Title: A question of confidence. Is tourism as vulnerable to civil unrest as we think? A comparative analysis of the impact of Arab Spring on total reserves and tourism receipts.

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Abstract

This paper uses monthly data to compare how international tourism receipts and the overall economy responded to the Arab Spring Total Reserves were used as an indicator of the economy overall, because they reflect confidence in the economy through such factors as Foreign Direct Investment and the effects of capital flight. To examine the response, interrupted time series was employed, using the outbreak of Arab Spring as the key interruption. To separate the impact of Arab Spring from other events, two treated and two untreated cases were selected. The results show that tourist spending recovered faster than the overall economy.

Key Words: Political instability, Revolution, total reserves, tourism, resilience

Section 1: Introduction

Political stability is one of the key underlying needs for successful tourism growth. Irrespective of the positive attributes of a destination, tourism is susceptible to the presence or perception of political instability and violence (Alluri 2009, Sonmez 1998). Tourism has been singled out as being particularly vulnerable to political shocks and acts of terrorism because it is an industry based on consumer faith and safety (Mansfield and Pizam 2006, Mushtaq and Zaman 2014). There is undoubtedly some truth in such perceptions; it is often easy for tourists to find alternative destinations where there is no political upheaval. However, focusing on tourism in isolation may be misleading. The systematic risk (e.g. political instability) affects all tourism sectors and businesses directly or indirectly affected by changes in tourism demand, as well as economic sectors independent of tourism activities. Comparing the resilience of tourism receipts and Total Reserves, underpins the aim of this study; Total Reserves were selected for the reasons explained below.

Total Reserves are defined as “holdings of monetary gold[1], special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities”. Total Reserves reflect confidence in the economy and its governance

[1] The gold component of these reserves is valued at year-end (December 31) London prices. Data are in current U.S. dollars” (World Bank, https://datacatalog.worldbank.org/total-reserves-includes-gold-current-us-1).

through such factors as exports, Foreign Direct Investment (FDI) and the effects of capital flight, all of which are impacted by political instability (Lensik and Morrissey 2000). Foreign investors may generally be prepared to take higher risks in pursuit of higher returns, but evidence suggests that political shocks and violence have significant effects on the investment climate and appetite for trade. For instance, Bekaert *et al* (2014) claim that a 1% point change in political risk spreads (of which internal conflict was a major factor) can result in a 12% change in the level of Foreign Direct Investment. Changes in Total Reserves affect the money supply, which affects interest rates, which, in turn affects the nominal exchange rate and hence, the domestic consumer price index (Keating 1985). Governments use Total Reserves to provide a buffer to meet the demands of imports, including basic necessities, such as grains and oil, when production is interrupted through events such as civil unrest or revolution. Central Banks' reserves act as a buffer to mitigate financial risk. It enables banks to offset the pressure during difficult times, such as when there is a large demand on withdrawals by the depositors, capital flight, credit defaults, instability in the currency market and flight from soft to hard currencies. Insufficient Total Reserves leaves countries vulnerable to direct and indirect hybrid threats (Hillingdon, 2019). Insufficient money supply challenges job security, including law enforcement staff, and therefore, has implications for national security, more so in countries located in unstable regions. It is inevitable that insecurity damages international reputation, affects credit rating and can push them below investment grade, which in turn further affects FDI, tourism, and trade more broadly. This vicious circle reduces Total Reserves further.

The simultaneous production and consumption of tourism means that tourists have to travel to the destination for production to take place, whereas investors can invest at arm's length (Fletcher et al, 2018). This might suggest that tourism would have greater volatility and slower recovery paths than the wider economic confidence indicator of Total Reserves, but this may not be the case. The rest of this paper provides a working definition for "revolution" and a brief overview on the impact of revolutions, followed by an explanation of the

methodology used and the results obtained. Finally, the paper concludes with the implications of the findings.

Section 2: Political instability, revolution and their impact

Political instability is an umbrella term embracing a multitude of events including revolution, terrorism and interstate war (World Bank 2017a). Jong-A-Pin (2009) asserts that it is multi-dimensional. It is imperative to distinguish between the components of political unrest because each hold different properties. The concept of revolution has been subject to debate over the years and there have been many attempts to identify its characteristics and put forward a universally accepted definition (see for instance: Kautsky 1902, Small 1912, Ellwood 1912, Adams 1913, Le Bon 1913, Yoder 1926, Arendt 1963, Davies 1962, Friedrich 1966, Tanter and Midlarsky 1967, Eckstein 1968, Kuhn 1962, Schrecker 1966, Gurr, 1970, Dunn 1972, Kramnick 1972, Johnson 1982, Greene 1990, Goldstone 1994, Holmes 1996, Goldstone 2001, Foran 2005, Selbin 1993 and 2006, Lawson 2012, DeFronzo 2014, Lynch 2013, Gunning and Barron 2013, Cole 2015).

Because revolution is a concept that refers to the behaviour of society, each revolution can be seen to be unique and, therefore, the concept cannot have a rigid definition. When the term “revolution” is used, it should come with a “descriptor” clarifying which revolution is being discussed as this provides the context e.g. the French Revolution, the Russian Revolution, the Great Syrian Revolution, the Arab Revolution, the Iranian Revolution or Arab Spring. This study focuses on Arab Spring characterised by mass civil unrest, violence, changes of government and its regional spread.

Revolutions bring political, social and economic impacts. A considerable amount of literature has been published on the impact of political instability (PI) on economies, although less so on revolution (e.g. Hibbs 1973, Venieris and Gupta 1986, Londegran and Poole 1990 and 1991, Barro and Wolf 1991, Alesina et al. 1996, Alesina and Perotti 1996, Carmignani 2003, Cerra and Saxena 2008, Polachek and Sevastianova 2012). Some of the approaches of

measuring the effects of PI and revolution on economies have been challenged (e.g. Campos and Nugent 2002, Carmignani 2003, Cochrane 2004, De Haan 2007, Cerra and Saxena 2008, Jong-A-Pin 2009). In spite of the differences in approach, the literature, with some exceptions (Abel and Eberly 1995, Serven 1998, Annett 2000, Asteriou and Price 2000a), has proffered the notion that there is an inverse relationship between PI and economic growth (e.g. Riedl 1999, Murphy et al. 1991, Barro and Sala-i-Martin 1995, Mauro 1993, Alesina et al. 1996, Darby et al 2004, Annett 2000, Acemoglu and Robinson 2000, Carmignani 2003, Jong-A-Pin 2009, Aisen and Veiga 2013, Shahzad et al. 2016). Barro and Wolf (1991), Barro and Lee (1993) and Knack and Keefer (1995) identified that revolution impedes investment and thereby decreases economic growth. Knack and Keefer (1995) found that changes to property rights have a greater effect on growth than had previously been thought. The literature argues that impacts are relative and depend on the probability of maintaining ownership, where a business can lose none, some or all of its property rights, and the uncertainty related to policy changes (Barro and Sala-i-Martin 1995, Carmignani 2003). The size and structure of the economy are also said to have an inverse relationship with the magnitude and length of the economic impact (Bloomberg et al. 2004, Polachek and Sevastianova 2012). Pastor and Veronesi (2013) found that the magnitude of the risk premium is inversely related to the strength of the economy. Of relevance to this study of Arab Spring, Hanke (2016) points out that property rights have always been tenuous in the MENA region, even in the absence of revolution.

Macroeconomic studies have tried to assess the effectiveness of government interventions, both fiscal and monetary, in reducing the economic impact of political instabilities (Wolff *et al,* 2006, Perotti 2005, Blanchard and Perotti 2002). But, it is doubtful if such remedies can be successful unless political stability is regained and violence addressed (Fielding and Shortland 2005). Fielding and Shortland (2005) demonstrate that the relationship between political violence and the consequent flight from domestic to foreign currencies can reduce public holdings as governments try to defend the exchange rate. The currency devaluations

(The Economist, November 3, 2016, Financial Times, January 3, 2017) by Egypt in 2016 and Turkey in 2017 are examples of interventions where the economic prospects remained challenging in the presence of PI and violence. Overall, the extent of the Political Impact largely depends on the perceived threat level to property and lives, government control of violence and the structure of the economy. The key question however, remains as to whether tourism is more susceptible to civil unrest and violence than the wider economy, hence, the following methodology has been put forward to compare the resilience of tourism and Total Reserves.

Section 3: Data and Methods

The Arab Spring cannot be considered as a natural experiment (Angrist 1990) given the external factors (e.g. the Global Financial Crisis, oil price volatility, the rise of the Islamic State) but can be seen as a quasi-experiment. The Arab Spring was of such magnitude that it provides an event from which it is possible to compare the effects of political instability (revolution) on international tourism receipts and total reserves. It was a major event, it impacted several countries, with similar economic structures, language and culture over a specific time period.

The impact of revolution on the confidence of tour operators, tourists, foreign investors, traders can be assessed by looking at the individual components and by looking at the wider economy in its entirety. Tourism confidence can be measured by changes in international tourist arrivals and receipts. Tourist arrivals would have been a good proxy for tourism activity, but these on their own, would not show whether there was significant discounting taking place to offset the lack of confidence felt by tourists. As seasonally adjusted[2] monthly tourist arrival figures were available they satisfy the need for high frequency variables, and

[2] This is similar to the method used by the office national statistics in the UK, ONS.

these were used along with average spending per visitor to estimate average monthly international tourist spending.

The impact of revolution on the wider economy can be seen through changes in Total Reserves. Total Reserves also reflect such aspects as the rationing of foreign exchange, caps on imports, changes in exchange rates, interest rates, decreasing FDI and capital flight, Special Drawing Rights and holdings in gold.

Four countries in the MENA Region were selected for this study, which had tourism industries that were responsible for at least 5% of their total gross domestic product. To be able to separate the effect of Arab Spring from other external factors, Egypt and Tunisia were chosen as the treated cases because, Arab Spring brought about a regime change and violence, followed by a period of relative stability, to allow for a cut-off point, to examine the recovery period. Morocco and Oman were selected because the uprisings inspired by Arab Spring were more focused on reform rather than revolution, consequently they did not experience regime changes and suffered relatively little violence. These four countries provided the study with a spectrum of political instability experiences across the region, ranging from the relative stability of Oman to the turbulence of Egypt. Table 1 shows the average political stability index for the four countries during the period immediately prior to Arab Spring (2005-2010). The data used for this analysis were acquired from the Global Economic Monitor (GEM), (World Bank 2017b) and tourism office for the period of 2008 to 2018.

[Table 1 around here]

To examine the effect of revolution on international tourism receipts and Total Reserves interrupted times series (ITS) was employed (Linden and Arbor 2015). The impact of large-scale interventions, for example, policy change, can be captured using ITS (Campbell and Stanley 1966, Shadish et al 2002, Linden and Arbor 2015). For the theoretical consistency, the strategy to fit the interruption (intercept and slope dummies) was based on the key shock of Arab Spring and the calendar of political events. It was assumed that any confounding effect, excluding the revolution, will not be as abrupt; thus, the immediate and pronounced fall in international tourism receipts and Total Reserves would indicate that the intervention was initiated by Arab Spring. The data were examined to ensure the resulting trend was not present before the intervention took place.

As the effect of Arab Spring is likely to be spread over more than one period, the Newey-West method was employed to obtain standard errors, corrected for autocorrelation of AR(1) or higher order, but residuals produced by ITS models are unaffected by these corrections, which carry the small-scale disturbances in the parent series. The data used in the analysis are in their levels and appear to be integrated of order one, I(1). It is argued that the unit root test, in the presence of structural breaks (i.e. the effect of Arab Spring) will be biased towards accepting the null hypothesis of unit root test (Gujarati and Porter 2009, Barunik 2010). This study examines the effects of shocks on each series and it is not concerned with cointegration, hence, if the series become stationary (differentiated) then the effect of shocks on the series will be lost. It was expected that the residuals from these series become stationary after fitting the dummy variables. The residuals produced by ITS were checked using the Augmented Dick Fuller test (ADF). The hypothesis that the residuals are nonstationary was rejected in all models. In time series stationarity does not suggest the absence of heteroscedasticity, the presence of heteroscedasticity in the residuals will suggest that there are some outliers. The residuals were checked for the presence of ARCH effect. The null hypothesis that there is no ARCH was rejected for international tourism receipts but not rejected for Total Reserves.

Section 4: Results

Section 4.1: Segmented Regression, Total Reserves

Monthly data from 2008 to 2018 were selected for analysis to provide enough observations for the periods before and after AS. The results of these analyses are shown in Table 2 and Figure 1. Equation 1 presents the model, which includes two breaks.

$$Y_t = \beta_0 + \beta_1 T_t + \beta_2 X_{1t} + \beta_3 X_1 T_t + \beta_4 X_{2t} + \beta_5 X_{2t} T_t + \varepsilon_t \quad (1)$$

Where:

Y_t	the dependent variable: Total Reserves
β_0	the intercept of the baseline at t=0
T_t	time since the start of study trend
$\beta_1 T_t$	the slope before AS
X_{1t}	the intercept dummy
β_2	the coefficient for the intercept dummy
$X_1 T_t$	slope dummy
β_3	the coefficient for the slope dummy
⋮	
ε_t	the error term residuals

Substituting the values (Table 2) of the intercept and slope coefficients:

$$TRs = 32994.31_{08.01} + 55.50T_{08-11} - 7707.74X_{11.02} - 656.47XT_{11.02} + 7626.80X_{13.07} +$$

$$588.00\, XT_{13.07} + 6559.20\, X_{16.01} + 1202.20\, XT_{16.01} \quad (2)$$

Equation 2 has the expected signs. It suggests at the starting level β_0 the Total Reserves were 32,994.31 US$M, and were increasing, on average, by 55.5 US$M monthly. Following the first break at February 2011(β_2) there is a significant decrease of -7,707.74 US$M, a quarter of its 2008 value. The coefficient of the slope dummy for this period β_3 suggests a decrease of Total Reserves of -656.4674 US$M per month. The second break in July 2013 coincides with the coup d'état in Egypt, where President Sisi took control, being the end of the period over which the major effects of Arab Spring were felt. The final break (2016) shows a significant increase both in level and trend (β_4, β_5), at a lower level than pre-Arab Spring, but then exceeding the pre–Arab Spring level by the end of 2017. The 'smile-shaped' area represents the loss had the trend line in 2010 continued (Figure 1a). This is in spite of the fact that Egypt received several aid packages and significantly increased its Special

Drawing Rights with the IMF (e.g. 23 US$ billion within 18 months of the Coup, Reuters 2015).

The Tunisia case has three breaks fitted:

$$Y_t = \beta_0 + \beta_1 T_t - \beta_2 X_{1t} - \beta_3 X_1 T_t + \beta_4 X_{2t} + \beta_5 X_{2t} T_t - \beta_6 X_{3t} - \beta_7 X_{3t} T_t + \varepsilon_t \qquad (3)$$

Substituting the coefficients' values (Table 2):

$$TRs = 8408.27 + 45.14 T_{08-11} - 777.12 X_{10.11} - 187.21 T_{10.11} + 316.22 X_{12.06} + 173.35 T_{12.06} - 667.82 X_{15.04} - 99.35 XT_{15.04} \quad (4)$$

Equation 4 has the expected signs. It suggests at the starting level β_0 the Total Reserves stood at 8,408.27 US$M and were increasing by 45.14 US$M per month. Following Arab Spring (also known as Jasmine Revolution) in Tunisia, the constant term β_2 is negative and significant. The estimated slope coefficient, β_3 suggests it is significantly (-187.21) lower than pre-Arab Spring despite the fact pre-Arab Spring was bearing the brunt of the financial crisis. The estimated slope coefficient for the second break, in June 2012, suggests there is a positive but insignificant intercept dummy β_4 and a significant increase in the slope dummyβ_5, showing early signs of recovery. However, a number of terrorist attacks in 2015 proved costly. Both the constant β_6 and slope β_7 coefficients for the final break are negative and significant. This is the period that coincides with the Bardo Museum attack, which was followed by the Sousse Beach attack (Figure 1b). Tunisia's image was further damaged by the fact that it emerged as a top breeding ground for recruits for the Islamic State (Bremmer 2017) and its credit rating by Moody dropped further because of its weak fiscal situation (Kassem,2017).

[Table 2 around here]

For Morocco, four breaks were fitted, two breaks preceding the AS and two following the AS (equation 5 and 6).

$$Y_t = \beta_0 + \beta_1 T_t - \beta_2 X_{1t} - \beta_3 X_1 T_t + \beta_4 X_{2t} + \beta_5 X_{2t} T_t - \beta_6 X_{3t} - \beta_7 X_{3t} T_t - \beta_8 X_{4t} + \beta_9 X_{4t} T_t + \varepsilon_t \quad (5)$$

Substituting values (Table 2):

$$Y_t = 24693.65 + 350.20\, T_{08-11} - 929.20 X_{08.08} - 2283.13 X T_{08.08} + 1169.16 X_{08.11} + 1979.19 T_{08.11} + 1554.921 X_{11.03} - 527.56 X T_{11.03} + 184.53 X_{12.08} + 629.39 T_{12.08} \quad (6)$$

Morocco's Total Reserves growth was impacted by the 2008 Global Financial Crisis, there is a significant drop in both the level and slope at August 2008, a slight recovery was experienced towards the final quarter of that year. The post-intervention linear trend[3]: $\beta_1 T_t + \beta_3 X_1 T_t + \beta_5 X_{2t} T_t$ suggests a positive increase, which was insignificant. There is a negative level shift post-Arab Spring, that is short lived, with positive estimated slope coefficients, post-revolution breaks. The relative magnitude of the drop is much smaller than that experienced in Egypt and Tunisia. Morocco did not experience the eruption of violence experienced by Egypt and Tunisia. Morocco reduced some of its political pressure by allowing the country to transition from the height of unrest, early in 2011, and experienced the least amount of damage (Financial Times, December 23, 2014). The first recovery sign appears in mid-2012, with a positive post-intervention trend that continues towards 2018. The security challenges elsewhere in the MENA region provided a vacuum of opportunity for Morocco. This, together with the recovery from the global financial crisis, which had affected Morocco's trading partners, such as France and USA, also stimulated Foreign Direct Investment in Morocco. Figure 1c shows the impact of Arab Spring on Morocco's Total Reserves, after which there is a trend of strong recovery with two brief downturns in 2014 and 2016.

The synchronous break with AS for Oman shows that there is an insignificant negative change in both the intercept and slope (Figure 1d).

[Figures 1a, 1b, 1c and 1d around here]

[3] Linear combinations of estimators

International Tourism Receipts

The analysis of the effects of Arab Spring on international tourism receipts follows the same procedure as that undertaken for total reserves. Three breaks (Figure 2a) were fitted for Egypt's international tourism receipts following the January 2011 revolution; February 2011, July 2013 where there was a *coup d'état* and the October 2015 Russian Metrojet attack in the Sinai region. The results suggest, there were instant losses of 431US$M, 387US$M and 535$USM following each break, respectively. The slope is slightly negative following Arab Spring and the magnitude of the fall in receipts is higher in response to the Metrojet attack, which was directly aimed at tourists and Russia; Russia has been a key tourism market for Egypt.

Tourism's response is shown by the reaction following each break; a sharp fall, which is then followed by a positive recovery period, until interrupted again. The results suggest, the post intervention trend is positive after each break, but the recovery starts from a much lower level. The key difference between Total Reserves and international tourism receipts is the slope, for the tourism receipts the recovery starts almost immediately, whereas the Total Reserves did not start to recover until after the coup *d'état* and the Presidency of Sisi, which attracted streams of foreign funds, particularly from Saudi Arabia.

[Table 3 around here]

A small but significant negative trend is present before the outbreak of AS in Tunisia and it needs to be taken into consideration when fitting the break. There is, however, a sudden drop following the unrest in November 2010, a loss of 47US$M, a far greater loss than the previous trend line, but it quickly rebounds, and the slope shows significant growth immediately after the drop post-Arab Spring. The second break is related to events that affected one of the key Tunisian markets, France. In Algeria (September 2014) a group

affiliated to ISIS beheaded French tourists. This appears to have reduced the number of French tourists in the last quarter of 2014. It seems that following, the Bardo Museum attack in March 2015, the French did not issue a travel ban, but the evidence suggests that the volume of French tourists was down anyway, since the killings in Algeria and the Charlie Hebdo attack in Paris (January 2015). It also seems that the perpetrators of the attack in the museum were linked to an Algerian terrorist group, which suggests that the French might connect the museum attack with the earlier attack in Algeria (September 2014). The French market was alerted on several occasions, there was a common element to the attacks, the perpetrators claimed to be a religious group, targeting French citizens directly in two out of the three occasions. The final break is fitted according to the two terrorist attacks (the Bardo Museum and Sousse) targeting tourists directly, which led to a further immediate drop of 17US$M. The results are consistent with those for Egypt, for international tourism receipts the recovery slope is positive almost immediately, whereas the Total Reserves downturn trend continued for quite some time following Arab Spring.

International tourism receipts for Morocco did not exhibit a fall because of Arab Spring or in the subsequent periods, it is in fact the opposite, there was a significant increase. Morocco did not experience the revolution that Egypt and Tunisia experienced and tourists continued to travel there. Tensions were reduced in Morocco through timely concessions, allowing the country to transition from the height of unrest, early in 2011, with the least amount of civil upheaval (Financial Times, December 28, 2014). The results for Oman also suggest that tourism was not affected, and this was expected as Oman did not experience the Arab Spring. The security challenges in Tunisia, Algeria, Libya and Egypt created a vacuum of opportunity in the region, shifting tourism demand away from troubled Egypt and Tunisia and towards Morocco and other more secure Mediterranean destinations.

[Figure 2a, 2b,2c and 2d around here please]

Section 4.2: Examination of residuals

Actest software (Baum and Schaffer, 2013) was employed to check the residuals for evidence of linear dependence (Appendix 1a, Table 3). The *actest* by default uses *Cumby-Huizinga* (1992*)* general test for autocorrelation, it tests the null hypothesis that the variable tested is a moving average of a known order *q*, MA(q). Examining the Total Reserves, suggests that autocorrelation is present, up to lag 3, for all but Tunisia, which was up to lag 2. Thus, the models specifying lag (3) should correctly account for autocorrelation and lag (2) for Tunisia. A similar approach was employed to analyse international tourism receipts (appendix 1a- Table 4).

The intervention analysis was based on historical events. To check whether the breaks fitted to the series captured the main effects, the residuals were checked. The results suggest that the residuals are stationary; however, the null hypothesis of no ARCH effect was rejected for Total Reserves. The automatic tso procedure employed detects, locates and identifies these outliers (see López-de-Lacalle 2015). The parameter δ was set as 0.7 as suggested by Chen and Liu (1993). The critical value, "*cval*" was set at 3.5 (López-de-Lacalle 2015) to test the significance of each outlier. Hence, the outliers that are not significant, given the set cval, have been removed (Figure 3).

The presence of outliers in Total Reserves reflects the effects of sporadic inputs relating to aid, increased borrowing facilities and the discrete increases in FDI. Therefore, because of the nature of Total Reserves it was not surprising to find that the data presents outliers. This is not the case with international tourism receipts which, once on the recovery path tends to be far more consistent and it was not surprising to see there is an absence of outliers.

Discussion, implications and conclusion

Four case studies were employed to empirically demonstrate the responsiveness of international tourism receipts and Total Reserves to political instability. Arab Spring was modelled by ITS using Newey-West methods which corrects standard errors for

autocorrelation. The residuals were examined to detect any remaining small-scale unknown effects such as those that result from financial aid packages, using the tso function

The negative impact of political instability on tourism is uniformly shared (e.g. Morakabati and Beavis 2017, Fletcher and Morakabati 2008, Sandler and Enders 2004, Drakos and Kutan 2003, Sedidighi 2002, Sonmez 1998, Pizam and Mansfield.1996). Both international tourism receipts and Total Reserves are susceptible to political instability, which is not a surprise, but what this study brings to light is the relative recovery period of tourism compared to the recovery of the overall confidence in the economy. Tourism has stronger elasticity and bounces back faster than the market's overall confidence in the economy. Following the Arab Spring (Figures 1 and 2) there is a level shift in international tourism receipts in both treated cases, and after the initial drop in receipts, the slope shows an upward recovery trend. The Total Reserves show a similar initial response, but it differs in its recovery pattern, following a significant drop, coinciding with the onset of Arab Spring, the estimated slope coefficients are negative and significant, with a relatively sluggish recovery. The turning point of Total Reserves took approximately 31 months for Egypt, 19 months for Tunisia, with the knock-on effects on Morocco taking 17 months and no discernible effect on Oman as expected. The negative effects on international tourism receipts appear to recede faster, within 12 months, with no discernible effects in Morocco, given the absence of violence. As expected, international tourism receipts are very responsive when a direct threat is felt towards tourists (e.g. the Russian Metrojet attack over the Sinai Region - the last interruption Figure 2a), the Bardo Museum or the Sousse attacks in Tunisia (the second and third interruptions Figure 2b). However, contrary to expectations, confidence in international tourism restores much more quickly than confidence in the economy as a whole. Total Reserves appear to be more responsive to large negative events than tourism revenue and show greater inertia in their recovery.

The literature widely argues that tourism is susceptible to negative events (e.g. Pforr and Hosie 2008, Santana 2004, Murphy and Bayley 1989). But most studies examined the impact on tourist revenues in isolation and did not compare the impacts and recovery with other sectors in those economies. Therefore, previous evidence appears to send a signal to investors, that tourism is more vulnerable to negative event than other productive sectors. This study argues that tourism is more resilient than the overall economy and tends to recover more quickly than, say FDI, allowing tourism to spearhead recovery.

The methodological contribution of this study is the application of methodologies to visualise the impacts and recovery paths of international tourism receipts and Total Reserves following specific shocks. This study provides a clearer picture to compare the effects of political shocks on the external levels of confidence in the tourism industry and the overall economy. The results of this research can inform policy, practice and prospects of investment, given the presence of political uncertainty. If tourism shows greater recovery abilities than that demonstrated by the overall confidence in the economy, then the prospects for investment in tourism might be better than initially thought.

This study provides some suggestive, but not conclusive, evidence of causality. From the theoretical point of view, there are some discernible effects in the view of patterns of recovery. The findings suggest that large-scale political events result in negative step changes both in international tourism receipts and Total Reserves. The downturn effect is likely to correlate with the intensity of the event. Recovery starts as governments begin to take the control[4] and the unrest deescalates. Therefore, promotional activities before the unrest ceases will not be effective (Biermann, 2003). Despite the similarities of the immediate drops, the economic structures of these selected cases and the revolution itself; the resulting impacts are not the same. The AS left an identifiable data 'fingerprint' across all

[4] If there is division among the top then recovery fails to start (e.g. Libya).

treated cases in this study (Figure 1 and 2) but with different impacts. These oscillations are conditional on a number of factors, such as financial aid packages provided, including access to such instruments as Special Drawing Rights. Tourism and the wider confidence in the economy benefit from stability, thus an immediate injection of foreign aid when both reserves and income from tourism are down can be beneficial. However, financial aid packages may be underpinned by the relationship with regional and international players and foreign interests and can be a function of the funders own interests and objectives, essentially hidden characteristics - a lemon problem (Akerlof 1970) which may not help long-term stability. Although financial aid is critical, because its absence can result in geo-political vulnerability, financial vulnerability can leave the door open to hybrid threats. The wrong financial aid could compromise regional competition in favour of involuntary cooperation, contention, coercion, conflict and confrontation.

It is conceivable that convulsion will happen again in the MENA region (Sudan and Algeria 2019), if threats are not made toward tourists, international tourism can act as a sustainable economic solution, benefitting both guests and hosts. With international tourism receipts recovering in two-thirds of the time needed for Total reserves to start their recovery path, it is clear that tourism provides a valuable source of recovery for the economy as a whole.

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Table 1: Political Stability Indices Comparison prior to Arab Spring (2005-2010)

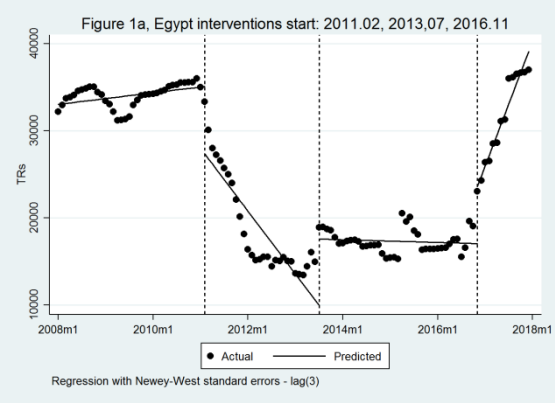
	Egypt	Tunisia	Morocco	Oman
Political Stability Average 2010 to 2015	-1.53	-0.63	-0.42	0.84
Type of economy	Lower middle income	Upper middle income	Lower middle income	High Income

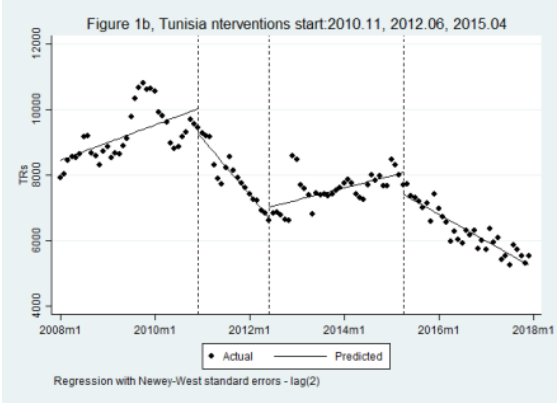
Source: Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance) http://info.worldbank.org/governance/wgi/index.aspx#home

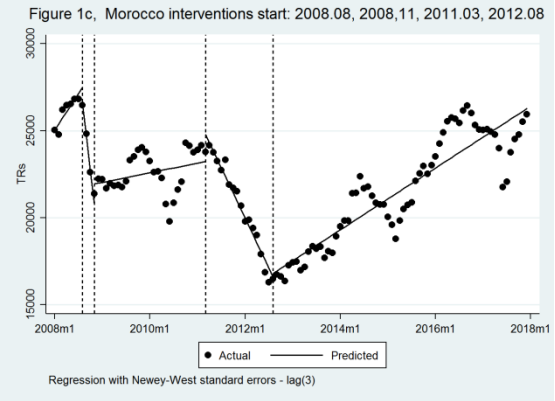
Table 2: ITSA output (Total Reserves, TRs)

Regression with Newey-West standard errors				Number of obs	=	120
maximum lag: 3				F(7,	112) =	241.24
Egypt				Prob > F	=	0.0000
TRs	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_t	55.50142	23.04708	2.41	0.018	9.836594	101.1663
_x613	-7707.737	1901.553	-4.05	0.000	-11475.42	-3940.054
_x_t613	-656.4674	114.6835	-5.72	0.000	-883.698	-429.2368
_x642	7626.795	1793.437	4.25	0.000	4073.331	11180.26
_x_t642	588.0015	116.3307	5.05	0.000	357.5072	818.4958
_x682	6559.202	770.6362	8.51	0.000	5032.285	8086.118
_x_t682	1202.202	96.64926	12.44	0.000	1010.704	1393.7
_cons	32994.31	670.549	49.20	0.000	31665.7	34322.92
Tunisia				Number of obs	=	120
maximum lag: 2				F(7,	112) =	105.66
				Prob > F	=	0.0000
_t	45.13962	14.28056	3.16	0.002	16.84451	73.43472
_x611	-777.1241	446.4869	-1.74	0.085	-1661.781	107.5324
_x_t611	-187.2116	18.87196	-9.92	0.000	-224.604	-149.8192
_x629	316.2229	249.1274	1.27	0.207	-177.391	809.8368
_x_t629	173.3458	16.45648	10.53	0.000	140.7394	205.9522
_x663	-667.8206	170.339	-3.92	0.000	-1005.326	-330.3157
_x_t663	-99.34911	11.49953	-8.64	0.000	-122.134	-76.56427
_cons	8408.274	202.0304	41.62	0.000	8007.976	8808.571
Morocco				Number of obs	=	120
maximum lag: 3				F(9,	110) =	296.62
				Prob > F	=	0.0000
	Newey-West					
_t	350.1986	48.40309	7.24	0.000	254.275	446.1221
_x583	-929.1974	200.5966	-4.63	0.000	-1326.733	-531.6621
_x_t583	-2283.134	81.50065	-28.01	0.000	-2444.649	-2121.618
_x586	1169.163	365.2231	3.20	0.002	445.3768	1892.95
_x_t586	1979.187	62.55998	31.64	0.000	1855.208	2103.166
_x614	1554.915	892.0208	1.74	0.084	-212.8608	3322.691
_x_t614	-527.5606	45.54041	-11.58	0.000	-617.811	-437.3102
_x631	184.5258	533.5297	0.35	0.730	-872.8049	1241.857
_x_t631	629.3851	40.33272	15.60	0.000	549.4551	709.3151
_cons	24693.65	222.464	111.00	0.000	24252.78	25134.52
				Number of obs	=	117
maximum lag: 3				F(3,	113) =	196.71
Oman				Prob > F	=	0.0000
	Newey-West					
T	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_t	113.1896	7.269445	15.57	0.000	98.78748	127.5916
_x612	-730.7664	410.4242	-1.78	0.078	-1543.891	82.35784
_x_t612	-24.26262	13.47192	-1.80	0.074	-50.95293	2.427691
_cons	9658.822	189.7424	50.90	0.000	9282.908	10034.74

Figure 1- Plots of Total Reserves using interrupted time series







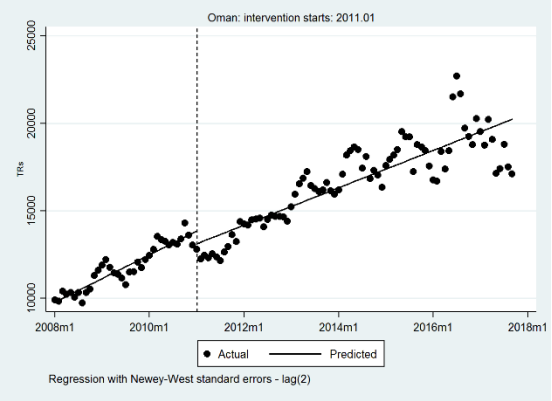
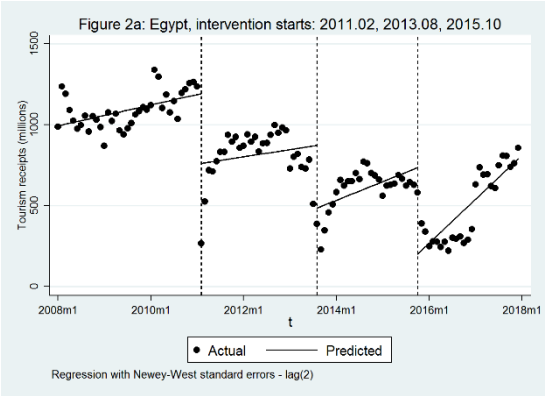
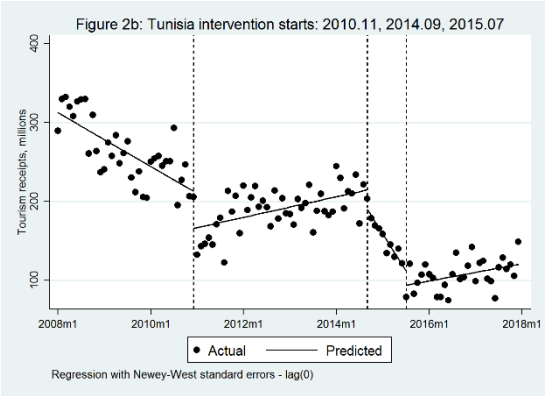


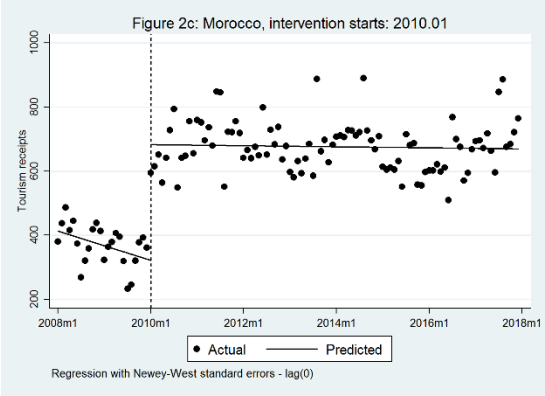
Table 3: ITS, using tourist receipts

Regression with Newey-West standard errors				Number of obs	=	120
maximum lag: 2				F(7,	112) =	47.40
				Prob > F	=	0.0000
Egypt						
_t	5.377366	2.129036	2.53	0.013	1.158953	9.595778
_x613	-431.1961	114.9101	-3.75	0.000	-658.8757	-203.5165
_x_t613	-1.655406	6.226788	-0.27	0.791	-13.99299	10.68218
_x643	-387.3315	110.5104	-3.50	0.001	-606.2937	-168.3694
_x_t643	5.895201	7.905486	0.75	0.457	-9.768507	21.55891
_x669	-535.0364	111.5674	-4.80	0.000	-756.0928	-313.98
_x_t669	13.07186	6.139346	2.13	0.035	.9075367	25.23619
_cons	988.5147	50.762	19.47	0.000	887.9364	1089.093
Tunisia				Number of obs	=	120
maximum lag: 0				F(7,	112) =	141.40
				Prob > F	=	0.0000
Tunisia	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_t	-2.843153	.4593011	-6.19	0.000	-3.7532	-1.933107
_x611	-47.25541	12.95549	-3.65	0.000	-72.92505	-21.58577
_x_t611	3.928227	.551763	7.12	0.000	2.834979	5.021474
_x656	-24.70877	8.901719	-2.78	0.006	-42.34639	-7.071155
_x_t656	-8.922805	1.038408	-8.59	0.000	-10.98028	-6.865332
_x666	-17.8658	8.589686	-2.08	0.040	-34.88516	-.8464388
_x_t666	8.752348	1.061254	8.25	0.000	6.64961	10.85509
_cons	315.6569	9.102023	34.68	0.000	297.6224	333.6914
Morocco				Number of obs	=	120
maximum lag: 0				F(3,	116) =	157.79
				Prob > F	=	0.0000
_t	-3.833573	1.651322	-2.32	0.022	-7.104224	-.5629215
_x600	361.1326	29.25468	12.34	0.000	303.19	419.0751
_x_t600	3.695539	1.680351	2.20	0.030	.3673927	7.023685
_cons	417.6415	23.05194	18.12	0.000	371.9842	463.2988

Figure 2- plot of tourist arrivals, using interrupted time series







Appendix 1a

Table 4, actest lag(6) Total Reserves

Cumby-Huizinga test for autocorrelation (Breusch-Godfrey)

H0: variable is MA process up to order q

HA: serial correlation present at specified lags >q

H0: q=0 (serially uncorrelated)				H0: q=specified lag-1			
HA: s.c. present at range specified				HA: s.c. present at lag specified			
lags	chi2	df	p-val	lag	chi2	df	p-val
Egypt							
1 - 1	72.105	1	0.0000	1	72.105	1	0.0000
1 - 2	72.144	2	0.0000	2	20.444	1	0.0000
1 - 3	72.374	3	0.0000	3	7.926	1	0.0049
1 - 4	72.396	4	0.0000	4	3.608	1	0.0575
1 - 5	73.121	5	0.0000	5	0.813	1	0.3674
1 - 6	73.168	6	0.0000	6	0.120	1	0.7291
Tunisia							
1 - 1	53.194	1	0.0000	1	53.194	1	0.0000
1 - 2	53.580	2	0.0000	2	10.271	1	0.0014
1 - 3	54.597	3	0.0000	3	1.511	1	0.2190
1 - 4	54.774	4	0.0000	4	0.001	1	0.9811
1 - 5	55.361	5	0.0000	5	0.982	1	0.3218
1 - 6	56.070	6	0.0000	6	3.078	1	0.0793
Morocco							
1 - 1	83.819	1	0.0000	1	83.819	1	0.0000
1 - 2	85.319	2	0.0000	2	20.396	1	0.0000
1 - 3	85.468	3	0.0000	3	7.743	1	0.0054
1 - 4	85.983	4	0.0000	4	2.502	1	0.1137
1 - 5	87.528	5	0.0000	5	0.127	1	0.7210
1 - 6	88.090	6	0.0000	6	0.177	1	0.6736
Oman							
1 - 1	62.241	1	0.0000	1	62.241	1	0.0000
1 - 2	63.015	2	0.0000	2	12.438	1	0.0004
1 - 3	63.041	3	0.0000	3	4.263	1	0.0389
1 - 4	63.299	4	0.0000	4	0.598	1	0.4393
1 - 5	64.195	5	0.0000	5	0.484	1	0.4866
1 - 6	64.206	6	0.0000	6	1.494	1	0.2216

Table 5, actest lag(6), tourists receipts

Cumby-Huizinga test for autocorrelation (Breusch-Godfrey)							
H0: variable is MA process up to order q							
HA: serial correlation present at specified lags >q							
H0: q=0 (serially uncorrelated)				H0: q=specified lag-1			
HA: s.c. present at range specified				HA: s.c. present at lag specified			
lags	chi2	df	p-val	lag	chi2	df	p-val
Egypt							
1 - 1	38.563	1	0.0000	1	38.563	1	0.0000
1 - 2	38.950	2	0.0000	2	9.642	1	0.0019
1 - 3	39.125	3	0.0000	3	2.100	1	0.1473
1 - 4	39.125	4	0.0000	4	0.364	1	0.5464
1 - 5	39.160	5	0.0000	5	0.027	1	0.8684
1 - 6	39.439	6	0.0000	6	0.030	1	0.8626
Tunisia							
1 - 1	0.709	1	0.3998	1	0.709	1	0.3998
1 - 2	2.842	2	0.2415	2	2.299	1	0.1294
1 - 3	4.233	3	0.2373	3	1.825	1	0.1768
1 - 4	4.405	4	0.3540	4	0.541	1	0.4622
1 - 5	5.405	5	0.3685	5	0.315	1	0.5749
1 - 6	10.890	6	0.0919	6	3.953	1	0.0468
Morocco							
1 - 1	7.840	1	0.0051	1	7.840	1	0.0051
1 - 2	8.063	2	0.0177	2	1.183	1	0.2767
1 - 3	8.181	3	0.0424	3	0.003	1	0.9578
1 - 4	10.689	4	0.0303	4	1.991	1	0.1583
1 - 5	11.290	5	0.0459	5	1.646	1	0.1995
1 - 6	11.397	6	0.0769	6	0.771	1	0.3800

Appendix 1b

Figure 3 tso- Total Reserves

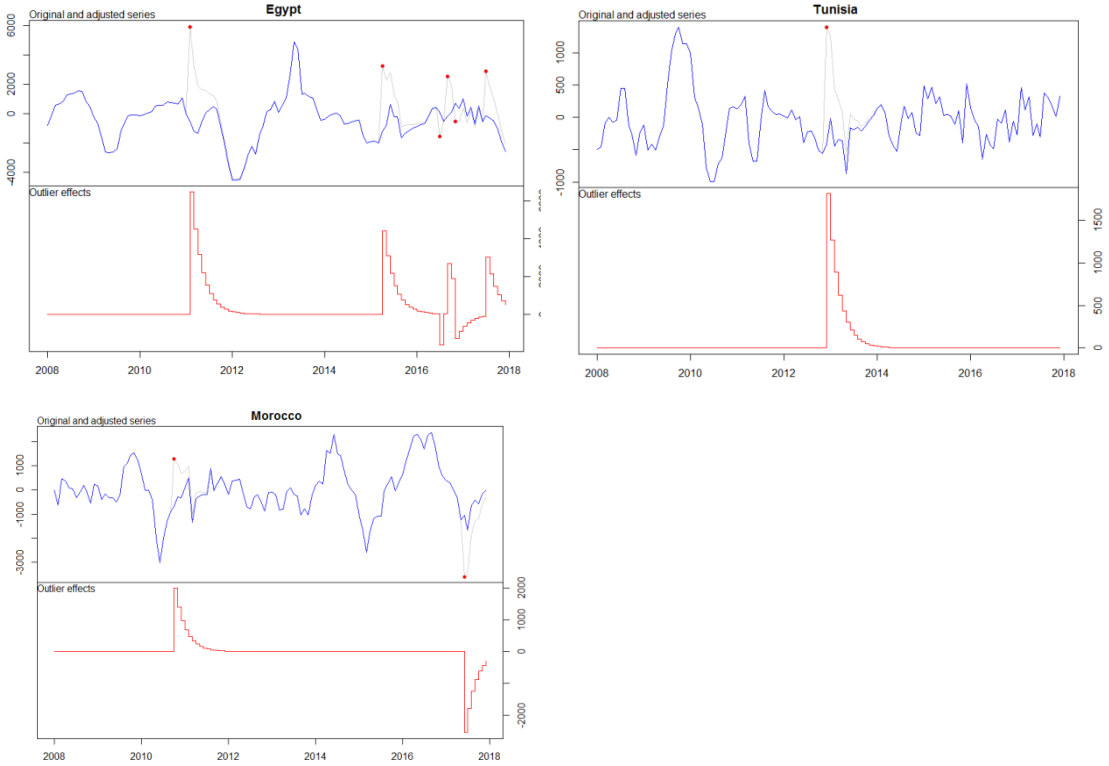


Table 6: tso output (TR)

Parameter	**Estimate**	**Std.error**	***t***	**Outliers date**
Egypt ARIMA(3,0,1)				
AR(1)	0.4927	0.1453		
AR(2)	0.6859	0.1275		
AR(3)	-0.4216	0.0863		
MA(1)	0.6495	0.1443		
TC	6480	543.6084	11.920	2011:02
TC	4434	547.5424	8.097	2015:04
AO	-1668	396.3567	-4.207	2016:07
TC	2674	561.0677	4.766	2016:09
TC	-2592	575.3258	-4.505	2016:11
TC	3115	552.7414	5.635	2017:07
Tunisia: ARIMA (1,0,0)				
AR(1)	0.7332	0.0623		
TC	1809.44	295.79	6.117	2012.12
Morocco ARIMA (1,0,0)				
AR(1)	0.8354	0.0484		
TC	1993.20	530.03	3.761	2010.10
TC	-2554.0428	532.01	-4.801	2017.06