killed in a car bomb.</td>
</tr>
<tr>
<td>September 29, 2008</td>
<td>Five people, including four soldiers, were killed and 35 were injured by a car bomb that destroyed a bus in Tripoli.</td>
</tr>
<tr>
<td>March 23, 2009</td>
<td>The deputy representative of the Palestinian Liberation Organization (PLO) in Lebanon and a former Fatah intelligence chief in the country (Kamal Naji, also known as Kamal Medhat) was killed by a roadside bomb.</td>
</tr>
<tr>
<td>October 19, 2012</td>
<td>Three people, including the head of the information branch of Lebanon’s Internal Security Forces (General Wissam al-Hassan), were killed in a car bomb in Achrafieh district of Beirut. This bombing also injured 120 others.</td>
</tr>
<tr>
<td>July 9, 2013</td>
<td>Fifty-three people were injured by a car bomb in Bir El Abed neighborhood of Beirut.</td>
</tr>
<tr>
<td>August 15, 2013</td>
<td>Twenty-seven people were killed and over 300 injured in an attack that targeted the Roueiss neighborhood of south Beirut.</td>
</tr>
<tr>
<td>August 23, 2013</td>
<td>Sixty-two people were killed and over 400 injured by two car bombs planted in front of two Mosques in Tripoli. The former General Director of the Lebanese Internal Security Forces, Ashraf Rifì, was believed to be one of the main targets.</td>
</tr>
<tr>
<td>November 19, 2013</td>
<td>A large explosion near the Iranian cultural centre in the southern suburbs of Beirut killed at least 22 people and injured 146.</td>
</tr>
<tr>
<td>December 27, 2013</td>
<td>Muhammad Chatah, a former Finance Minister of Lebanon, was killed in a car bombing in Beirut. Seven ordinary citizens were also killed in this bombing.</td>
</tr>
</tbody>
</table>
Figure 1. Arrivals by nationalities to Lebanon.
Figure 1. (Continued)
Table 2
Results of LS and ILT Tests

<table>
<thead>
<tr>
<th>Countries</th>
<th>Test</th>
<th>Break Dates</th>
<th>k</th>
<th>Countries</th>
<th>Test</th>
<th>Break dates</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LS test</td>
<td></td>
<td></td>
<td></td>
<td>ILT test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total arrivals</td>
<td>−6.936*</td>
<td>2011:01</td>
<td>5</td>
<td>Total Arab arrivals</td>
<td>−6.291*</td>
<td>2011:01</td>
<td>5</td>
</tr>
<tr>
<td>Lebanon</td>
<td>−6.626**</td>
<td>2011:03</td>
<td>5</td>
<td>Tunisia</td>
<td>−9.776*</td>
<td>2009:06</td>
<td>0</td>
</tr>
<tr>
<td>Kuwait</td>
<td>−6.525*</td>
<td>2010:09</td>
<td>5</td>
<td>KSA</td>
<td>−9.321*</td>
<td>2009:11</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>−5.897*</td>
<td>2010:01</td>
<td>2</td>
<td>Jordan</td>
<td>−6.994*</td>
<td>2010:12</td>
<td>5</td>
</tr>
<tr>
<td>Qatar</td>
<td>−5.467*</td>
<td>2012:06</td>
<td>0</td>
<td>Morocco</td>
<td>−7.470*</td>
<td>2009:12</td>
<td>0</td>
</tr>
<tr>
<td>Bahrain</td>
<td>−6.153*</td>
<td>2011:01</td>
<td>5</td>
<td>Algeria</td>
<td>−9.253*</td>
<td>2009:06</td>
<td>0</td>
</tr>
<tr>
<td>Oman</td>
<td>−6.101*</td>
<td>2009:05</td>
<td>0</td>
<td>Iraq</td>
<td>−7.039*</td>
<td>2008:09</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>−5.799*</td>
<td>2012:05</td>
<td>0</td>
<td>Syria</td>
<td>−5.389*</td>
<td>2010:01</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>−7.139*</td>
<td>2008:07–2009:03</td>
<td>0</td>
<td>Syria</td>
<td>−7.139*</td>
<td>2008:07–2009:03</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: *and ** denote rejection of the null of unit root with breaks at the 1% and 5% significance level, respectively. The 1%, 5%, and 10% critical values for the panel LM test with a break, respectively, are −2.326, −1.645, and −1.282. The maximum number of lags (k) for all the tests is set to 6.
good news as tourism makes a very large contribution to GDP.

Conclusion

Tourism sector plays an important role in Lebanon’s economy. In recent years, the Lebanese economy has been hit by a number of domestic political and external shocks. The external shocks are closely linked with regional conflicts. However, none of the existing studies have empirically evaluated the impact of these shocks on Lebanon’s tourism industry.

Using some relatively recently developed unit root testing procedures, this article aims to identify the location and number of structural breaks in visitor arrivals to Lebanon. We focus on monthly visitor arrivals over the period 2008 to 2013 from a number of Arab countries as well as Lebanese expatriates. The analysis presented is based on both univariate and panel LM-based unit root tests with structural breaks. Our empirical results suggest that visitor arrivals to Lebanon are characterized by a stationary process that is subject to two structural breaks. These breaks coincide with a series of bombings and assassinations that struck Lebanon during the sample period. Based on the results presented, it can be argued that exogenous shocks only have a transitory effect on visitor arrivals to Lebanon.

This result has important policy implications. Any negative shock to the tourism industry in Lebanon, such as terrorist attacks, will only have a transitory effect and hence investment in Lebanon’s tourism infrastructure is not necessarily a bad idea. However, these findings also suggest that any policy that aims to increase tourist arrivals from Arab countries will also have a transitory effect. Such policies will initially increase demand for tourism-related services but the impact of these policies will dissipate over time. Hence, this study argues that Lebanese government needs to take effective steps to further diversify its economy.

Acknowledgments

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Notes


2Arab arrivals include visitors from Yemen, Kuwait, Qatar, Algeria, Bahrain, Oman, United Arabs Emirates (UAE), Tunisia, Egypt, Jordan, Morocco, Syria, Iraq, and Saudi Arabia.

3For instance, Perron (1989) shows that the standard ADF tests are biased towards the non-rejection of the null hypothesis of unit root in the presence of structural changes.

References


