Original scientific paper

ARDL MODELING OF TUNISIAN ECONOMIC GROWTH

Imtinen Ben Saied [1]

Abstract

Investment is an essential tool for generating an increase in productivity and an increase in the stock of capital. Indeed, given its positive short-term and long-term effects (Bouchoucha et al (2019) in several sectors, investment is one of the most important drivers of growth. On the other hand, high investment is a good sign for economic growth. This could be explained mainly by the rate of profit derived more from public investment (Paloma et al 2004). Investment can play an important role in the attractiveness of certain developing countries, especially by in relation to its foreign component. The case arises in Tunisia, which has always been concerned about these foreign direct investments (FDI) which are supposed to strengthen its exports, boost job creation, generate technology transfers and embellish the contribution of the economic development, especially industrial development.

The objective of this article focuses on evaluating the impact of investment on Tunisia's economic growth between the years 1972-2021. We applied the test of stationarity and cointegration of the different variables in order to estimate the model Autoregressive Scaled Lag (ARDL). Estimation results show that investment has a negative effect on economic growth in the short term. However, these estimates suggest a positive long-term effect.

Keywords: Economic Growth, FDI, Tunisia, ARDL model.

JEL classification codes: O1; 011; 016

INTRODUCTION

Economic growth refers to the steady course of action by which the productive capacity of an economy is improved in time to bring about increasing levels of national output and income. It is defined as the increase in the set of goods and services produced over time. This growth is generally linked to the growth of a country's potential output. It should be noted that studies on economic growth have been largely renewed in recent decades. The factors of growth include labour, capital and productivity. However, the role of country-specific structural data has been better recognized and has been the subject of countless researches. Today, it seems useful to us to show that growth is the unavoidable challenge sought by public policies in most developing countries. Indeed, it appears to be an essential way to solve economic and social problems.

In this context, public policies today have a set of tools and mechanisms that aim to stimulate economic growth (Iaich et al 2020), in particular investment, which is the key determinant for boosting economic growth. and increase aggregate demand.

Most rapidly growing countries invest a considerable fraction of their GDP. It is clear that investment is a vital component of economic growth. Economists define it as the source of production of goods which will be used to produce other goods. It is a fact

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that economists have developed a common opinion on the constructive effect of investment on economic growth. Tunisia, like most developing countries, confirms the role of investment which has become essential for economic growth thanks to the positive externalities they generate in the economy in question.

The Tunisian economy stalled after the 2011 revolution, resulting in a decade of lost growth in a context further aggravated, from 2020, by the COVID-19 pandemic. Between 2011 and 2019, gross domestic product growth fell to 1.7% on average. Low investment and lack of innovation have weighed heavily on the country's economic growth (ITCEQ 2016). Job creation slowed in the post-revolution period as the economy failed to produce enough job opportunities. Markets are increasingly concentrated, creating barriers to entry, while the costs of doing business remain high across all sectors, not least because of cumbersome investment rules. Although the Tunisian economy has felt these consequences, it is currently in the recovery phase. Growth is expected to increase by 3.3% in 2023 and 3.6% in 2024 (World Bank, 2022) on the latest global economic outlook.

Investment is therefore the key determinant for pushing this economic growth. Indeed, it provides capital and increases competition in the country's industries while improving the productivity of companies by adopting more efficient technologies or by investing in human or physical capital. It should be noted here that this macroeconomic aggregate contributes considerably to growth because it serves as a source of capital, thus making it possible to create jobs. However, investment is seen as a key driver of economic growth and development. It not only stimulates capital formation, but also improves the quality of domestic capital. In this context, and according to Jean-Marc Fournier (2016), public investment has a positive effect on long-term growth and labor productivity. Indeed, public investment can also increase the speed of convergence of catching-up countries. In addition, in a context of trade liberalization, foreign direct investment (FDI) could strongly contribute to the transfer of modern technology and innovation from developed countries to developing countries and subsequently, they could boost transactions. trade and enhance economic growth (Mansouri 2009). Note here that Tunisia was among the first developing countries to promote FDI to increase its economic development through the potential effects of FDI, and to catch up with the development of countries (Alaya 2004). However, FDI has a positive and significant impact on the growth of the Tunisian economy in the short term rather than the long term. Indeed, according to Bouchoucha et al (2019), an increase in FDI of 1 point contributes to promoting economic growth in Tunisia in the short term and long term respectively by 0.512 and 0.298 points.

Given this observation, this article aims to analyze the role played by investment and its impact on the Tunisian economy during the period 1972-2021. It should be noted here that the choice of this period of study is explained on the one hand by the availability of data and on the other hand through the importance of this period, where Tunisia experienced various crises, in particular that of the revolution and of COVID19. To do so, we attempt in the first section to present a review of the literature on the relationship between investment and economic growth. In a second section, we present the methodology as well as the data to be used in our analysis. The third section

will be devoted to the results of estimates and their interpretations, then we end with a conclusion.

1. LITERATURE REVIEW

The relationship between investment and economic growth has long been a subject of great interest that has been the subject of several works.

Some works have focused on the role played by FDI such as the study by Nam Hoai Trinh et al (2015), which examines the impact of FDI on economic growth in Vietnam between 1990 to 2013 and this year. is using time series analysis techniques that deal with the problem of non-stationarity. The analysis results reveal that FDI inflows, domestic investment, trade openness and secondary education have positive effects on economic growth, while inflation rate has a negative effect on economic growth. . Furthermore, the authors suggest that the Vietnamese government should improve regulations governing business activities by facilitating the process of starting a business, controlling prices, increasing public spending on education and training, and increasing cooperation between training centers and companies with foreign capital.

Along the same lines, Bouchoucha et al (2019), attempted to examine the impact of FDI on economic growth in Tunisia and this is using time series data for the period 1980-2015. Empirical results show that FDI has a positive impact on economic growth in the short and long term. As for Louzi and Abadi (2011), they studied the relationship between economic growth and FDI in Jordan. Indeed, based on temporal data, the unit root test and the error correction model (ECM), the result of the study shows that FDI has a positive impact on GDP. However, this result reveals a positive association between foreign direct savings and economic growth.

The article by Hussain and al. (2016), titled "Foreign direct investment and economicgrowth in SAARC countries" examined the link between growth and FDI in South Asian Association for Regional Cooperation (SAARC) countries, using the least squares model, between 1990 and 2014. It is clear from the results that FDI has had a positive effect on economic growth. On the other hand, the contribution of domestic private investment is more reliable than the contribution of FDI, which loses its appeal as an engine of growth if the negative consequence on the balance of payments of the resulting repatriation of profits is also taken into account.

Other works focus on the effect of public investment, in particular the study by Devarajan et al. (1996), who looked at the effect of public investment on growth. The results show the existence of a negative impact of public investment on per capita GDP growth. Moreover, the authors attribute these results to the non-productivity of public investment. Dabla-Norris et al. (2011), for their part, they showed that public spending on infrastructure does not correctly capture the stock of capital, especially in developing countries. Indeed, according to them, the link between public spending on infrastructure and economic growth is weakened by the inefficiency of investments. Indeed, in developing countries, public investments made in contexts marked by corruption negatively affect economic growth (Dabla-Norris et al., 2011).

Private investment is at the heart of many works, such as the study carried out by the Tunisian Institute for Competitiveness and Quantitative Studies (ITCEQ) in 2016, showed that the private investment decision could be explained mainly by the rate of profit and, to a lesser extent, by the ratio of loans granted to the private sector. An increase in these two variables implies an increase of more than 2% in GFCF. Of

course, bank loans represent the dominant source of investment financing for private companies, mainly SMEs which represent 90% of the Tunisian industrial fabric. Cost of Doing Business in Tunisia", they tried to compare the effect of investment on economic growth in MENA countries between 1996 and 2001.

Indeed, the comparison with these countries also suggests that to achieve sustained growth, Tunisia must consolidate and further improve its human capital base, while continuing to strengthen the major cogs of its economy. However, despite the solidity of its macroeconomic fundamentals and the generosity of the incentives offered to investors, private investment in Tunisia remains below what it could be compared to other countries with strong growth. Empirical evidence suggests a loss of momentum in private investment since the mid-1990s. concerns the predictability and transparency of regulation, which weakens the investment climate. Vamvakidis (1998) tried to estimate a panel model in order to explain the determinants of investment in the Union (which EU union ???). The estimation results showed that financial liberalization, the degree of openness and transparency of the internal market are positively correlated with investment. In their work entitled "Impact of public infrastructures on the productivity of companies in Senegal" Diagne and Fall (2007) showed that public infrastructures play an important role in increasing the productivity of companies in Senegal, through the reduction of production cost. However, the study seems very limited in the analysis, since it only takes into account a few companies in the modern sector selected by sampling.

Given the interest of the works that provide rich information on the impact of investment on economic growth, we will focus in this research work on the analysis of the link between economic growth and foreign direct investment which can contribute to the growth across multiple streams (Alfaro 2003).

2. DATA AND METHODOLOGY

The question of the impact of foreign direct investment on economic growth has been the subject of numerous empirical studies. Although, some works are based on the estimation of the VAR model (Randolph & Ebenezer (2022), Olanrewaju and al (2015), Rafat (2018),..), as well as on the VECM approach (Nsabimana and al (2020) , Saba et al (2015), Asaduzzaman, Md (2021), Rosdiana Sijabat (2022), Najaf Ali and YeMingque (2018), Lütfi ERDEN (2005), …). Others are based on the ARDL model (Sarker and Khan (2020), Ntanga Ntita et al (2019), Bakari and El Weriemmi (2022), Bouchoucha and al (2019), Jehangir and al (2020), Cañal-Fernández and al (2018), DEMIR (2022), …). The results show that FDI flows on economic growth will have different effects depending on the country. Moreover, given this empirical literature, we will draw inspiration from the study by Ntanga Ntita et al (2019), in order to analyze the impact of FDI on Tunisian economic growth. We therefore propose a model of economic growth, which will be tested in a chronological series from 1972 to 2021. This model establishes the link between the endogenous variable defined by GDP and the exogenous variables which are: Foreign Direct Investments (FDI), private sector expenditure (DCPS), government final consumption expenditure (GGFCE), (TRD)), expenditure exports (EXP), inflation rate (INF), gross fixed capital formation (GFCF), gross fixed capital formation private sector (GFCFPS) and gross capital formation (GCF).

The model is defined as follows:

GDP= f (IDE, DCPS, GGFCE, TRD, EXP, INF, GFCF, GFCFPS, GCF) (1)

After specifying the economic model, it is necessary to transform it into what is called an econometric model defined as follows:

GDP= B0 +B1 IDE+ B2DCPS +B3GGFCE + B4TRD + B5EXP + B6 INF +B7 GFCF + B8 GFCFPS +B9 GCF + εt (2)

With $\beta 0$: is a constant, εt the error term and βj ($j = 1\ldots, k$) represents the different coefficients of the model to be estimated. It should be noted here that the choice of these variables is determined by the economic literature (see Table 1) dealing with the impact of investment on economic growth, and also by considerations related to the data, in particular their availability. All these data are extracted from the world bank (2023).

Table 1. Justification of choice of variables

Studies	Variables
Nsabimana et al (2020)	fixed investment and GDP
Francois Cornelius Wehncke and al (2023)	GDP, Official Development Assistance.
Sultanuzzaman, Md Reza (2018)	GDP and FDI
Jehangir and al (2020)	foreign direct investment (FDI), inflation (INF), expenditure (EXP), final consumption expenditure (FCE), gross fixed capital formation (GFCF)
Mounir Belloumi (2014), Bouchoucha (2019)	FDI GDP Trade gross domestic product per capita (GDP) and foreign direct investment (IDE), domestic investment (ID), school enrollment rate (SC) and trade openness (OUV)

In this study, we used an approach based on the application of the ARDL model (Pesaran et al (2001)). The approach is to first check whether the data series are stationary or not. For this purpose, we use the Augmented Dickey Fuller (ADF) test and the Phillips/Perron (PP) unit root test. Next, we will use Johansen's cointegration test to examine the cointegration between the model variables. Then we have to look at the ARDL methodology. We used EViews 12 software to perform the econometric estimates.

3. ESTIMATION RESULTS

This section will be devoted to the presentation and discussion of the different estimation results of our model. For this, we will first proceed to the descriptive analysis of the different variables and the presentation of the correlation matrix. We will also perform stationarity and cointegration tests in order to estimate the ARDL model.

• Descriptive statistics and correlation matrix

The descriptive statistics of the main variables of our study are presented in the following table:

Table 2. Descriptive statistics

	GDP	FDI	EXP01	DCPS	GFCF	GFCFPS	GGFCE	INF	TRAD
Mean	5.124017	2.422398	26.41316	56.24851	26.05374	15.22557	16.10284	6.718995	79.64732
Median	5.440944	2.046198	26.17213	58.95078	25.16665	14.75980	16.33760	4.526058	82.39034
Maximum	17.74272	9.424557	31.22731	71.18597	34.03130	21.14842	17.77554	24.39473	104.0594
Minimum	-1.446988	0.684526	19.62529	33.70155	19.76581	8.814988	13.22522	2.126477	50.08899
Std. Dev.	3.446052	1.638443	2.797201	9.830215	3.850840	3.786643	1.010146	5.064785	12.39384
Skewness	1.110301	2.571755	-0.236791	-0.693050	0.313680	0.203667	-0.944132	1.738858	-0.589051
Kurtosis	7.319679	11.77664	2.955713	2.582905	2.071156	1.621751	3.477521	5.966438	2.988682
Jarque-Bera	30.47133	133.6683	0.292229	2.706357	1.622761	2.667927	4.900021	26.98843	1.792898
Probability	0.000000	0.000000	0.864059	0.258418	0.444244	0.263431	0.086293	0.000001	0.408016
Sum	158.8445	75.09435	818.8080	1743.704	807.6659	471.9926	499.1880	208.2889	2469.067
Sum Sq. Dev.	356.2582	80.53482	234.7300	2898.994	444.8690	430.1601	30.61187	769.5613	4608.221
Observations	31	31	31	31	31	31	31	31	31

According to descriptive statistics, the GDP growth rate averages 5.124017 during the period from 1972 to 2021, it also admits a maximum of 17.74272 and a minimum of -1.446988. This decline in GDP can be explained by the various political and health crises, in particular the Tunisian revolution and COVID19, the consequences of which weighed on the Tunisian economy during this period. In the same vein, the net inflow of FDI reaches a maximum of 9.424557 with a minimum of 0.684526, which is explained by economic instability. (see figure 1).

It should be noted here that these descriptive statistics make it possible to provide a good knowledge of the determinants of growth in order to visualize the impact of these variables on Tunisian economic growth.

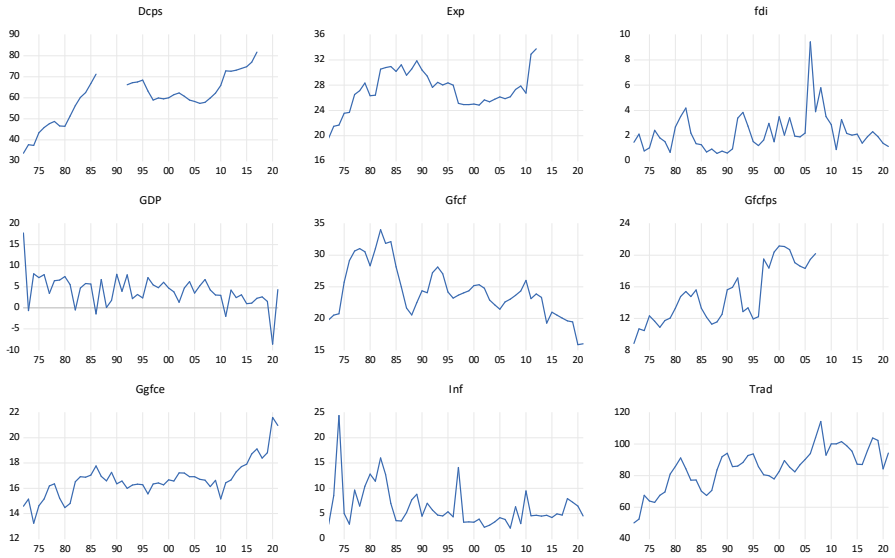


Figure1. Évolution of variables study entre 1972-2021

The estimation results of the correlation between the different variables of the time series show that these variables do not suffer from multi-collinearity problems.

Table 3 of the matrix of correlation coefficients of variables indicates a negative correlation of -0.13789 between the variable GDP and FDI. Expenditures are correlated by -0.47408 with GDP. We also note a negative correlation between economic growth measured by GDP and other factors including inflation (-0.03261), trade (-0.25063), gross fixed capital formation (-0.20085) and private sector spending (- 0.4798).

Table 3. Variables Correlations matrix

	GDP	IDE	EXP	DCPS	GFCF	GFCFPS	GGFCE	INF	TRD
GDP	1	-0.13789962283492063	-0.47408383463158319	-0.47984441469521833	-0.20085842563788651	-0.18867642841200653	-0.51444716179239443	-0.03261892877044278	-0.25063667573106778
IDE	-0.13789962283492063	1	0.01400599008147918732275	0.14894769018732275	-0.00436823458637765	0.41636883408470866	0.19672659070681662	-0.14397867822007135	0.47010560218545224
EXP01	-0.47408383463158319	0.01400599008147918732275	1	0.70364491095658581	0.64852726056118052	0.02826352312926482	0.57562258519573291	0.00235011816874432	0.39981827527494977

D	-	0.1489	0.7036	1	0.1261	0.4688	0.7804	-	0.6119
C	0.4798	476901	449109		235048	695477	87889	0.4067	845667
PS	444146	873227	565858		458249	429928	52079	738390	353874
	952183						7	648637	
G	-	-	0.6485	0.1261	1	-	0.1015	0.2573	0.0679
FC	0.2008	0.0043	272605	23504		0.1787	09308	920120	624237
F	584257	682345	611805	84582		260295	81062	785133	155534
	846378	863776		49		442128	95		8
		5							
G	-	0.4163	0.0282	0.4688	-	1	0.5573	-	0.6047
FC	0.1886	688340	635231	69547	0.1787		47473	0.3139	056342
FP	764284	84708	292648	74299	260295		89104	470184	237202
S	120065		2	28	442128		23	764547	
G	-	0.1967	0.5756	0.7804	0.1015	0.5573	1	-	0.3698
G	0.5144	265907	225851	87889	093088	474738		0.5242	765202
FC	471617	068166	957329	52079	106295	910423		517331	530542
E	923944			7				718624	
IN	-	-	0.0023	-	0.2573	-	-	1	-
F	0.0326	0.1439	501181	0.4067	920120	0.3139	0.5242		0.1354
	189287	786782	687443	73839	785133	470184	51733		216055
	704427	200713	23	06486		764547	17186		32216
	8			37			24		
TR	-	0.4701	0.3998	0.6119	0.0679	0.6047	0.3698	-	1
A	0.2506	056021	182752	84566	624237	056342	76520	0.1354	
D	366757	854522	497749	73538	155534	237202	25305	216055	
	310677			74	8		42	32216	

It should be remembered that a regression is fallacious when most of the series used are non-stationary time series (Granger 1974). In this order of idea, data are qualified as stationary if the value of the p-value, for all the tests carried out, is less than 5% ($p < 0.05$).

The analysis of the results of the unit root tests for all the variables (using the test of Dickey and Fuller (ADF, 1979) and Phillips/Perron relating to the group of variables of study, makes it possible to note that certain variables are nonstationary of level since the p-value is greater than 5%. Moreover, using the first difference, the outgoing p-value of the statistical tests is significant, which confirms that these study variables are first-difference stationary.

Table 4. Stationarity test

Variables	Stat-ADF	Phillips/Perron (PP	Integration order
DCPS	-3.483338 (0.0141)***	-3.429771 (0.0542)***	I(1)
EXP	-6.414065 (0.0000)***	-6.413892 (0.0000)***	I(1)
FDI	-11.07357 (0.0000)***	-20.03510 (0.0000)***	I(1)
GGFCE	**-8.321513 (0.0000)*** **	**-8.792115 (0.0000)*** **	**I(1)**
GDP	-9.936565 (0.0000)***	-9.936565 (0.0000)***	I(0)
GFCF	**-4.012329 (0.0150)*** **	**-5.468344 (0.0002)*** **	**I(0)**
GFCFPS	-6.235669 (0.0000)***	-8.321513 (0.0001)***	I(1)
INF	**-6.114672 (0.0000)*** **	**-19.46672 (0.0000)*** **	**I(0)**
TRD	-3.539136	-8.593084	I(0)

(0.0462)***	(0.0000)***

At this level, we can say that the variables of the model are integrated of order 1 and also of order 0 (I(1) and I(0)). Thus, there is a confirmation of the possibility of Cointegration of the variables .Indeed, the cointegration test displays two types of critical values for the test statistic, which represent the lower bound and the upper bound which correspond respectively to the explanatory variables of order I(0) and of order I(1).

• Cointegration test *by* Johansen's method

The acceptance of the cointegrating test hypothesis also refers to the p-value which must be less than 5% ($p < 0.05$), which indicates that there is a cointegrating relationship between the variables. However, if the F-stat. exceeds the upper bound then there is a cointegration. If not, in the case where it is lower than the lower bound, we reject the hypothesis of the existence of a cointegration relationship. However, if the F-stat. is between the two bounds, we cannot conclude unless we know the exact order of integration of the variables.

Table 5. Cointégration test

Series: GDP FDI EXP01 DCPS GFCF GFCFPS GGFCE INF TRAD
Lags interval (in first differences):

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.958482	279.4910	197.3709	0.0000
Atmost 1 *	0.866968	187.2239	159.5297	0.0006
Atmost 2 *	0.721866	128.7262	125.6154	0.0319
Atmost 3	0.685755	91.61624	95.75366	0.0931
Atmost 4	0.581256	58.04635	69.81889	0.3002
Atmost 5	0.427242	32.80197	47.85613	0.5678
Atmost 6	0.281120	16.64052	29.79707	0.6665
Atmost 7	0.169172	7.068740	15.49471	0.5697
Atmost 8	0.056744	1.694113	3.841465	0.1931

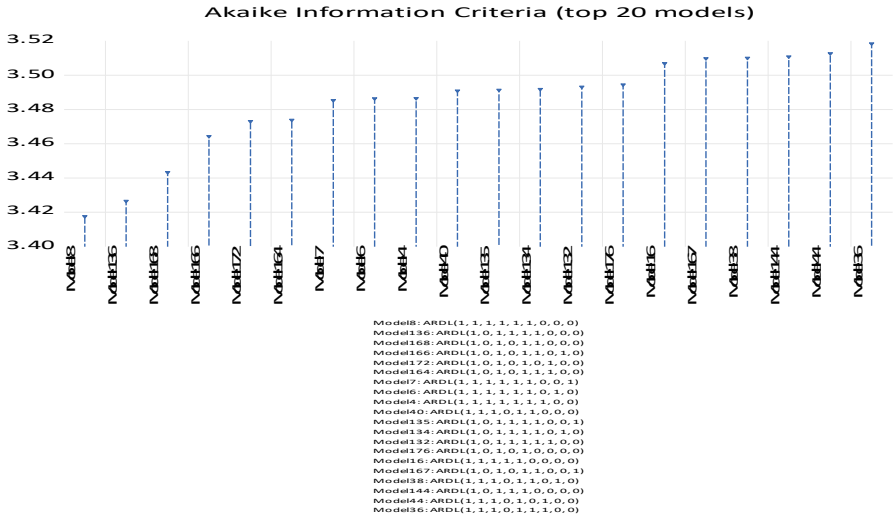
Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source : Résultats obtenus à partir de l'estimation, effectués par les auteurs

Based on the results of the trace test, the p-value associated with the different variables is less than 5%. Consequently, we confirm the existence of a long-term relationship between the studied variables. The results of the trace test indicate the presence of a cointegration relationship at the 5% threshold between the dependent variable (GDP) and the explanatory variables.

- ***Estimation of variables model (ARDL)***

The objective of the ARDL model is to model the adjustments in order to have a long-period equilibrium situation. It is considered to be a model that simultaneously integrates changes in long- and short-term variables. Given the existence of cointegration and based on the AIC model, we will choose the ARDL(1, 1, 1, 1, 1, 1, 0, 0, 0) model.



Note here that given the estimates made using the ARDL model, the variables of the model are significant. Indeed, as for foreign direct investment, the results showed a negative (-0.318691) and significant (p=0.1188) coefficient of FDI, which means that foreign direct investment had a negative effect on economic growth. Tunisia in the short term. This confirmation is identical to the work result of Ntanga Ntita et al (2019), who attempted to examine the impact of foreign direct investment on economic growth. The results show that FDI has a negative impact on economic growth in the short term

Table 6. ARDL estimation result

SelectedModel: ARDL(1, 1, 1, 1, 1, 1, 0, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	-0.318611	0.089764	-3.549416	0.0032
FDI	-0.318691	0.191814	-1.661457	0.1188
FDI(-1)	0.200102	0.187888	1.065002	0.3049
EXP01	-0.556516	0.371935	-1.496271	0.1568
EXP01(-1)	1.478600	0.340625	4.340851	0.0007

DCPS	-0.478704	0.127150	-3.764892	0.0021
DCPS(-1)	0.184375	0.125999	1.463306	0.1655
GFCF	0.540390	0.207376	2.605850	0.0207
GFCF(-1)	-0.656961	0.258844	-2.538061	0.0237
GFCFPS	-0.033623	0.215995	-0.155665	0.8785
GFCFPS(-1)	0.298170	0.192392	1.549807	0.1435
GGFCE	-1.276131	0.745270	-1.712307	0.1089
INF	-0.257085	0.073705	-3.488033	0.0036
TRAD	-0.037656	0.048125	-0.782463	0.4470
C	23.87360	9.303153	2.566184	0.0224

However, we suggest negative links between GDP and the rest of the study variables and a negative lagged GDP growth rate coefficient of -0.318611. This could be explained by the instability of growth in Tunisia over the years despite the multiple crises, in particular political instability, the health crisis, etc. .However, Tunisia being subject to several crises, this can only have negative effects on the process of economic growth which is then compromised. The value obtained from the error correction coefficient means that the adjustment towards the he long-term balance is corrected at 30% per year. In other words, the results in the table above show that the long-term effect of FDI on gross domestic product (GDP) is significant.

Table 7. Result of the long-term relationship.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	30.90073	10%	1.85	2.85
K	8	5%	2.11	3.15
		2.5%	2.33	3.42
		1%	2.62	3.77

In addition, the estimation of the long-term relationship shows that the FDI is significant. This result is consistent with the research of bouchoucha et al. (2019). Therefore, we can say that foreign direct investment has a significant effect on economic growth in Tunisia.

Foreign direct investment has a significant effect on Tunisian economic growth. An increase in foreign direct investment of 1% leads to an increase in GDP by 0.31%. This result means that economic growth in Morocco is based more on private sector investment.

CONCLUSION AND RECOMMANDATIONS

This article has tried to study the question of the impact of foreign direct investment on Tunisian economic growth. Indeed, based on the distributed lag model (ARDL), developed by Pesaran et al (2001), which is part of the temporal econometric models, in which the endogenous variable depends on the values taken by an exogenous

variable at times previous studies, we have shown that in the short term FDI has a negative and significant effect on growth. However, this link is significant in the long term. This result is therefore justified by Brahim et al (2019), Ntanga Ntita (2019) and Bouchoucha, (2019). Consequently, we can note that the originality of our contribution lies in the multiplicity of statistical exercises that we carry out to establish the nature and direction of the link. Indeed, thanks to the estimation of the ARDL approach, we can establish a causal link that exists between investment and growth.

Our analysis, allows us to draw economic policy conclusions, particularly for the case of Tunisia, where the investment climate needs to be further improved through the implementation of appropriate measures, such as, the establishment of an appropriate regulatory framework in order to to attract investments, especially because of these recent political and health crises which have had a negative impact on the Tunisian economy. Thus, the Tunisian government has an interest in better directing foreign investors towards the growth sectors in order to benefit from the investments made on its territory.

REFERENCES

AICH ElMestapha H. & BOURAOUANE B. (2020) « Investissement public et croissance économique au Maroc : approche par modèle ARDL » Revue du Contrôle de la Comptabilité et de l'Audit ISSN: 2550-469X Volume 4 - Numéro 3.

Alfaro, L. (2003). Foreign Direct Investment and Growth: Does the sector matter? Harvard Business School, Boston, MA

Bakari, S. & El Weriemmi, M. (2022) "Exploring the Impact of Agricultural Investment on Economic Growth in France" MPRA Paper No. 113970, posted 03 Aug 2022

Bouchoucha, N. & Ali, W.(2019), « The impact of FDI on economicgrowth in Tunisia: An estimate by the ARDL approach »MPRA Paper No. 91465, posted 16 Jan 2019 15:26 UTC

MANSOURI B.,(2009) « Effets des ide et de l'ouverture commerciale sur la croissance économique au maroc », United Nations Economic Commission for Africa Conférence Africaine-2009

Nsabimana L., Khan H., Zhong H. & Tang Y. (2020), "A Vector Error Correction Model (VECM) Approach in Explaining the Relationship between Fixed Investment and Economic Growth in Rural China" Global Journal of HUMAN-SOCIAL SCIENCE: E Economics Volume 20 Issue 8 Version 1.0 Year 2020

Calderon, C. &Serven, L. (2010), Infrastructure and Economic Development in Latin America. The World Bank Policy Research Working Paper No. 5317.

Cañal-Fernández, V. &; Fernández, J. T. (2018), The long run impact of foreign direct investment, exports, imports and GDP: evidence for Spain from an ARDL approach, EHES Working Papers in Economic History, No. 128, European Historical Economics Society (EHES), s.l.

Dabla-Norris, E, Brumby, J, Kyobe, A, Mills, Z, &Papageorgiou, C. ,(2011), « Investing in Public Investment: An Index of Public Investment Efficiency. » International Monetary Fund Working Paper No. WP/11/37.

Davarajan, S., Swaroop, V. &Zou, H., (1996), « The composition of public expenditure and economic growth » Journal of Monetary Economics 37, 313-344.

Diagne, S. Youssoufa et Fall A., (2007), « Impact des infrastructures publiques sur la productivité des entreprises au Sénégal » Document de travail 02, DPEE/DEPE

Wehncke F. C., Marozva G. &LindelwaMakoniP. (2023), "Economic Growth, Foreign Direct Investments and Official Development Assistance Nexus: Panel ARDL Approach". Economies 11

Fournier J.-M.(2016), « the positive effect of public investment on potentialgrowth » economicsdepartmentworkingpapers no. 1347

Jehangir, M., Sunhae L., SaeWoonP.(2020) : Effect of foreign direct investment on economic growth of Pakistan: The ARDL approach, Global Business & Finance Review (GBFR), ISSN 2384-1648, People & Global Business Association (P&GBA), Seoul, Vol. 25, Iss. 2, pp. 19-36,

NGUYEN K.&Thanh NGUYEN H.. (2021). The Impact of Investments on Economic Growth: Evidence from Vietnam.Journal of Asian Finance, Economics and Business Vol 8 No 8 (2021) 0345–0353

Louzi??and A. Abadi A., (2011), "The impact of foreign direct investment on economic growth in Jordan". International Journal of Recent Research and Applied Studies, 8(2): 253-258

Alaya M. (2004), « Investissement direct étranger et croissance économique : Le cas de la Tunisie » Centre d'Economie du Développement (CED), workingpaper.

Rafat M. (2018), « The Interactive Relationship between Economic Growth and Foreign Direct Investments (FDI): A VAR Analysis in Iran", Iran. Econ. Rev. Vol. 22, No. 1, 2018. pp. 163-185

Belloumi M. (2014), "The relationship between trade, FDI and economic growth in Tunisia: An application of the autoregressive distributed lag model"EconomicSystemsVolume 38, Issue 2, June 2014, Pages 269-287

Hoai Trinh N. &Anh Mai Nguyen Q. (2015), "The Impact of Foreign Direct Investment on Economic Growth: Evidence from Vietnam" Developing Country Studies ISSN 2224-607X (Paper) Vol.5, No.20, 2015

Ntanga N., De Dieu J.,Kazadi N., François and NtitaNtita, Jean???(2019), « FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN DEMOCRATIC REPUBLIC OF CONGO (DRC) »MPRA Paper No. 92910, posted 22 Mar 2019 23:59 UTC

OLANREWAJU, S.O. OGUNTADE, E.S. ZUBAIR, M.A. (2015), "An Application of Vector Autoregressive Model on Investments and Savings in Nigeria", Journal of Economics and Sustainable Development www.iiste.org ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online) Vol.6, No.21, 2015

DEMIR O. (2022), "TESTING THE LONG-RUN GROWTH EFFECTS OF FOREIGN DIRECT INVESTMENT IN TÜRKIYE: EVIDENCE FROM ARDL & NARDL ANALYSIS" EURASIAN RESEARCH JOURNAL ERJ, Vol. 4, No. 4, pp. 65 - 79,

Anos P. &Varoudakis C. A. (2004), « Growth, Private Investment, and the Cost of Doing Business in Tunisia: A comparative perspective », document of world bank

Randolph &Ebenezer(2022), "A vector autoregression (VAR) analysis of corruption, economic growth, and foreign direct investment in Ghana"Randolph&Ebenezer(2022),

Rapport d'ITCEQ (2016), « La croissance potentielle de l'économie en Tunisie Bilan et perspectives »

S. Hussain, Erum N., and A. Yousaf, (2016), "Foreign direct investment and economic growth in Saarc countries". Journal of Asian Finance Economics and Business, 3(4): 57-66.

Ismail S. (2015), « Economic Growth and Macro Variables in India: An Empirical Study", Journal of Economics and Development, Vol.17, No.3, December 2015, pp. 42-59

Sultanuzzaman, Md Reza; Fan, Hongzhong; Akash, Mahamud; Wang, Banban; Uddin SarkerMdShaki(2018) : The role of FDI inflows and export on economic growth in Sri Lanka: An ARDL approach, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 6, Iss. 1, pp. 1-17,

Vamvakidis, A., (1998), « Explaining Investissement in the WAEMU, ». Working Paper No. 98/99 International Monetary Fund.