The Impact of Tourism on Economic Growth in Tunisia: Application through ARDL Modelling

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Abstract: The objective of this work is the empirical investigation of the relationship between tourism and economic growth in Tunisia over the period from 1975 to 2018. Using control variables chosen during a reading of the theoretical and empirical review of the determinants of economic growth in the context of responding to the problem posed for the case of Tunisia. In the first step, it is appropriate to present the methodology of analysis that we will adapt in our study, where the identification of the theoretical and empirical bases combined with the specification of our empirical model occupies a place of honor. The second step consists in gathering the empirical results with the help of the ARDL modelling, the interpretations of this study in Short term (ST) as well as in Long term (LT) accompanied with some lessons for a possible development strategy of the tourist sector.

Keywords: Tourism, Economic Growth, ARDL modeling.

1. Introduction

It is a booming sector in Tunisia where the Tunisian government was faced with a challenge to diversify its tourism products in order to maintain the tourism development it has achieved for years. That is why the state has chosen to invest more in this direction and what has allowed Tunisia to be the second destination of thalassotherapy in the world after France by recording the entry of 250,000 curists per year of which 50% are of European origin.

In fact, Tunisia has developed 28 centers in 2007 to 40 centers in 2008 and during the following year (2009) there were 12 centers under construction and 10 other centers under study to accommodate tens of thousands of curists each year. The thalasso centers in Tunisia are ultra-modern and sumptuously located at the seaside using sea water pumped to a thousand meters off the coast and products labeled so that its customers enjoy the virtues of sea water at rates compared to others. In this sense, what characterizes Tunisia is the very interesting quality-price ratio allowing to increase the number of curists attracted by the high quality of the thalasso centers, the climate as well as the proximity of Europe while putting in consideration that since 1994 and ensuring an ascending innovation.

Besides, the tourist activity is not a novelty in Tunisia where its existence is claimed since the beginning of the 19th century and which recognized phases of development, which characterizes the tourist movement of an inevitable rise. The public authorities aware of the economic interest of this activity and promote it in different ways by: the implementation of customs measures to facilitate the admission of vehicles, the organization of advertising propaganda abroad of the tourist industry and the orientation of public investments towards the development of infrastructure

In order to examine the impact of tourism on economic growth in Tunisia, it is appropriate to refer to the theoretical foundations underlying the specification of the chosen econometric model and answering the question of the choice of the ARDL model in particular. Based on the theoretical and empirical literature review formulating corrective measures to the imbalances reported at the level of economic growth, this study aims to address the novel issues associated with the relationship between tourism and economic growth by applying the ARDL model.

2. Review of the literature

2.1. Growth Determinants

The relationship between trade openness and economic growth is an issue debated in the theoretical and empirical economic literature by Grossman and Helpman (1991), Lucas (1988), Young (1991) Rivera-Batiz and Xie (1993) who noted a negative effect of trade openness on economic growth.

Indeed, Harrison (1996) found a strong positive effect of trade openness on economic growth, as did Lee (1993) and Edwards (1998) who found a significant relationship between the average tariff rate and economic growth. The results for Tunisia are not well defined, which reflects the inclusion of this variable in our economic growth regression in order to quantify its impact for Tunisia.

According to the neoclassical growth theory, the capital stock is a determinant of growth, where Lucas (1988) and Mankiw et al. (1992) proved this with their results that showed the existence of a positive and significant relationship between the capital stock and economic growth.

The relationship between inflation and economic growth is a bit controversial, where taking into account the duration it seems that inflation has a contrasting impact on the economic growth on the LT. It can be said that in ST, inflation has a negative effect on the growth rate of production, but in LT it seems that the GDP is not affected by the high and persistent level of inflation according to Sidrauski (1967) and Faria (2001). Where even in Tunisia it is necessary for the health of the economy to have a moderate range of inflation while the low moderate level of inflation can harm the growth rate according to Lim (1997). These contradictory results reflect the integration of the inflation indicator in the growth regression.

The examination of the impact of tourism on the economic growth in Tunisia by using ARDL estimators by taking into consideration the other determinants of the economic growth. However, the tourist activity is not a novelty in Tunisia where its existence is claimed since the beginning of the 19th century and which recognized phases of development which characterizes the tourist movement of an inevitable rise. The public authorities aware of the economic interest of this activity and promote it in different ways by: the implementation of customs measures to facilitate the admission vehicles, organization of advertising propaganda abroad of the industry tourism and the orientation of public investments towards infrastructure development

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2.2. Development of the original function

The function in its most general form that links the quantity of the product obtained and the quantities of the different productive services used, in other words it represents a relationship between output and input. This model proposes a scenario integrating the economic and social dimensions relating to the fundamental characteristics of the system such as: the economic potential, the level and dynamics of the economic results, the efficiency of the use of the factors of production and the process of reallocation of resources, the major imbalances of the economic system, the degree of commercial openness and the standard of living of the local population.

$$Y_t = A_t * K_t^{\alpha} \tag{I}$$

This type of production function developed in the macroeconomic literature where researchers incorporate variables that affect economic growth such as: inbound tourism by Jimenez (2008), Tang (2011) and Kreishan (2011); physical capital stock by Lucas (1988) and Mankiw et al. (1992); trade openness by Grossman and Helpman (1991), Lucas (1988) and Young (1991) as well as inflation by Sidrauski (1967) and Faria (2001).

$$A_t = f(T, Z_t) \tag{II}$$

Z_t : the vector of economic growth-enhancing variables such as indicators of tourism development, capital stocks, trade openness, inflation and other trade policies; and T: the time dynamics.

II.3. Form of the treated model

Following the application of numerous econometric estimations taking into consideration the theoretical determinants of economic growth with the integration of the Tower variable within the empirical study. Based on the econometrically estimable equation proposed by Katircioglu (2009) from which we extracted our basic model -1 as follows:

MODEL- 1: $\quad Y_t = \alpha + \beta_1 TOUR_t + \beta_2 TRADE_t + \beta_3 INFLA_t + \beta_4 INV_t + \mu_t \tag{III}$

Y_t represents the real GDP per capita at constant 2005 prices, while for the explanatory variables where TOUR which represents the annual tourism receipts per capita divided by the (REER) (the real effective exchange rate) in order to deflate the effect of the exchange rate. TRADE represents the degree of trade openness calculated as the sum of exports and imports reported by 2*GDP; INFLA which reflects the inflation index at constant prices since 2015 and INV which presents the gross formation of physical capital per capita at constant prices of 2005 then β_1, β_2, β_3 and β_4 represent the associated coefficients and α represents the Gaussian white noise.

At the level of this model, we integrated 'INST2011' as a dichotomous variable; reflecting the political instability which disrupted the economic situation in Tunisia and tourist activity in particular; which takes the value '1' during the year 2011 representing the Arab Spring revolution and the value '0' elsewhere. The inclusion of the latter is argued by the effect of the crisis and its repercussions on the security stability of Tunisia as a tourist destination noted in the graph below:

Graph N°. 1. The evolution of tourism receipts in Tunisia during (2010-2018)
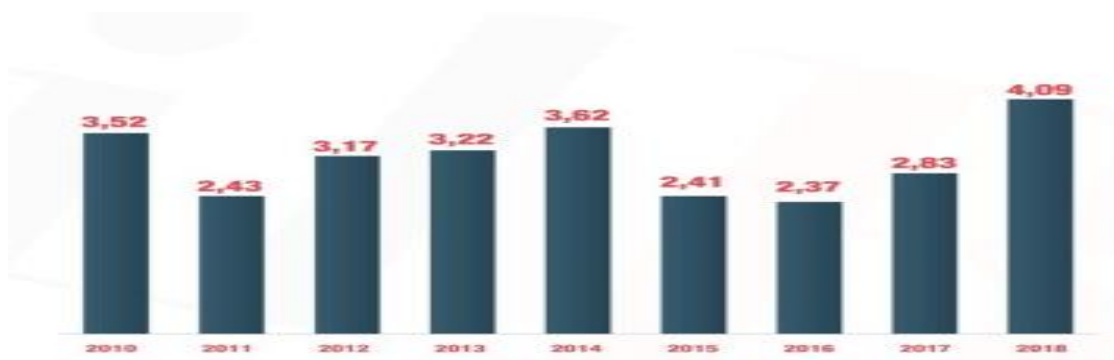
Source: working by Author

The integration of the second dichotomous variable 'INS 86' representing the economic crisis where Tunisia has recorded a year of negative growth.

This leads us to our second following ARDL 2 model after integrating the two variables INS_{2011} and INS_{86} where γ_1 and γ_2 have the associated coefficients respectively:

MODEL- 2:

$$GDP_t = \alpha + \beta_1 TOUR_t + \beta_2 TRADE_t + \beta_3 INFLA_t + \beta_4 INV_t + \mu_t + \gamma_1 INST_{2011} + \gamma_2 INST_{86} \tag{IV}$$

The data collected belong to the statistical apparatus that describes the situation using indicators from descriptive statistics; in our model, interactionist indicators seem to better reveal the potential of the interactions between the country's actors. It should be noted that this interaction is of primary importance, since it bears the seeds of development potential, although we analyze how the relationship between these variables operates. The answer to this question allows us to evaluate the potential of tourism development and its impact on economic growth and vice versa. In addition, this type of diagnosis makes it possible to define which actors a development strategy should rely on. Our contribution is manifested in the mobilization of the ARDL method to put it at the service of a better understanding of the place of tourism in the economic development in Tunisia by forming a documentary corpus having for origin the reports of the BCT, ONTT and the national statistics of the INS relating to the tourist indicators and the economic development. However, we referred to the collection of data from the World Bank and the IMF since the diversity of sources of information can ensure a plurality of views reflecting an approach closer to the real activities.

3. Methodology

The examination of the nature of the relationship that can link tourism and economic growth requires first checking whether the variables or, in other words, the time series have similar behaviors over time, which can be done econometrically by testing the cointegration relationship.

Moreover, several economists have proven that this notion is essential because many macroeconomic relationships can be identified as LT equilibrium relationships. While from a statistical point of view, the cointegration relation proves that there is a linear stationary combination even if these series are not individually stationary.

3. 1. Stationarity tests

The Augmented Dickey Fuller (ADF) test was used in the process of checking the stationarity of the selected data series, where the results offered a mixed picture in terms of stationarity in the following table:

Table N°.1: Unit Root ADF Stationarity Tests ADF

	ADF	K	p-Values		ADF	K	p-Values
GDP	0,5089	0	0,9851	ΔGDP	-4,8365***	0	0,00
TOUR	0,2981	3	0,9753	ΔTOUR	-7,8187***	2	0.00
INV	-2,4600	2	0,1325	Δ INV	-5,2591***	0	0,00
TRADE	-2,3515	0	0,1612	Δ TRADE	-6,4270***	0	0,00
INFLA	-2,5740	0	0,1061	ΔINFLA	-8,8257***	0	0,00

Notes: GDP = real GDP per capita at constant 2005 prices; TOUR= annual tourism receipts per capita/REER; OPEN= the degree of opening to the outside; INFLA = the inflation rate at constant prices for 2015; INV= gross fixed capital formation per capita at 2005 constant prices. K/ Lag length automatically selected by Akaike's information Creteria. Period selected 1975-2018. (***) (**) (*) indicates the significance respectively at the risk of 1%, 5% and 10%.

It is evident from the results collected in this table demonstrated that the integrated data sets of order 1 except for some stationary variables integrated at order 0; this justifies the use of ARDL estimators and one can subsequently apply the ARDL boundary testing procedures in our determination of the nature of the relationship between tourism expansion and economic growth in LT. Thus, these results justify our choice of the Autoregressive Distributed Lag Model (ARDL) estimation methodology developed by Pesaran, Shin (1996 and 1998) and Pesaran et al. (2001). There is a large body of literature in which researchers

have relied on the cointegration techniques of Engle and Granger (1987), Johansen (1991) and Johansen and Juselius (1990), which have presented contradictory results generally within the same country over different periods. Therefore, the use of the ARDL model in our study to examine the link between economic growth and tourism will allow us to make an original contribution, since we will avoid the application of the usual methods on the same variables, which effectively only allow us to accentuate the doubt on the management policies because of the contradictory results. In my reading of the empirical review at the national level that approximately, none of the studies is available used ARDL estimators in testing the link between tourism and economic growth for the case of Tunisia throughout the study period. In the fact that even the low number of studies carried out on Tunisia have shown contradictory results and over reluctant periods.

This ARDL methodology is introduced as a cointegration technique that has been chosen by several researchers because of the advantages it offers. For example, in terms of application, it is independent of the order of integration of the repressors, i.e., it does not require that all the data series must belong to the same order of integration (Pesaran and Pesaran 1997). However, the ARDL method exempts the residual correlation and deprives it of the endogeneity problem.

In the context of small samples these ARDL estimators provide true parameters compared to the Johansen and Juselius cointegration technique although the coefficients of these estimators appear to be very consistent according to Pesaran and Shin (1999). Pesaran and Shin (1999) noted that this method ensures the distinction between dependent variables and explanatory variables, as well as it presents a possibility of estimating even in case of endogeneity in the explanatory variables, which can solve the problem that the majority of published research has encountered in the results associated with the direction of causality between tourism and economic growth.

3.2. Why the ARDL model?

The ARDL is a parsimonious infinite lag distributed model where it explains by its own lag other than the variables of the model. This model (Auto Regressive Distributed Lag) allows for the analysis of the economic scenario since within an economy any change in the variable results in a change in other economic variables that is not generally reflected immediately, but is spread out over future periods. Examining the impact of a change in a macroeconomic variable (tourism) on the economy as a whole over a given period. The ST and LT behavioral consequences of one variable on another variable or variables reflect the role of the ARDL model in addressing the distributed lag problem in the economic scenario more effectively because it considers the dynamic influence of one variable on the others.

Most econometric models suffer from collinearity in the regression caused when some of the model's predictor variables measure the same phenomenon (multi-collinearity) which can increase the variance of the regression coefficients and make them unstable or difficult to interpret. This can then lead to insignificant coefficients either even if the relationship is significant, or to strongly correlated coefficients that vary from sample to sample which can lead to the suppression of one of these terms affecting the estimated coefficients of the others or even lead to a wrong sign. Multi-collinearity has no effect on the goodness of fit or on the quality of accuracy, but the individual coefficients specific to each explanatory variable in the model cannot be interpreted weakly, where this finite model allows to deal with this collinearity problem by choosing the optimal lag length.

The ARDL model addresses the collinearity problem by allowing the dependent variable to be lagged within a model encompassing other independent variables and their lags. While the infinite lag model allowing an infinite number of parameters to be estimated which can be complex at the resolution level, where it solves the problems of specification characterized by a given length by making the model non-linear although it allows the placement of successive lag weights. This model is presented as a dynamic model that allows to take into account the temporal dynamics in the process of variable explanation, although it allows to improve the forecasting and the effectiveness of future policies. In addition, this model allows for the consideration of lagged variables in the explanatory variables. The advantages of ARDL modeling are mainly summarized in the possibility of application even if the variables selected in the case

of study have a unit root or not as well as in the cases of a mixture of integration orders. It should be noted that this method is suitable for small sample sizes (Pesaran 2001), which is similar to our case study, which covers 43 observations over the period studied. Thus, it allows to estimate the components of a relationship at TC and LT in a single equation.

4. Estimation and interpretation of results
4.1. ARDL1 and ARDL2 model and determination of the optimal delay

At this level, after the justification of the choice of the ARDL model in our present study where the following two models **ARDL1** and **ARDL2** should be presented:

ARDL-1':

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta Y_{t-i} + \sum_{i=0}^{q1} \alpha_2 \Delta TOUR_{t-i} + \sum_{i=0}^{q2} \alpha_3 \Delta TRADE_{t-i} + \sum_{i=0}^{q3} \alpha_4 \Delta INFLA_{t-i} + \sum_{i=0}^{q4} \alpha_5 \Delta INV_{t-i} + \delta_1 Y_{t-1} + \delta_2 TOUR_{t-1}$$
$$+ \delta_3 TRADE_{t-1} + \delta_4 INFLA_{t-1} + \delta_5 INV_{t-1}$$
$$+ \varepsilon_t \qquad\qquad\qquad (\mathbf{V})$$

   Tourism is often represented as a key sector of the Tunisian economy but it should also be noted the fragility of this resource of economic development, defined in this case mainly by the national anthropic threats (the revolution of January 11, 2014, terrorist attacks, nepotism of the presidential regime, economic crises, ...) as well as international (the war in neighboring countries such as Libya, the competition that has been to the benefit of Morocco that have attracted our traditional markets, ...). Despite all these problems, that this sector has encountered it should not be abandoned because for two decades it was an indispensable sector for the Tunisian economy where in 2016 it contributed to 12.1% of national GDP. It is necessary to put in place concrete remedial measures to cushion the negative effects of the crisis starting with the categorization of the Tunisian crisis in order to implement a framework of analysis of crisis management appropriate to the Tunisian case. The tourism industry has suffered from several fluctuations generated either by exogenous parameters (assets, risks) or by exogenous parameters (opportunities, threats) in interaction with the socio-economic system, the strategies applied, particularly the internal tourism system, which hinders development. This justifies our choice to integrate two dichotomous exogenous variables in the ARDL2 model as "Fixed Regressor" where each takes the value '1' during the year of crisis and the value '0' elsewhere. This fact can be explained by the economic crisis of 1986 and the revolution of January 14, 2011. The operation of introducing dummy variables in the estimation allows the analysis of the effect of these crises on the relationship between tourism activity and economic growth, where it is admitted that the crises (political or economic) affect the instability and security at the country level which will damage the image of Tunisia as a tourist destination and weakens their arrivals which devalues the tourist revenues.

ARDL-2' :

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta Y_{t-i} + \sum_{i=0}^{q1} \alpha_2 \Delta TOUR_{t-i} + \sum_{i=0}^{q2} \alpha_3 \Delta TRADE_{t-i} + \sum_{i=0}^{q3} \alpha_4 \Delta INFLA_{t-i} +$$
$$\sum_{i=0}^{q4} \alpha_5 \Delta INV_{t-i} + \delta_1 Y_{t-1} + \delta_2 TOUR_{t-1} + \delta_3 TRADE_{t-1} + \delta_4 INFLA_{t-1} + + \delta_5 INV_{t-1} + \delta_6 INST_{2011} +$$
$$+ \delta_7 INST_{86} + \varepsilon_t \qquad\qquad (\mathbf{VI})$$

   First, we have to determine the optimal number of delays of the two chosen ARDL models with reference to the Akaike Information Criteria (AIC) in order to be able to select which is the most significant ARDL model by comparing some ARDL models. The following graph extracted from Eviews 10 software representing the application of the Akaike criterion which allowed us to choose the model (1, 4, 4, 0, 0) with the lowest value of the test:
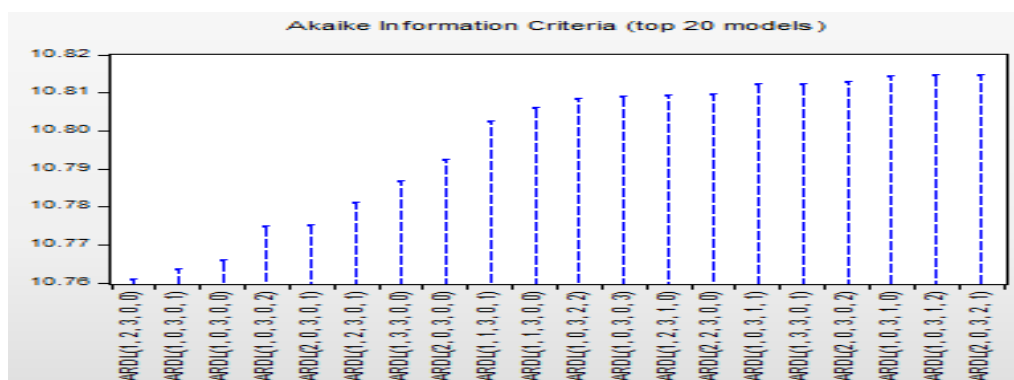
Graph N°2. The ARDL1 delay specification
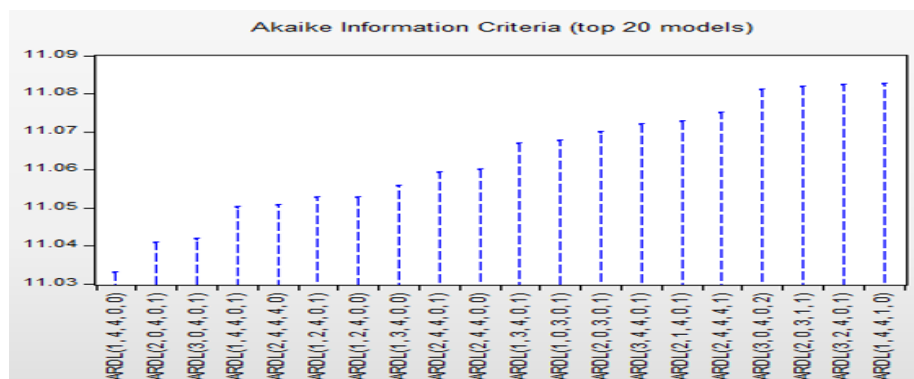
Source: Author's estimate

Following the introduction of the two dichotomous variables into our **ARDL1** model as Fixed Regressors, the selection criteria in Table 7 determined a new delay optimality state and hence an **ARDL2** (1, 2, 3, 0, 0) model:

Graph N°3. Specifying the optimal order of ARDL2

Source : Author's estimate

4.2. Estimation of ST and LT relationships without crises

Based on the empirical literature of economics, TLGH which has been well observed (Oh, 2005), but there may be an endogeneity problem between the two basic phenomena, where Ang (2010) proposes a re-estimation of the equation by keeping TOUR as the dependent variable in order to address the endogeneity problems. If the F-statistics values remain below the lower bound of the critical values, there will not be a LT relationship and tourism will not contribute to the expansion of the economy.

Conducting numerous regressions of the ARDL1 model, as shown in Table 5, confirmed the existence of a significant LT equilibrium relationship between PIBH and TOUR validating the existence of a LT relationship. The value of F-calculated equal to (6.92) which is higher than the largest value of Pesaran et al. (2001) at the risk of 1% (4.37) and 5% (3.49).Where it is necessary to have an F-statistics higher than the upper bound at the risk of 1% in order to have a LT relationship between the two main variables of the present study.

Table N°. 2. ARDL1 and the Terminal Cointegration Test

		Critical terminals 1%	Critical terminals 5%	Critical terminals 10%

	F-statitics	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
TOUR explains GDP	6.92	3.29	4.37	2.56	3.49	2.2	3.09

Sample: 1975-2018. The selected model and corresponding F-statistics for Yt as the dependent variable is an

ARDL1 (1,4,4,0,0). The deterministic component of the selected model is case2: Restricted Constant and No Trend.

Statistical diagnostic and robustness tests such as normality of error terms, heteroscedasticity, autocorrelation of residuals, and functional form specification should be run before engaging in interpretation.

From Table 2, we can see that there is a long-run relationship between per capita economic growth and tourism, which appears to be a significant and positive determinant. In line with the results of Belloumi (2010) for Tunisia validating TLG in ST and LT, but contradicting the results of Nowak and Sahli (2011) rejecting TLG and asserting the opposite hypothesis. Regarding the control variables retained in ARDL1, it is worth noting that openness to the outside world exerts a statistically significant and negative effect on GDPH growth, proving the results of Helpman (1991) and Lucas (1988).

This result is not consistent with the study dealing with panel cointegration tests and error correction models within 158 countries conducted Gries and Redlin (2012) which found a positive causal relationship between trade openness and economic growth. As well as Beck (2002) and Katircioglu (2009) finding that improved international trade leads to increased output.

Similarly, our study found a statistically significant and positive effect of fixed capital formation on GDP per capita growth, which is consistent with the neoclassical literature. However the inflation variable exerts a negative effect on GDP/head growth which is consistent with a large empirical literature such as the work of Ghosh and Phillips (1998), Khan and Senhadji (2001) and Sarel (1996).

Table N°. 3. Long term estimate

Dependent variable: GDP per capita		
Explanatory variables	Coefficients	T-Statistique
TOUR	579,49***	3,7638
TRADE	-50,26**	-2,2694
INV	0,777**	2,1587
INFLA	-16087,68**	-2,1010
Robustness tests		P-value
Autocorrélation Test	Breusch-Godfrey Correlation LM test H0: that there is no serial correlation of any order up to 2	0.07
Fonctionnel Forme	Ramsey's RESET test H0: the functional form is correctly specified	0.36
résidus Normality	Y	1.89
Heteroscedasticite	Breusch-Pagan-Godfrey test H0: homoscedasticity	0.55

Notes: GDP per capita = real GDP per capita at constant 2005 prices; TOUR= annual tourism receipts per capita/REER; TRADE= the degree of opening to the outside; INFLA = the inflation rate (base 100 2015); INV= gross fixed capital formation per capita at constant 2005 prices. Period used 1975-2018. (***) (**) indicates significance at 1% and 5% risk respectively

After having specified the nature of the LT relationship, it is appropriate in what follows to analyze the short-term dynamics as well as the speed of adjustment towards the long-term equilibrium.

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta Y_{t-i} + \sum_{i=0}^{q1} \alpha_2 \Delta TOUR_{t-i} + \sum_{i=0}^{q2} \alpha_3 \Delta TRADE_{t-i} + \sum_{i=0}^{q3} \alpha_4 \Delta INFLA_{t-i}$$
$$+ \sum_{i=0}^{q4} \alpha_5 \Delta INV_{t-i} + \theta_1 ECM_{t-1} + \varepsilon_t \qquad (VII)$$

The rejection of the H0 hypothesis: H0 : θ_1= 0 $\llbracket(\theta)\rrbracket\_1$: the speed of adjustment towards LT equilibrium) translated by the existence of a LT relationship and the convergence condition leads us to an additional constraint (: $-1<\theta_1<0$) allowing us subsequently to define the number of years needed in order to restore LT equilibrium.

As shown in Table 3, the most important result of the TC dynamics is the lagged error correction coefficient ECM (-1) revealing the speed of adjustment equal to (0.19) statistically significant at the 1% risk affirming the TL equilibrium relationship between GDPH and tourism revenues. This implies that about 19% of the imbalances in the previous year's ST shock readjust to TL equilibrium from one year to the next.

Table Nº. 4. Short term estimate

Explanatory variables	Coefficients	T-Statistique
ΔTOUR	144,7906***	5,6991
ΔTOUR (-1)	-59,1663**	-2,0343
ΔINFLA	-800,1984	0,1270
ΔINFLA (-1)	2677,017***	4,2501
ECM (-1)	-0,1926***	-7,0378
Tests de robustesse du modèle		
R-squared		0,9236
F-Statistic		6,9236
CUSUM		Stable
CUSUMSQ		Stable

Notes: GDPpar capita = real GDP per capita at constant 2005 prices; TOUR= annual tourism receipts per capita/REER; TRADE= the degree of opening to the outside; INFLA = the inflation rate (base = 100- 2015); INV= gross fixed capital formation per capita at 2005 constant prices. K/ Lag length automatically selected by Akaike's information Creteria. Period selected 1975-2018. (***) (**) (*) indicates the significance respectively at the risk of 1%, 5% and 10%.

The results in Table 4 are almost the same in sign as those in TL, but the magnitude of the latter appears to

be larger. The result is that the selected variables have more impact on economic growth in ST. However, these estimates showed that annual tourism receipts per capita divided by REER (ΔTOUR (-1)) or in other words the associated growth rate exerts a negative effect on the growth rate of GDP per capita, while the instantaneous effect (ΔTOUR) remains significant and positive. But, it should be noted that the positive magnitude of the change in tourism receipts in the current period (t) outweighs that in the period t-1. The result is that the effect of tourism, in terms of revenue, remains positive and statistically significant on short-term economic growth, which validates the TLGH hypothesis for Tunisia.

For the control variables, it should be noted that inflation has an ambiguous effect on economic growth where (ΔINFLA) has no significant effect, while (ΔINFLA (-1)) has a positive significant effect as shown in the table above. As for gross fixed capital formation and trade openness have no effect at TC on economic growth in contrast to a significant effect at LT.

The CUSUM and CUSUMSQ tests present two graphs with the aim of testing the hypothesis of stability of the LT relationship between the variables. The calculated statistic that must evolve between the two bounds of the interval, for our case the following two graphs have validated a stable LT relationship between the evolution of annual tourism revenues and economic growth per capita.

Graph N°4. RDL1 stability tests: Cusum and Cusum Square tests
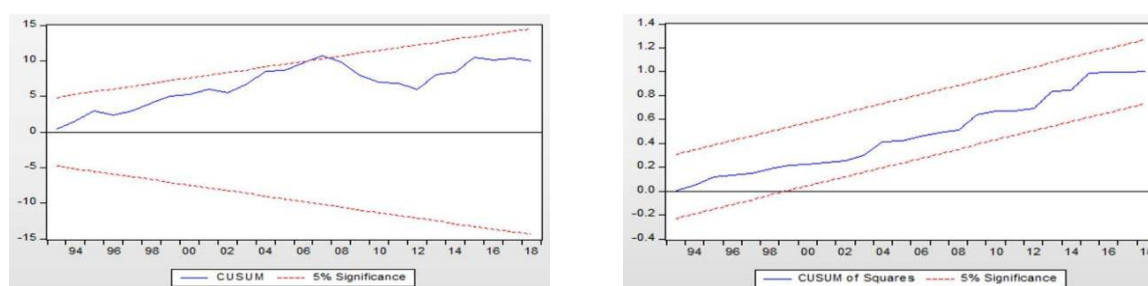
Source: By Authors

4.3. Estimation of TC and LT relationships with crises

Despite the stability of our model and the econometric validity of our ARDL regressions, the period selected is characterized by the advent of two economic-political crises. It would be wise to study the effects of the introduction of these two crises on the tourism-economic growth relationship in Tunisia.

The phases of evolution over time of tourism as well as its resilience through retrospective analysis of its responsiveness to the various events that have impacted. The distinction of the origins of the crisis at the level of the Tunisian tourism sector shows that the internal factors responsible for these crises seem to be more serious and difficult to overcome. The stakes and perspectives related to the identity and attractiveness of the countries as tourist destinations are confronted with the different development logics and management practices.

We can distinguish two types of elements that impact these destinations either by anthropic events (caused either at the national level by the policies applied by the countries in the tourist case such as: the lack of diversification and / or promotion of tourism products, the absence of futuristic visions for the development of the sector, the deterioration of the tourist image of the country at the global level ... or by the international system cite: (such as terrorism, wars, social, political, cultural events, ...) or by natural events (such as unpredictable natural disasters resulting in massive destruction but remain minimal compared to the damage caused by anthropogenic threats).

The estimation operation of the ARDL2 model offering the possibility to study the dynamics of CT and LT between the TOUR and PIBH following the integration of two dummy variables in the second modeling representing the effects of the main crises that affected the economic situation in Tunisia that of 1986 and 2011.

Table N°5. ARDL2 and limits Cointégration Test

		Critical limits 1%		Critical limits 5%		Critical limits 10%	
		I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
TOUR leads PIBH (With 2011 crisis and 1986 crisis)	F-statitics						
	22.82	3.29	4.37	2.56	3.49	2.2	3.09

Note: Sample: 1975-2018. The selected model and corresponding F-statistics for PIBH as the dependent variable is an ARDL (1, 2, 3, 0, 0) that passes the statistical robustness tests (autocorrelation of residuals, normality of error terms, functional form specification, heteroscedasticity and model stability). In accordance with Pesaran et al (2001), the specification of the deterministic component is the case: Restricted Constant and No Trend was selected as the element in our regressions.

The introduction of the two dummy variables "Crisis 86" and "Crisis 2011" has led to a new ARDL, which means the birth of a new cointegration relationship in the line of Pesaran et al. (2001). The results of Table 8, show an F-statistics equal to (22.82) higher than the upper bounds cited by Pesaran at the risk of 1%, 5% and 10% which confirms the existence of a LT relationship between the selected variables.

In contrast to the first model, annual tourism receipts have a positive and statistically significant effect at LT on GDPH growth. Thus, this modeling has made the positive relationship between these two variables clearer and statistically significant which shows that taking into account the crises gives more conformity to the tourism growth relationship.

Therefore, the integration of the two crises (the one resulting from the revolution of January 14, 2011 and the economic crisis of 1986) in our model as "Fixed Regressors" did not effectively alter the explanatory variables at the level of the long-run relationship resulting from the cointegration relationship in line with Pesaran et al.)

Table N°6. Long-term estimation

Explanatory variables Coefficients T-Statistics

Explanatory Variables	Coefficients	T-Statistics
TOUR	*561,6082****	*4,5080*
OUV	*-61,8979****	*-2,8020*
FBCF	*1,1565***	*3,2874*
INFLA	*-16747,96***	*-2,8577*
Les tests statistiques de robustesse *P -value*		
Autocorrelation	*Breusch-Godfrey Correlation LM test*	*0,26*
Formed functional	*Ramsey's RESET test*	*0,66*
Residues Normality	*Jarque-Bera test*	*0.39*

Heteroscedasticity	Breusch-Pagan-Godfrey test	0,20

Statistical robustness tests Dependent variable: GDP per capita

Notes: GDPH = real GDP per capita at constant 2005 prices; TOUR = annual tourism revenue per capita/CER; OUV = degree of openness to the outside world; INFLA = inflation rate at constant 2015 prices; GFCF = gross fixed capital formation per capita at constant 2005 prices. Period considered 1975-2018. (***) (**) indicate significance at 1%, 5% risk respectively.

Our ARDL2 model passing diagnostic tests and results are reported in Table 9. The p-values indicated that there is no evidence of serial correlation and heteroscedasticity. In addition, the p-value of the functional form is an evidence of good linear specification of the model and the p-value is an indication of the acceptance of the null hypothesis of the normality assumption of the residuals.

According to the ST estimation table 10, the speed of adjustmentθ_1 is between 0 and -1 of value equal to -0.16. It is statistically significant at the 1% risk. This validates the cointegration relationship between the explanatory variables selected, in particular between annual tourism revenue per capita divided by TCER and GDP growth per capita at LT.

Table N°7. Short-terme Estimation

Dependent variable: GDP per capita

Explanatory Variables	Coefficients	T-Statistics
ΔTOUR	71,9311***	4,0964
ΔTOUR (-1)	-48,4537**	-2,3715
ΔINFLA	-1069,395**	-2,3685
ΔINFLA (-1)	2039,744***	3,9735
INST 86	-158,4369**	-3,5910
INST 2011	-150,3799**	-3,1682
ECM (-1)	-0,1608***	-12,7047

Diagnostic tests

R-squared	0,7619
F-Statistic	22,8255
CUSUM	Stable
CUSUMSQ	Stable

Notes: GDP per capita = real GDP per capita; TOUR = annual tourism receipts per capita/REER; TRADE = degree of trade openness; INFLA = the inflation rate; INV= gross fixed capital formation; INST 86=the economic crisis of 1986; INST 2011=the revolution of January 14, 2011. Period retained 1975-2018, (**), (***) represent .5%, 1% respectively the level of significance

According to the previous table, the inclusion of the two dummy variables in our model did not alter any change in terms of the explanatory power of the TOURs on the GDP growth inferred through the ARDL1 model. However, the two crises included on the two years of 1986 and 2011 in our model translating our dummy variables having a negative and statistically significant effect at the 5% risk.

Since the outbreak of the revolution, economic growth has been steadily deteriorating. The deterioration that extended to the tourism business may also be as cause of the modest growth in 2016. The security instability and the series of attacks that hit the country in 2015 resulted in a 33% decline in tourism revenues between 2014 and 2015 and another 4% in 2016.

With respect to the control variables, the TC estimates revealed that inflation has a negative effect keeping the same effect exerted in model 1. Nevertheless, trade openness and gross fixed capital formation have no effect on economic growth in the TC.

The following graphs of the CUSUM and CUSUMSQ statistics are within the critical limits meaning that all coefficients of the error correction model are stable.

Graph N°6 ARDL2 stability tests: Cusum and Cusum Square tests
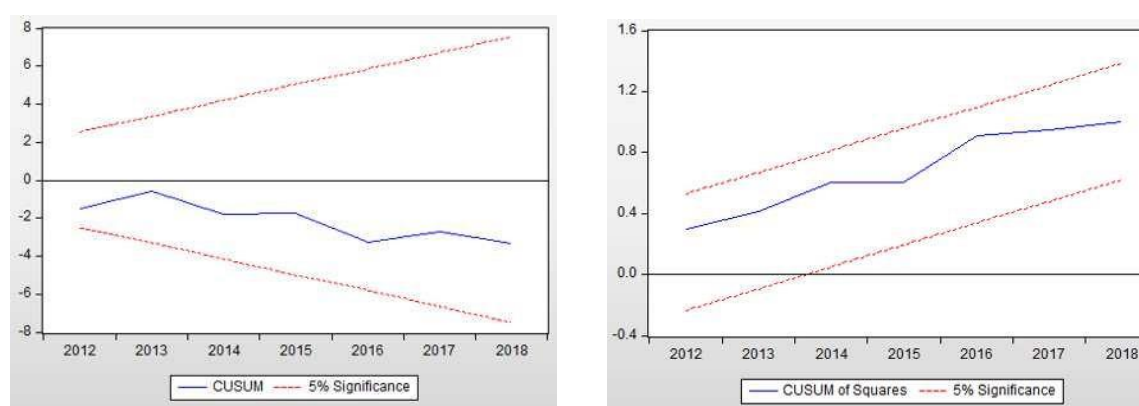
Source : Authors

4.4. Discussion and Recommendations for a possible national tourism strategy

Our study for the case of Tunisia has shown the robustness both in the short and long term of the positive relationship between tourism and economic growth per capita. Its contribution in the promotion of the standard of living of the citizen, approximated by GDP per capita, is undoubtedly validated empirically.

Tunisia, which has been engaged in a democratic process since the 2011 revolution, is oscillating between a difficult economic situation and a desire to achieve a sustainable democratic, economic and social transition. In particular, it is perceived as a cheap destination that has favored mass tourism since its launch to the detriment of the quality of services offered, and this despite the political crises that have negatively impacted the fundamentals of the economy. Therefore, it is clear that the tourism-growth relationship in Tunisia is very resilient and solid in the face of political crises, which highlights a consensus that political and economic crises do not have a lasting effect on the stability of the tourism-growth relationship.

As possible recommendations for our country suffering from a lack of foreign currency and a chronic imbalance of the current deficit of the balance of payments, a strategic reflection of competitiveness of this sector is necessarily to rethink. It is essential to develop a favorable and stable environment with the help of fiscal and financial incentive policies. A policy of diversification of markets, products and services offered to refine the brand image of Tunisia as a tourist destination deserves special attention. At the same time, as part of the socio-political orientation towards positive discrimination between regions, regional tourism investments highlighting the cultural and natural heritage of the region are a cornerstone to fight unemployment, create income for the region and boost the creation of value added (growth) at regional and national level. In addition, the intensification of professional training of human resources from travel agencies through top management to security guards are a measure of first rank support in this strategy.

Referring to the "linkage effects" of tourism, it is advisable to integrate this tourism activity fully into the national economy in order to maximize the social benefits resulting from tourism specialization by strengthening the links and complementarities with other sectors (agriculture, industry, crafts, etc.).

However, real multiplier effects can only be generated if tourism is integrated into local activities. The "leakage effects" where experience has shown the extent of these effects of tourism activity to the detriment of local economies.

5. Conclusion

The analysis of the dynamics of economic growth seems to be a difficult task because of the multidimensional factors that can be discussed within a wide variety of growth models, of which a plethora of studies have included tourism in this set. The emergence of the tourism sector and its rapid growth in recent decades has been beneficial to the economy as a whole through the direct positive effects of its contribution to the creation of value added and employment and to the balance of payments.

Over the last few decades, many researchers have been interested in examining the link between tourism and economic growth in an attempt to validate the "Tourism Led Growth Hypothesis". The results of the estimates have shown a mixed picture even for a single country: positive effect, negative effect, neutral effect. In recent years, the conflicting results have polarized the attention of researchers and constituted the object of several issues: anomalies associated with the identification of econometric models and estimation methods, possible non-linear relationships, socio-political crises, and the varieties of tourism services, have constituted lines of research leaving the subject still relevant.

In Tunisia, despite the importance given to this sector at the national level, few published empirical studies have been conducted to test the TLGH hypothesis. Our study has sought to shed light on the debate on the validity of this hypothesis for the case of Tunisia.

The first originality of this study was to apply, for the first time in Tunisia, an econometric estimation methodology "Autoregressive Distributed Lag (ARDL) Models" of Pesaran and Shin (1998) and Pesaran, Shin and Smith (2001)) to test this hypothesis. Contrary to VAR modeling, this ARDL approach is very well adapted to relatively short time series that form a heterogeneous group in terms of stationarity (I (0) and I (1)). It allows to highlight the dynamics of the relationship in the short term as well as in the long term.

The second originality of this research work consisted in integrating the political dimension into this relationship by considering two dummy variables, the 1986 crisis and the 2011 crisis, introduced into the ARDL as "Fixed Regressors". The short- and long-term validity of the TLGH, the robustness of the results, and the stability of the relationship were our major concerns in this study.

The results of the econometric estimations showed that tourism receipts, adjusted for exchange rate effects, exert a statistically significant positive effect on GDP per capita in both the short and long run. The inclusion of dummy variables in the regressions capturing the 1986 and 2011 crises added rigor to our specification and to the validation of the positive short- and long-term tourism-growth relationship. Our results confirm the TLGH hypothesis in both the short and long term in Tunisia. Moreover, we must point out the negative effect of the political and economic crises of 1986 and 2011 on economic growth. This reflects that political instability affects the latter either directly or even through its determinants (openness to the outside world, inflation, capital formation, tourism revenues). Our two models are stable, and moreover, they outperform all robustness tests.

Our study suggests a certain adequacy between the two ARDL specifications by comparing the results of the two models retained: on the one hand, the effect of tourism is positive and significant in the short run as well as in the long run and on the other hand, the integration of the political crises of 1986 and 2011 approximated by dummy variables did not alter our results, on the contrary the results obtained showed the strength of the positive relationship between tourism and economic growth.

As possible recommendations for our country suffering from a lack of foreign currency and a chronic imbalance of the current deficit of the balance of payments, a strategic reflection of competitiveness of this sector is necessarily to rethink. It is essential to develop a favorable and stable environment with the help of fiscal and financial incentive policies. A policy of diversification of markets, products and services offered

to refine the brand image of Tunisia as a tourist destination deserves special attention.

At the same time, as part of the socio-political orientation towards positive discrimination between regions, regional tourism investments highlighting the cultural and natural heritage of the region are a cornerstone to fight unemployment, create income for the region and boost the creation of value added (growth) at regional and national level. In addition, the intensification of professional training of human resources from travel agencies through top management to security guards are a measure of first rank support in this strategy.

Referring to the "linkage effects" of tourism, it is advisable to integrate this tourism activity fully into the national economy in order to maximize the social benefits resulting from tourism specialization by strengthening the links and complementarities with other sectors (agriculture, industry, crafts, etc.). However, real multiplier effects can only be generated if tourism is integrated into local activities.

Leakage effects" where experience has shown the extent of these effects of tourism activity to the detriment of local economies''.

Certainly, the variables selected are characterized by a long-term equilibrium relationship and a significant short-term relational dynamic. Therefore, going deeper to explain this balance of results, probably by introducing new variables, by applying short- and long-term causality tests, and by introducing the qualitative dimension, opens up promising avenues of research for the validation of the TLGH.

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