ECONOMIC GROWTH BETWEEN TRADE OPENING AND FDI IN A CONTEXT OF POLITICAL INSTABILITY IN TUNISIA: EMPIRICAL EVIDENCE OF THE ARDL APPROACH

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Abstract:
The objective of this article is to empirically examine the effect of trade openness on economic growth in the Tunisian context for the period 1988-2020. We use a time series model for this purpose. The empirical results obtained show that trade openness and political stability can positively impact long-term economic growth, unlike foreign direct investment. The lack of impact from the latter factor may be explained by political instability and macroeconomic uncertainties, which hinder the transfer of technology brought by foreign firms.
Keywords: *economic growth ;* ***trade openness*** *;* ***political instability***

INTRODUCTION

Since the 1980s, the Tunisian economy has undergone several reforms aimed at broader integration into the global economy. An economic stabilization program was implemented to establish a market economy. Trade openness and free trade are the two pillars of these reforms. Additionally, Tunisian authorities have always targeted foreign direct investment (FDI), seen as a vehicle for technological transfer and technical progress that would enhance the economic development process. International trade enables countries to access markets, knowledge, and financing. It promotes the import of necessary goods and services, the circulation of knowledge and technologies, and provides access to global financial markets, also fostering economic development and overall progress.

This process could be reinforced by better attractiveness for FDI. FDI offers an alternative way to finance an economy struggling due to weak domestic savings and facilitates the implementation of productive investments, further stimulating economic growth.

However, the events that occurred in Tunisia during the revolution disrupted the smooth progress of these reforms. Factors such as political stability and the extent of terrorism appear to be crucial for the success of these reforms. Indeed, for FDI to fully play its role as a growth stimulant, it is essential to meet other conditions in the host economy (Nurbel and Ahamada, 2008). These include the host country's absorption capacity, such as the qualification of the workforce, financial development, infrastructure levels, and trade openness. This idea is based on the notion that growth in developing countries depends on their ability to adapt to and benefit from the technology available in developed countries (Barro and Sala-i-Martin, 1997). A low absorption capacity can restrict the positive effects of FDI on the host country's growth (Borensztein et al., 1998).

It is primarily for these reasons that, empirically, there is ambiguity surrounding theoretical developments, as some studies find a positive relationship between openness and growth (Feder, 1983; Edwards, 1998; Sachs and Warner, 1995), while others remain skeptical about the existence of such a relationship (Rodriguez and Rodrik, 2000; Brock and Durlauf, 2001; Greenaway, Morgan, and Wright, 2002). This is why we propose a time series model for the case of Tunisia for the period 1988-2020, where economic growth is explained by our growth equation, incorporating several indicators simultaneously.

The remainder of the article is organized as follows. In part 2, we present a summary of theoretical and empirical work on the relationship between openness and economic growth. In part 3, we present the methodology. Finally, we present the results and discussions in part 4 before concluding.

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I. LITERATURE PAPER

The literature on the relationship between economic growth and international trade has been significantly stimulated by the emergence of endogenous growth models. The work of Grossman and Helpman (1991) and Aghion and Howitt (1992) provides theoretical support for the predictions that openness can influence long-term growth through various channels.

Trade openness enhances the transfer of new technologies and facilitates technological progress as well as higher productivity. These benefits heavily depend on the level of economic openness. According to Zahonogo (2017), trade creates economic incentives that increment productivity through two dynamics: in the short term, trade reduces the misallocation of resources, while in the long term, it facilitates the transfer of technological advancements.

Building on this idea, recent research, including the work of Mtiraoui, A., and Talbi, N., (2022)[2], underscores the nuanced impact of trade openness on economic growth through technological transfer and productivity gains. Mtiraoui, A., (2015)[3] highlight that openness to trade allows countries, particularly those developing or emerging, to integrate into global value chains. This integration is key, as it not only promotes access to innovative technologies but also leads to the adoption of more efficient production practices and standards, which in turn increase productivity. Moreover, Mtiraoui's research emphasizes the role of institutional quality and the absorptive capacity of an economy as determinants in maximizing these gains. Stronger institutions can better support the diffusion of technologies across sectors, while a country's absorptive capacity the skills and infrastructure required to effectively use new technologies dictates the extent of productivity enhancements. These insights complement Zahonogo's (2017) findings by suggesting that the benefits of trade-induced technological transfer and productivity depend not only on openness but also on a country's institutional environment and investment in education and infrastructure, which determine how well these technologies are integrated and utilized.

Furthermore, trade openness promotes access to a wide range of intermediate goods and new finished products, thereby improving the country's productivity. An adopted openness policy not only allows for lower costs but also generates imitation goods similar to those from developed countries. Consequently, the economy is able to benefit from better accumulation of know-how, increased investment, and a more sustained production pace.

Teignier (2018) clarified that changes in productivity and the reduction of trade barriers influence both sectoral reallocation and growth and transformation. Using a general equilibrium framework, Dessy, Mbiekop, and Pallage (2005) also clarified that trade can promote the diversification and transformation of developing economies. This diversification of exports reduces fluctuations in foreign exchange earnings, improves the quality of manufactured products, and fosters growth and employment (Elhiraika and Mbate, 2014; Hausmann, Hwang, and Rodrik, 2007; Osakwe, 2007).

However, several studies cast doubt on the arguments for a positive link between openness and growth. They do not provide convincing answers and find neutral or even negative relationships between trade openness and economic growth (Capolupo and Celi, 2008; Musila and Yiheyis, 2015; Ulaşan, 2015). This is why it is important that trade openness is accompanied by policies that promote macroeconomic stability and an adequate investment climate (Newfarmer and Sztajerowska, 2012). In this regard, Baldwin (2003) observes that trade liberalization policies are never implemented in isolation; therefore, it is not possible to identify the impact of trade liberalization alone on growth. The goal should rather be to assess the impact of a macroeconomic and fiscal policy program that includes trade liberalization. In the same vein, Winters (2004) argues that, for trade liberalization to have a lasting effect on growth, it must be associated with other policies such as those encouraging investment and promoting human capital accumulation.

Indeed, these two factors are considered important determinants of growth by the new growth

[2]Mtiraoui, A., and Talbi, N., (2022). Liberalization of International Trade And Sectoral Economic Growth in Tunisia: Empirical Evidence by the ARDL Approach. *Journal of Global Economics.* Vol.10, N°*9*. Pp1-10.

[3] Mtiraoui, A., (2015). Openness, human capital and economic growth In MENA: Theoretical foundations and application to dynamic panel data. *MPRA Paper. econpapers.repec.org*

theory. Kim and Lin (2009) inferred that the impact of trade openness on long-term economic growth varies depending on the level of economic development. Herzer (2013) even emphasized that trade openness has positive effects on developed countries and negative effects on developing countries.

Our paper is divided into five sections, the first of which considers the introduction. For the second section highlights a review of recent literature. The third section is devoted to the methodology. The discussion of the results will be the subject of the fourth section to end with the last section by the conclusion

II. WORK METHODOLOGY

III.1. Model:

We use annual data covering the period from 1988 to 2020, originating from a single country (Tunisia). The choice of the study period is tied to data availability. Economic growth is measured by the logarithmic difference of gross domestic product per capita (GDP per capita).

We employ the ARDL approach proposed by Pesaran, Shin & Smith (1999) to analyze both the short-term and long-term relationships between economic growth and trade openness, with variables integrated of order (0) and order (1). We propose the following model (I):

$$\begin{aligned}\Delta(GDP/C)_t = \alpha_0 &+ \sum_{i=0}^{p} \alpha_{1i}\,\Delta(GDP/C)_{t-i} + \sum_{i=0}^{q} \alpha_{2i}\,\Delta(TO)_{t-i} + \sum_{i=0}^{q} \alpha_{3i}\,\Delta(PVT)_{t-i} + \sum_{i=0}^{q} \alpha_{4i}\,\Delta(HK)_{t-i} \\ &+ \sum_{i=0}^{q} \alpha_{5i}\,\Delta(INL)_{t-i} + \sum_{i=0}^{q} \alpha_{6i}\,\Delta(FDI)_{t-i} + \sum_{i=0}^{q} \alpha_{7i}\,\Delta(PS)_{t-i} + \sum_{i=0}^{q} \alpha_{8i}\,\Delta(TSM)_{t-i} \\ &+ \sum_{i=0}^{q} \alpha_{9i}\,\Delta(UPR)_{t-i} + \beta_1 GDP_{t-1} + \beta_2 TO_{t-1} + \beta_3 PVT_{t-1} + \beta_4 HK_{t-1} + \beta_5 IFL_{t-1} \\ &+ \beta_6 FDI_{t-1} + \beta_7 PS_{t-1} + \beta_8 TSM_{t-1} + \beta_9 UPR_{t-1} \\ &+ \varepsilon_t \qquad (\boldsymbol{I})\end{aligned}$$

With:

GDP/C: GDP per capita at constant prices, Data are taken from the WDI database.

TO: This is a measure of the degree of trade openness, by the ratio: ((Exportation + importations))/GDP. WBI

PVT: This is a measure of poverty by the household standard of living. Data are accessible from the World Development Index (WDI).

FDI: Foreign direct investment. This is the value of equity invested by foreign investors in resident companies of the Tunisian economy and the net loans they have granted them. FDI stocks are a percentage of GDP. Data are extracted from the Central Bank of Tunisia (BCT) database

UPR: This is the unemployment rate, measured by the ratio of the number of unemployed / the active population. The data for this variable are taken from the World Bank[4].

IN: This is the inflation rate, measured by the GDP deflator. The data are extracted from the Central Bank of Tunisia database. We consider that this indicator reflects macroeconomic instability and uncertainty.

PS: This is a measure of political stability. This indicator measures the probability that the government could be destabilized or overthrown either by unconstitutional means or by violence (political violence or terrorism). Low values of this indicator reflect an absence of violence/terrorism. The data for this variable are taken from the Trading Economics database.

TSM: This indicator measures the number of annual terrorist attacks that a country has suffered. The data are taken from the Global Terrorism Database (GTD).

HK: human capital is often considered a key determinant of long-term growth, as it enhances labor productivity and innovation, especially in developing economies. (school enrollment rate).

[4] Mtiraoui, A., and Chemli, L., (2024). The Impact of Tourism on Economic Growth in Tunisia: Application through ARDL Modelling. *Contemporary Readings in Law and Social Justice.* Vol. 16, N°1. Pages 1327 – 1343.

However, the recourse of the dependent variable in equation (**I**) to its long-run equilibrium level may not be immediate following a change in one of its determinants. Thus, the speed of adjustment between the short and long run of the levels of the dependent variables can be captured by estimating the following error correction model:

$$\Delta(GDP/C)_t = \alpha_0 + \sum_{i=0}^{p} \alpha_{1i}\,\Delta(GDP/C)_{t-i} + \sum_{i=0}^{q} \alpha_{2i}\,\Delta(TO)_{t-i} + \sum_{i=0}^{q} \alpha_{3i}\,\Delta(PVT)_{t-i} + \sum_{i=0}^{q} \alpha_{4i}\,\Delta(HK)_{t-i} + \sum_{i=0}^{q} \alpha_{5i}\,\Delta(IFL)_{t-i} + \sum_{i=0}^{q} \alpha_{6i}\,\Delta(FDI)_{t-i} + \sum_{i=0}^{q} \alpha_{7i}\,\Delta(PS)_{t-i} + \sum_{i=0}^{q} \alpha_{8i}\,\Delta(TSM)_{t-i} + \sum_{i=0}^{q} \alpha_{9i}\,\Delta(UPR)_{t-i} + \theta\omega_{t-1} + \varepsilon_t \qquad (II)$$

Where Δ represents the first difference operator, ω_{t-1} represents the error correction term of our model (ECT). The ECT in the equation measures the speed of adjustment for the disequilibrium between the short and long term of the dependent variable. We expect the ECT to have a negative and significant sign (Gujarati DN, 2003).

The ARDL (Auto Regressive Distributed Lags) methodology allows for the analysis of both short- and long-term relationships between economic growth and trade openness, with variables that are both integrated of order (0) and order (1). The existence of a cointegration relationship between the variables of an econometric model is tested through several tests.

However, the bounds test for cointegration, proposed by Pesaran et al. (1999, 2001), is increasingly used in recent studies. This choice is due to the fact that this technique has the advantage of being more efficient for studies with a small sample size and applies to series that are integrated of order 1, level 0, or mutually integrated, unlike traditional cointegration tests such as those of Engle and Granger (1987), the Johansen test (1988), and the Johansen and Juselius test (1990). However, the technique ceases to be applicable when the order of integration of the series is higher than 1. Another advantage of this method is that it allows for the estimation of both short- and long-term dynamics in the same econometric model (Akpan et al., 2012).

- ***The empirical exercise would proceed in several steps:***

To verify the existence of a cointegration relationship, it is first necessary to establish the order of integration for each variable. Thus, we will use the Dickey-Fuller test (ADF), the Phillips-Perron (PP) test, and the Break Point test, which are popular unit root tests commonly used to test and verify the order of integration of the series. These tests are carried out with different specifications to check whether the series is stationary at level or in difference. They assume a null hypothesis of non-stationarity against an alternative of stationarity.

Next, we need to verify the existence of a cointegration relationship; for this, we will use the Bounds test for cointegration. This test is essentially based on the Wald F-statistic, where the null hypothesis indicates the absence of a cointegration relationship. The Bounds test involves first estimating model (1) by ordinary least squares (OLS). Then, the joint nullity of the long-term multipliers is tested using the F-test. Thus, the two hypotheses under consideration are presented as follows:

$\boldsymbol{H_0}$: $\boldsymbol{\alpha_i}$ =0

$\boldsymbol{H_1}$: $\boldsymbol{\alpha_i}$ ≠0.

With ; i ∈ {0,1,2,3,4,5,6,7,8,9}

Finally, the last step is to compare the calculated Fstatistic with the critical value. Indeed,

Pesaran et al. (2001) report two sets of critical values for a given significance level.

After specifying our modeling, the general approach will be continued by a number of specification tests, including: (i) residual normality (Jarque-Bera normality test); (ii) series correlation (Breusch-Godfrey LM test); (iii) heteroscedasticity (ARCH test); and (iv) model specification (Ramsey regression error specification test - RESET). These steps are continued by the CUSUM and CUSUM squares test to analyze the stability of the model.

III.2. Model

- ***Results and discussions:***

Before analyzing these variables using the ARDL approach, we will present a descriptive study of the annual data covering the period from 1988 to 2020.

Table 1: Descriptive statistics.

	GDP/C	TO	PV	HK	IFL	FDI	UPR	PS	TSM
Mean	29.492	2.0331	37.677	0.3485	4.6394	2.51393	14.989	-0.1428	3.8437
Me.	25.295	1.7050	40.250	0.5550	4.43000	2.1750	15.260	0.0550	1.000
Max.	50.270	4.4200	43.400	0.7300	8.2300	9.4200	18.330	0.9600	29.000
Min.	11.290	0.6600	4.035	0.0041	1.9800	0.6000	12.370	-1.1400	0.0006
Std. Dev.	13.710	1.0644	6.9261	0.3347	1.7700	1.7191	1.3493	0.5153	7.5139
Skewness	0.1473	0.7421	-3.7037	-0.0874	0.5683	2.1717	-0.13603	-0.4503	2.1818
Kurtosis	1.4502	2.4897	18.6245	1.0537	2.3628	9.38158	3.4837	2.3249	6.5394
Jarque-Bera	3.3181	3.2846	398.657	5.09112	2.2640	79.4545	0.4101	1.6891	42.092
Prob.	0.1903	0.1935	0.0031	0.0784	0.3223	0.00032	0.8145	0.4297	0.0001
Sum	943.76	65.060	1205.52	11.1500	148.46	80.4460	479.42	-4.5700	123.00
Sum Sq. Dev.	5827.1	35.123	1487.077	3.473422	97.13199	91.61630	56.441	8.2342	1750.2
Obs.	32	32	32	32	32	32	32	32	32

Source : Working by author

We note that the average level of terrorist attacks was 3.84. This shows that the average values of the incidences of terrorism and losses are very high. An increasing number of incidents and casualties are responsible for the loss of not only human lives but also hinders the growth process. Similarly, the average values of inflation, poverty and unemployment are higher than the minimum desirable level.

Similarly, the average value of political stability, GDP, trade openness and net foreign direct investment inflows are very low. So overall, Tunisia's conditions are not up to par.

Before analyzing these variables using the ARDL approach proposed by Pesaran et al 2001, we used unit root tests to assess the order of integration of the variables. The stationarity of all variables was tested using first the ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) procedures and then the structural break test to avoid any possible ambiguity in the order of integration of the variables.

The results presented in Table 3 show that all the variables are integrated of order 1 I(1) with the exception of two variables which are political stability and foreign direct investment FDI which are stationary at level I(0). These results confirm that all the variables have an order of integration lower than 2.

Table 2: Stationarity tests

Variables	ADF Test		PP Test		Breakpoint Test	
	In level	First difference	in level	First difference	in level	First difference
GDP/C	-1.073837 [0.7138]	-4.120795* [0.0032]	-1.049979 [0.0.7229]	-4.189205 [0.0027]	-3.579776 [2002]	-5.648636* [2008]
TO	-1.667774 [0.4371]	-8.872457* [0.0000]	-1.509798 [0.5159]	-15.31244 [0.0000]	-3.354783 [1990]	-10.36230* [1991]
TSM	-2.080226 [0.2535]	-5.323000* [0.0002]	-2.080226 [0.2535]	-9.364006* [0.000]	-20.41911 (2012)	-11.68005** (2012)
UPR	-2.353594 [0.1626]	-5.471741* [0.0001]	-2.439659 [0.1397]	-5.872020* [0.000]	-3.344265 (2013)	-10.02893** (2011)
PS	-2.9206*** [0.0540]	-6.404084* [0.000]	-2.878396 [0.0591]	-16.67718* [0.0001]	-6.127244 (2008)	-8.654684* (1997)
FDI	-4.07182* [0.0036]	-9.449640* [0.000]	-4.096156** [0.0034]	-16.55148* [0.0001]	-4.580455* (1991)	-9.477037* (1933)
PVT	-1.394570 [0.9985]	-4.392025* [0.0016]	1.211274 [0.9974]	-4.392025* [0.0016]	-0.956485 (2008)	-5.464094** (2015)
IFL	-0.728960 [0.3923]	-7.940987* [0.000]	-0.897691 [0.3194]	-8.011709* [0.000]	-3.511857 (1991)	-8838506** (1993)
HK	-0.785119 [0.8098]	-4.664836 * [0.0008]	-0.785119 [0.8098]	-4.680710 * [0.0007]	-16.68331 (2001)	-12.45457 ** (2002)
(***), (**) and (*) denote statistical significance at the 1%, 5% and 10% levels respectively						

Source : Working by author

The results of the stationarity tests guide the decision to apply cointegration tests within the ARDL framework, emphasizing the importance of the Bounds test for confirming long-term relationships among the variables in the model.

According to Feridun and Shahbaz (2010), accurately selecting the appropriate lag length is essential for the reliability of the Bounds test results. In this study, the Akaike Information Criterion (AIC) is employed as the selection criterion for optimal lag length. The AIC, known for its efficiency in small samples, helps in balancing model complexity with explanatory power, minimizing the risk of overfitting or underfitting the model.

Table 3 presents the results of the Bounds test for cointegration, detailing the F-statistic values compared against critical values for upper and lower bounds. If the **F-statistic** falls above the upper bound, the null hypothesis of no cointegration is rejected, indicating a significant long-term relationship among the variables.

Table 3: Bounds cointegration test

Dependant variable	**lagselection**	**F-statistic**	**Decision**
GDP/C	(3, 2, 1, 2, 2, 2, 2, 2, 1)	17.195018	cointegration
Significance	I_0 Bound	I_1 Bound	
10%	1.85	2.85	
5%	2.11	3.15	
2.5%	2.33	3.42	
1%	2.62	3.77	
Lower and Upper-bound critical values are taken from Pesaran& al. (2001), Table CI (i) Case I.			

Source : Working by author

The results indicate that the calculated F statistic, at 17.195018, exceeds the critical value established by Pesaran et al. (2001) at the 1% level. This confirms the presence of at least one long-term relationship among the variables in Tunisia from 1987 to 2019. Consequently, equation (1) is estimated using the ARDL technique, with results presented in Table 4.:

Table 4 : Long term relationship

Variable	**Dependent variable PIB**		
	Coefficient	T-Ratio	Prob.
OC	19.31567	3.015743	0.0570
PAUV	0.292252	2.302258	0.1048
PT	-5.350582	-0.950967	0.4118
INFL	-17.52548	-4.032308	0.0274
IDE	-3.023956	-2.426253	0.0936
UNEM	-3.547092	-2.574707	0.0822
SP	-74.13790	-4.414243	0.0216
Terrorism	0.746620	3.160897	0.0508
C	105.6303	4.073459	0.0267

Source : Working by author

Table 4 presents our model's findings on the long-term relationship between economic growth and its determinants, particularly trade openness. The results confirm a significant long-term relationship between economic growth and its fundamentals in Tunisia. Specifically, trade openness positively impacts Tunisia's economic growth, showing that a 10% increase in openness results in a 19.31% rise in economic growth at the 10% significance level. This suggests that international openness effectively supports Tunisia's economic development.

The findings are consistent with those of Kaufmann et al. (2010), supporting the impact of country-specific risk on economic performance. Sequera and Nunes (2008) emphasize the importance of incorporating country risk factors into experimental models. Eilat and Enaf (2004) further identify international trade, terrorism, and exchange rates in developed countries as critical influences on economic growth, and they introduce a risk index evaluating political stability and security. They find that a one-point increase in country risk leads to a 0.2% decline in development levels. Additionally, frequent political leadership changes in Tunisia are associated with economic instability, contributing to terrorism and further economic decline, highlighting the detrimental effects of political instability on economic growth.:

Table 5 : Short-term relationship

Dependent variable: GDP			
Lagstructure: (3, 2, 1, 2, 2, 2, 2, 2, 1)			
Variable	Coefficient	t-Statistic	Prob.
GDP/C(-1)	0.460308	2.955947	0.0597
PVT(-1)	-0.134526	-1.783063	0.1726
HK(-1)	2.462917	1.241012	0.3028
IFL(-1)	8.067125	5.236463	0.0136
FDI(-1)	1.391952	4.076048	0.0267
UMR(-1)	1.632756	2.547679	0.0841
PS(-1)	34.12629	5.507684	0.0118
TRM(-1)	-0.343675	-2.670678	0.0756
D(GDP/C (-1))	-1.640794	-6.114323	0.0088
D(GDP/C (-2))	1.329779	3.494752	0.0396
D(TO(-1))	0.201684	0.366651	0.7382
D(TO(-2))	10.27899	4.764948	0.0176

D(PVT)	-0.270560	-4.662694	0.0186
D(HK(-1))	25.99578	4.272689	0.0235
D(HK(-2))	35.47569	5.078960	0.0147
D(IFL)	2.913933	3.988986	0.0282
D(IFL(-1))	-2.061388	-4.945133	0.0159
D(FDI)	-0.907676	-3.272481	0.0467
D(FDI(-1))	-1.442255	-6.347989	0.0079
D(UMR)	3.288955	5.009673	0.0153
D(UMR(-1))	-3.235727	-2.881011	0.0635
D(PS(-1))	16.19996	4.916877	0.0161
D(PS(-2))	-5.814528	-6.436298	0.0076
D(TRM)	-0.684072	-4.034733	0.0274
ECT(-1)	-48.62248	-3.685963	0.0346
Adj. R2=.0.999704 ; AIC=1.606297; F-stat.=405.9372, F-prob.=0.000174			

Source : Working by author

In fact, the existence of an equilibrium relationship between economic growth and the various explanatory variables of the model highlights a long-term relationship among them, at least in one direction. For the short-term coefficients, we observe that the lags of the GDP variable have a strongly significant and positive effect. Once the phenomenon of economic development appears in a given area, its spread accelerates over time.

Regarding the trade openness variable, its sign is positive and significant. This result confirms the hypothesis that openness enables developing countries to access foreign knowledge and expertise. In conclusion, the influence of openness policies on economic growth is undeniable. A dual advantage is linked to adopting openness policies: on one hand, it promotes technological progress, and on the other, it allows for a more substantial increase in the level of capital (broadly defined) and income. Therefore, countries implementing openness policies can expect high economic growth.

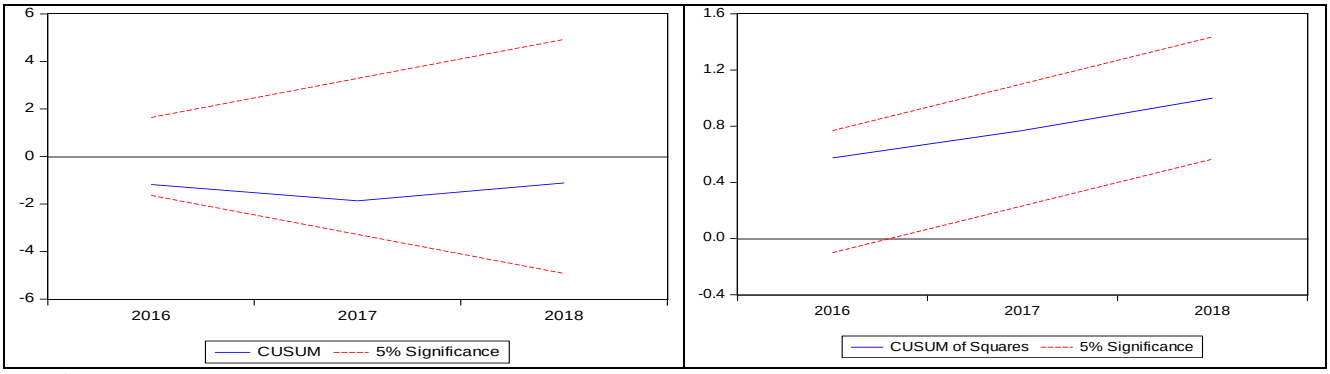
The results also show that the coefficient associated with the unemployment rate lagged by one period is higher than that associated with the same variable lagged by two periods. The amplification of unemployment has a positive and significant effect on economic growth. Regarding the lags of political stability, we observe that they positively and significantly affect economic growth.

Thus, a 1% increase in the country's political stability leads to a 34.12% appreciation in the growth rate. Finally, our results indicate that foreign direct investment (FDI) has a positive and significant effect in the short term. Concerning terrorist attacks, their lags have a negative and significant effect at the 1% level on economic growth.

Therefore, an increase in terrorist attacks by one percentage point results in a 0.34% decrease in the economic growth rate in Tunisia. Finally, the technical progress rate positively and significantly influences economic growth in the short term at the 5% level. Thus, a one percentage point increase in the level of technical progress results in a 34.47% increase in economic growth.

Table 6 : Diagnostic Test

x2 (serial correlation)1	**11052.01[0.0067]**		
x2 (functionalform)2	0.144842[0.8981]		
x2 (normality)3	3.569726[0.167820]		
x2 (heteroscedasticity)4	7.330787[0.0118]		



✓ TheBreusch–Godfrey LM test statistic for no serial correlation.

✓ The White's test statistic for homoscedasticity.

✓ The Jarque–Bera statistic for normality.

- ***The Ramsey's Reset test statistic for regression specification error***.

In order to validate the model, a series of econometric tests must be performed on the residual. Table (6) contains the results of the diagnostic tests of the selected ARDL model (3, 2, 1, 2, 2, 2, 2, 2, 1). The Jarque-Béra test of normality confirms that the distribution is normal. In addition, from the results of the "Breusch-GodfreyLgragemultiplié" test of the correlation of the series and the Breusch-Pagan-Godfrey test of heteroscedasticity, an absence of correlation of the residuals is shown, which means the absence of heteroscedasticity. In addition, the Ramsey Reset test confirmed the linear specification of our model.

Finally, and in order to judge the structural stability of the model coefficients, one of the econometric requirements for an ARDL model is to properly verify the presence of parameter stability. In order to test the stability of the short-run and long-run coefficients estimated by the ARDL model, we apply the cumulative sum (CUSUM) and cumulative sum of squares (CUSUM Square) tests, performed on recursive residuals from the ARDL model estimated in this paper (Brown et al. 1975). The test results are presented in Table 6. We note that the curves do not intersect the 5% confidence interval, considering that the CUSUM and CUSUM squared plots are located within the 5% critical limits. Thus, we have empirical evidence that the estimated coefficients of the ARDL cointegration model (3, 2, 1, 2, 2, 2, 2, 2, 1) are structurally stable.

IV. CONCLUSION

This paper attempts to test the impact of trade openness and foreign direct investment on economic growth in the case of Tunisia. An ARDL approach was adopted for the period from 1988 to 2020. Our results show that trade openness positively impacts economic growth in the long run. Trade openness creates an environment conducive to economic growth by encouraging competition, specialization and efficiency.

Political stability creates an environment conducive to investment by building investor confidence and reducing political risks. When investors perceive a stable political environment, they are more likely to engage in long-term investments. This stimulates economic activity, promotes the development of local businesses and generates employment opportunities. In addition, increased political stability promotes effective governance, predictability of economic policies and protection of property rights, thus creating an environment conducive to business expansion and attracting foreign direct investment. Trade openness and political stability thus appear as key elements that interact and reinforce each other, thus contributing to promoting sustainable and sustained economic growth. As part of this line of research, our econometric study through ARDL modeling showing a positive and significant effect of tourism revenues on GDPH at ST although at LT. However, our results also show that foreign direct investments have an unfavorable effect on growth in Tunisia. This result

is revealing and shows a lower absorption capacity of Tunisia for the technologies generated by these investments. We can add to this the absence of the implementation of complementary policies to the trade openness policy concerning the general macroeconomic framework. Furthermore, the inefficiency of political and economic institutions seems to be an important factor that can explain this unfavorable effect. As part of a perspective of improving economic policy in Tunisia, a set of proposals could be formulated. First, Tunisia should continue to combat political instability and terrorism on the one hand and undertake stabilization policies aimed at controlling inflation and unemployment to improve the macroeconomic framework as a whole on the other hand. Then, consolidate its business climate in order to attract more foreign investors for a better technology transfer. Finally, it is important that the trade opening strategy succeeds in stimulating competitiveness, innovation and foreign investments. By adopting a balanced approach between trade opening and political stability, Tunisia can create an environment favorable to economic growth, job creation and poverty reduction.

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REFERENCES

1. Aitken, B. et A. Harrison (1994). "Do Domestic Firms Benefit from Foreign Direct Investment? Evidence from Panel Data," Policy Research W.P. No.1248, Policy Research 58 Department, World Bank, Washington DC.
2. Annaji H. & al . (2023). IDE, ouverture commerciale et croissance économique : Evidence empirique pour le Maroc (1985-2020), Revue Française d'Economie et de Gestion . Vol 4 : N° 5, pp :186 – 207.
3. Balakrishnan P., K. Pushpangadan et M.S. Babu (2000). "Trade Liberalization and Productivity Growth in Manufacturing: Evidence from Firm-Level Panel Data," Economic and Political Weekly, October 7, 3679-3682.
4. Bee Yan Aw, Sukkyun Chung et Mark J.Roberts (1998) "Productivity and the decision to export: micro evidence from Taiwan and South Korea" Working Papers 6558 NBER.
5. Bee Yan Aw, Sukkyun Chung et Mark J.Roberts (1998) "Productivity, Output and Failure: Comparison of Taiwanese and Korean Manufacturers" Working Papers 6558 NBER.
6. Clerides, S.K, S. Lach et J.R. Tybout (1998). "Is Learning by Exporting Important? Micro Dynamic Evidence from Colombia, Mexico and Morocco," Quarterly Journal of Economics 113, 903,947.
7. Djankov, S. et B. Hoekman (2000). "Foreign Investment and Productivity Growth in Czech Enterprises,"World Bank Economic Review 14(1), 49-64.
8. Fontagné, L. and M.Pajot. 1997. How foreign direct investment affects international trade and competitiveness: An empirical assessment. Paris, CEPII. Working Paper: 97/17.
9. Haddad, M. et A. Harrison (1993). "Are there Positive Spillovers from Foreign Direct Investment? Evidence from Panel Data for Morocco," Journal of Development Economics 42, 51-74.
10. Harrison, A. et S. McMillan Margaret (2001). "Does Foreign Direct Investment Affect Domestic Firms Credit constraints?". NBER Working Papers 8438.
11. Harrison, A.(1994). "Productivity, Imperfect Competition and Trade Reform," Journal of International Economics 36, 53-73. 21
12. Jérôme Sgard (2001). "Direct Foreign Investment and Productivity Growth in Hungarian Firms, 1992-1999." CEPII, document de travail n° 01-19.
13. Karim, M., and Attoumane, A. B. (2021). "The impact of Trade Opening on Economic Growth in Africa: A Panel Study. International Journal of Accounting, Finance, Auditing, Management and Economics", 2(1), 233-257. https://doi.org/10.5281/zenodo.4495573
14. Mtiraoui, A. (2015). ''Openness, Human Capital and Economic Growth in MENA: Theoretical foundations and application to Dynamic panel data''. https://core.ac.uk/display/211615509.

15. Mtiraoui, A., and Chemli, L., (2024). The Impact of Tourism on Economic Growth in Tunisia: Application through ARDL Modelling. Contemporary Readings in Law and Social Justice. Vol. 16, N°1. Pages 1327 – 1343.
16. Mtiraoui, A. and Talbi, N. (2022). ‘‘Liberalization of International Trade And Sectoral Economic Growth in Tunisia: Empirical Evidence by the ARDL Approach’’. Journal of Global Economics. Vol.10. Issue 9.Pages 1-10.
17. Paolo Epifani (2003). “ Trade Liberalisation, Firm Performance and Labor market Outcomes in the developing World : What Can We Learn From Micro-Level Data ?”
18. Rodrik, D. (1996). “Trade and Industrial Policy Reform in Developing Countries”, Handbook of Development Economics and Trade, 1996 .
19. Smarzynska, B.(2002). “Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages,” World Bank Policy Research Working Paper No. 2923.
20. Tybout, J.R.(1991). “Linking Trade and productivity New Research Directions”, The world Bank Economic Review, Vol.6, 2, 1991.
21. Wolfgang Keller (1997) “How Trade Patterns and Technology Flows Affect Productivity Growth” WB, Working Papers 1831