JSEG

JOURNAL OF SMART ECONOMIC GROWTH

www.jseg.ro ISSN: 2537-141X Volume 4, Number 3, Year 2019

THE IMPACT OF FDI ON ECONOMIC GROWTH: EVIDENCE FROM TUNISIA

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Abstract

This paper examines the impact of foreign direct investment on economic growth in Tunisia using times series data for the period 1980-2015. In this study, we used the ARDL (Autoregressive Lag Distribution) approach to study the short-run and long-run relationship between Foreign Direct Investment and economic growth. The empirical results show that FDI has positive impact on economic growth in both the short and the long run. For the other determinants of economic growth, we have shown that domestic investment and human capital have had a positive and significant effect on the economic growth in Tunisian economy in the short run rather than in the long run. On the other hand, the degree of trade openness has a negative effect on economic growth in short-run and long-run.

Keywords: FDI, economic growth, Tunisia, ARDL.

1. Introduction

Foreign direct investment has been identified as an important factor affecting economic growth through enhancing the stock of knowledge, skill acquisition diffusion, and the introduction of new managerial practices (De mello1997).Also, as a direct effect, FDI based-capital flows can renforce the accumulation of capital in a host country, and as an indirect

effect, Foreign dierct investment flows stimulate the economic growth in a host country by enhancing productivity growth through technology transfer(Okada and Samreth(2014)).

Therefore, when foreign companies expand to operate in host countries, they introduce efficiency into high-technologie management and production. They give developing countries the ability to compete with foreign competitors and produce better quality goods and services in the future.

All the more, foreign direct investment can bring benefits for domestic investment. Indeed, FDI is considered an important component of development finance. On the other hand, they facilitate the transfer of technological and managerial knowledge to host countries, create employment opportunities and promote economic growth. Policy makers in a large number of countries have undertaken to study and provide incentives to attract more investment inflows in order to promote economic growth and development. In this context, since the 1970s, Tunisia has always adapted an approach that makes FDI a major component of its development plan. Thus, a series of measures has been taken to make the government initiate policies to actively Foreign Direct Investment.

In recent decades, many measures have been adopted by the Tunisian government to attract more FDI inflows, believing that this can introduce modern technologies, improve productivity and stimulate export-led economic growth. Indeed, Tunisia has adopted the structural adjustment plan since 1986. It has promoted standard fiscal and monetary reforms and the liberalization of the financial sector.

This paper contributes to the earlier literature by examining the FDI-growth relationship in the context of Tunisia over the period 1980-2015. It has been argued that, despite a relatively low level of FDI inflows, the latter played a crucial role in the economic success of Tunisia. From a methodological point of view, we use the ARDL Bounds to test the relationship between FDI and economic growth in both the long and the short run.

This paper is organized as follows: Section 2 presents a brief review of the literature on the link between FDI and economic growth. Then Section 3 highlights the data used for modeling and some methodological aspects related to the estimations. Finally, we will finish this work with a conclusion and some political implications.

2. Review of the theoretical literature the impact of FDI on economic growth: a theoretical analysis

FDI does not affect the economic growth of the host country in an arbitrary way. Nevertheless, this allocation manifests itself in the transfer of new technologies and know-how, the training of human resources, foreign trade, the increase of competition and the development and reorganization of enterprises.

2.1.Technology transfer

The theories of endogenous growth have paid particular attention to technology as a source of economic growth. Thus, many endogenous growth models have focused on the role of technological innovation and resources devoted to research and development in growth. The growth rate of a country is explained by the state of technology that it has used. For example, in developing countries economic growth depends on the implementation of more advanced technologies provided by multinationals Borensztein et al. (1998). Multinational firms are often considered as the most technologically developed companies. Indeed, they are the main source of research and development activities. Ford et al. (2008) consider multinationals as a major source of technological dispersion due to their international presence. Rogmans and Ebbers (2013) confirmed that foreign direct investment has important implications for host countries, including technology transfer, the benefit of management expertise, and improving the efficiency of productivity.

Several studies have focused on the influence of technological change on economic growth, notably the work of Helpman (1991) and Barro and Martin (1995). In these studies, the growth rate of less developed countries is known to be highly dependent on the ability of these countries to utilize and implement new technologies that are available in developed countries. In fact, by adapting new technologies and ideas, that is to say, through technological diffusion, they can, through a process of catching up, access to the technological levels of the most developed countries. As a result, FDI is seen as an essential channel for the transmission of new technologies to the least developed countries. According to an OECD (1991) study of both developing and OECD countries, innovation and diffusion

of technology would have a significant impact on economic growth. This confirms the link between technology and economic growth. Indeed, technical efficiency is a channel through which FDI can affect growth.

Also, the effect of FDI on economic growth is further enhanced by technology transfer. This technology would diffuse subsidiaries by the relationship of subsidiaries with their suppliers and their customers, imitation, competition ... So, despite the multitude of technology transfer mechanisms, their impact on economic growth are similar. Indeed, the transfer of technology has a positive effect on the growth of the economy by improving productivity, making better use of potential and rationalizing the country's resources.

On the other hand, several studies have shown that technology transfer can have negative effects. In this context, the work of Moura and Forte (2009) has shown that technological spin-offs can negatively affect the growth of the host country depending on the technologies introduced by the foreign firm. For Vissak and Roolaht (2005), the host country may become dependent on technologies introduced by multinationals and other developed countries.

2.2. Human Capital

Several studies have studied the impact of FDI on economic growth through the improvement of human capital. For example, Robert Lucas (1995) highlights the role of human capital in economic growth, which, by developing its knowledge and skills, becomes a more productive element and creates increasing returns.Also, the endogenous growth models developed by Romer (1990) and Lucas (1988) show that human capital become a central element in the growth process. Busse and Groizard, (2008) have suggested that FDI is an essential source of capital inflow and enhancement of human and physical capital development in the host country.

In addition, Zhang (2001) suggested that FDI is a source of economic growth since it brings together know-how in production and management methods and also highly skilled workers. According to De Mello (1999), FDI can improve knowledge of the labor force by providing training in new production and management methods and practices. Indeed, it is important to stress that the labor-force training activities of foreign firms are a key element of economic development in the countries. When a foreign company establishes itself in a host country, it

brings with it skills and new ways of working, and devotes more budget to the training of their employees than domestic companies.

The result of Borensztein et al. (1998) indicated that there is a strong complementarity relationship between FDI and human capital in host country economic growth. Borensztein said that the existence of a basic skill of the workers and infrastructure conditions the sign of the impact of FDI on economic growth. Indeed, Ndefo (2003) indicated that the availability of a stock of human capital is amplified by the impact of FDI on growth. Human capital is a determinant of the degree and speed of assimilation of new technologies introduced by foreign investment. A minimum qualification of the labor force is needed to facilitate the attraction of FDI and technology transfer, and therefore it positively influences economic growth. Moreover, Blomstrom and Kokko (2003) have shown that improving human capital via FDI can be done through higher education. Similarly, Shahid (2015) also suggested that a higher level of education in the labor market can promote economic growth.However, human capital from FDI can negatively affect economic growth. The OECD (2002) has argued that MNE affiliates use high technology, which reduces the number of workers compared to those used by local firms, so there is an increase in the unemployment rate, which threatens Economic Growth.

2.3. Domestic investment

FDI affects economic growth through domestic investment. Indeed, foreign firms can stimulate domestic investment and push domestic firms to adopt certain marketing techniques employed by them or to improve their management, either in the local market or at the international level (Alaya (2004)). For Hansen and Rand (2006), FDI is a key element in the process of creating a better economic environment with positive effects on economic growth. This confirms the idea that FDI is a source of change in host country firms.

Ngouhouo (2008) assumed that the effect of FDI on local firms is dynamic in nature and can be broken down as follows: FDI inflows have a negative effect because of its competitive advantages. Secondly, there is a more advantageous long-term effect on domestic investments that benefit from FDI spillovers. The competition created by FDI plays an important role in

improving the factors of production and capital accumulation in the economy. Indeed, the implementation of the multinationals increases the supply on the local market, so that the domestic companies, in order to maintain their market share, they are brought to answer this competition, which causes an improvement of the productivity, a fall of the prices and more efficient use of resources (Pessoa (2007)).

Nevertheless, several theoretical studies show that the degree to which domestic firms can benefit from these spin-offs depends on their "absorptive capacity". Aitken et al. (1997) have shown that the presence of multinational firms in the domestic market stimulates not only competition but also encourages domestic firms to export and improve their efficiency.

But, in some cases, the establishment of foreign firms could be unfavorable to the development of economic fabric. Indeed, Herzer et al. (2008) suggested that FDI can reduce domestic investment by removing their opportunities through licensing and credit facilities, reflecting the superiority of FDI over domestic investment. Also, the entry of foreign firms affect negatively domestic investment by relying on the powers in terms of technological advantage, branded products and exerting a crowding out effect on domestic investments kumar and Pradhan (2002) , Markussen and Venable (1977), Agosin and Mayer (2000). FDI can thus crowd out domestic investment and could then cause impoverishment of the host country, which threatens economic growth (Agosin and Mayer (2000), Fry (1992)).

2.4. Foreign trade

FDI can affect directly economic growth in a host country through foreign trade. The relationship of complementarity or substitution between FDI, trade and economic growth has been the subject of much debate both theoretically and empirically since the 1980s. 1970s. Among the first economists who support the link between FDI and economic growth through trade, Dunning (1970). Indeed, FDI can be considered as a contribution in foreign currencies for developing countries. Omri and Kahouli (2014) suggested that trade and FDI are increasingly becoming important drivers of economic development and technology transfer.

In addition, Kashif and Muhammad (2013) pointed out that economic growth can be achieved if the volume of exports increases relative to imports. In the same vein, FDI has played an important role in increasing exports. Indeed, it is established that MNC affiliates often have a

strong propensity to export and are more export orientated than local firms because of the low export costs they face as a result of their knowledge of the international market. In addition, Dritakis (2014) suggested that FDI increase export capacity in the host country, leading to an increase in foreign exchange earnings mainly in developing countries. They also increase the provision of funds for national investments, encouraging the creation of new jobs, strengthening technology transfer and increasing economic growth in total. In general, two direct effects mark the impact of FDI on host country exports:

-The re-export platform: this is the case where the multinational subsidiaries produce for export to the country of origin or to other countries

-The conquest of new markets: this is the case where the establishment of a subsidiary can be mobilized as part of a strategy to conquer new markets. The purpose of this strategy may be to reduce transportation costs.

In both cases, the overall effect on exports is significant in the host country, especially for less-capital-intensive developing countries. Increased trade caused by FDI can have a positive impact on economic growth (Makki and Somwaru (2004)). But this sector can also negatively affect economic growth. Indeed, a shock in one economy may result in a lack of demand for another country's exports or a higher price of imports leading to lower and / or more variable economic growth than before. Mecinger (2003) suggested that FDI has a much larger impact on imports than on exports. This also affects the balance of payments.

OECD (2002) has shown that the strong impact that FDI has on imports is due to the fact that multinationals are in great need of goods and raw materials, and most of the time, they are not available in either quantity or in quality in the host country, because of the high requirement that they put on their purchases. Another explanation is that the investment made by the subsidiaries may have the main objective of supplying the products to local markets and thus not encouraging exports (Ram and Zhang (2002)).

It can be concluded that the impact of FDI on economic growth via trade plays an ambiguous role. In fact, FDI has a positive effect on a country's economy through exports. On the other hand, via foreign trade, multinational affiliates threaten host-country economic growth by making it more sensitive to global problems and negatively affecting the balance of payments.

3. The specification of the econometric model

3.1. Presentation of the model

The main objective of this paper is to examine the impact of FDI on economic growth in Tunisia over the period 1980-2015. To do this , we estimate our econometric model by applying an ARDL (Autoregressive distribution Lag) technique developed by Pesaran and Smith (1998), Persaran and Shin (1999) and Pesaran et al. (2001). The ARDL bound test approach has several advantages over the Johansen's cointegration method following: First the ARDL model its ability to detect long run relationships and solve the small sample size problem. Another important benefit of the ARDL Bounds, it can be applied to model the relation between the variables of different level of integration (I0 or I1).

This study seeks to examine the possibility of a long-term relationship between gross domestic product per capita (GDP) and foreign direct investment (FDI), domestic investment (ID), enrollment rate (Enrol) and trade openness (Open), by applying the cointegration method developed by Pesaran et al. (2001). Thus, to highlight the impact of FDI on economic growth, we will present the following model:

$$\mathbf{GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 DI_t + \beta_3 Open_t + \beta_4 Enrol_t + \varepsilon_t} \qquad \mathbf{(1)}$$

Where GDP is the annual growth rate of GDP, FDI indicates the level of foreign direct investment relative to GDP, DI is the domestic investment proxied by the gross fixed capital formation relative to GDP, Enrol is a proxy for human capital across secondary school gross enrollment ratio, trade openness is proxied by the sum of imports and exports relative to GDP, ε_t :: represents a standard residual term and $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ denotes the coefficients associated with the different explanatory variables.

3.2. Descriptive statistics and data sources

The data in our study come from the statics of the World Bank. To examine the relationship between FDI and economic growth, we will first proceed to the descriptive statistics test on

the variables that make up our sample, which is in our case Tunisia. These statistics are summarized in the tables 1 below.

Table 1 : Descriptives Statistics

Variables	Observation	Mean	Median	Max	Min	Std.dev
GDP	36	4,430	4,692	7,949	-2,38	2,011
FDI	36	2,509	2,202	9,424	0,600	1,695
Open	36	72,069	71,374	97,997	51,553	11,391
DI	36	25,900	24,808	35,899	20,709	3,469
Enrol	36	63,445	65,166	92,506	25,164	23,278

The exploratory analysis shows that the growth rate of GDP averages is 4,430 during the period from 1980 to 2015.It admits a maximum of 7.97 and a minimum of -2.38 in 2011. We can explain this decrease of GDP by the revolution and their consequences on the Tunisian economy during this period. Also, the high value of FDI inflows in Tunisia is 9.42 and and his minimum is 0.60 in 1988. This can be explained by economic instability during this period. Then, the trade openess variable admits a minimum of 51.55 and a maximum of 97.99. These results can be explained by the attractiveness of the investment project mainly towards the exchangeable good sector. Regarding the domestic investment variable, it is on average equal to 25.90 .This reflects the low participation of domestic investment in economic growth in Tunisia. In addition, Tunisia has an average school enrollment rate of 63.44%, and a minimum of 25.16, while his maximum is 92.50. So, education becomes a national priority for Tunisia, which has made remarkable efforts in recent years to develop the education sector.

3.3. Results and discussions

Before proceeding with the estimation by the ARDL approach, in the first step we check of the order of integration of the various variables by using unit root tests of ADF (Dickey and

Fuller (1979) and FP (Phillips and Perron(1988)). Then, the procedure of " bounds test" of Co integration is no longer valid if there is an integrated variable of order two or more.

3.3.1. Results of Unit root tests

The ARDL approach and more specifically the cointegration test (or bounds test) is based on the assumption that the variables must be integrated of order zero or one, in the case, an integration of order 2 or more, this test becomes irrelevant (Pesaran et al., 2001). Thus, to check the level of integration of the model variables, we must begin our study by using the unit root tests (ADF and PP). These tests are based on the null hypothesis H0 is the hypothesis of non -stationarity.The principle of the ADF test and the PP test is that if the T-statistic of the different series is greater than the critical value at the threshold level of 5%, so we agree to have a unit root, so the series are non-stationary.

Table 2. Results of Unit root tests

	ADF		PP	
Variables	Level	1st difference	Level	1st difference
GDP	-4,993*** (0,0003)		-4,791*** (0,0008)	
FDI	-3,632** (0,037)		-3,108** (0,035)	
Open	-1,608 (0,467)	-5,735*** (0,000)	-1,678 (0.432)	-5,737*** (0,000)
DI	-5,290*** (0,0008)		-1,996 (0,286)	-5,617*** (0,000)
Enrol	-4,086*** (0,0031)		-3,812*** (0,006)	

Notes : Indicate***, **, *: stationarity of variable at the 1%, 5%, 10% level.

The results of Table 2 concludes that we can not reject the null hypothesis of unit root in several cases. The results of the unit root tests obtained show that according to the Dickey-Fuller Augmented Test (ADF), the economic growth rate (GDP), the foreign direct investment (FDI), the domestic investment (ID) and the rate of schooling (SC) are stationary in level. However, the trade openness variable is stationary in first difference. This authorizes us to perform the Co integration tests between the economic growth rate and the explanatory variables. Similarly, the Phillips-perron test shows that all the variables are stationary in level, with the exception of the variables: the openness variable and the domestic investment which are stationary in first difference.

3.3.3 The ARDL bounds test

We start with a brief description of the ARDL technique. This procedure classifies all model‘s variables as endogenous variables. However, the error correction model is given by the following equation:

$$\mathbf{D\left(Ln(GDP_t)\right) =}$$
$$\boldsymbol{\alpha_0 + \beta_1 ln(GDP_{t-1}) + \beta_2 ln(FDI_{t-1}) + \beta_3 ln(Open_{t-1}) + \beta_4 ln(DI_{t-1}) +}$$
$$\boldsymbol{\beta_5 ln(Enrol_{t-1}) + \sum_{i=1}^{p} \alpha_{1i} D\left(ln(GDP_{t-i})\right) + \sum_{i=1}^{q1} \alpha_{2i} D\left(ln(FDI_{t-i})\right) +}$$
$$\boldsymbol{\sum_{i=1}^{q2} \alpha_{3i} D\left(ln(Open_{t-i})\right) + \sum_{i=1}^{q3} \alpha_{4i} D\left(ln(DI_{t-i})\right) + \sum_{i=1}^{q4} \alpha_{4i} D\left(ln(Enrol_{t-1})\right) + \varepsilon_t}$$
(2)

Where all the variables are as previously defined, with Ln: denotes the operator of the logarithm, D: represents the first difference and ε denotes the error terms.

We estimate our equation (2) using the ordinary least squares (OLS) method in order to test the presence of a long term relationship between the variables by the value of the Ficher test. The Co integration test "Bounds" is based on two conditions: one compares the Fisher test statistics with the two limits:

-If statics- F is greater than the upper bound then we reject H0 and we conclude that there is a long-term relationship between the variables considered.

-If statics-F is lower than the lower limit then H0 is not rejected and the absence of the long-term relationship between the variables considered is concluded.

Table 4. Bounds Test

Significance	I0 Bound	I1 Bound
1%	3,07	4,4
5%	2,26	3,48
10%	1,9	3,01
F-Statistics	4,74	

Source : Eviews 9

Using the Pesaran et al. (2001), we obtained the parameter level of the long-term estimates of our model. The ARDL model (2, 0, 0, 0, 0) used is selected by the AIC information criteria. Table 4 reports results of the bound test for the existence of a long run relationship between all variables. The results of the ARDL Bounds test show that the F-statistical value (4.74) is above than the upper bound for the different significance thresholds (1%, 5%, 10%), thus implying that the null hypothesis of no cointegration can be rejected. We conclude that there is a long-run relationship between the different variables of our model.

3.3.4. Long-run dynamics

We examine the long-term relationship between among the variables of our model using the following equation:

$$\mathrm{Ln(GDP_t)} = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \left(\ln(\mathrm{GDP_{t-i}})\right) + \sum_{i=1}^{q1} \alpha_{2i} \left(\ln(\mathrm{FDI_{t-i}})\right) + \sum_{i=1}^{q2} \alpha_{3i} \left(\ln(\mathrm{Open_{t-i}})\right) + \sum_{i=1}^{q3} \alpha_{4i} \left(\ln(\mathrm{DI_{t-i}})\right) + \sum_{i=1}^{q4} \alpha_{4i} \left(\ln(\mathrm{Enrol_{t-1}})\right) + \varepsilon_t \quad \textbf{(3)}$$

All variables are defined previously. The orders of the ARDL model (p, q1, q2, q3, q4) in the four variables are selected using AIC. Equation (3) is estimated using the following specification of ARDL (2, 0, 0, 0, 0).

Table 5. Estimation of the long-term coefficient

The variables	Coefficient	statistic- T	Prob
Break	-0,5077	-1,666	0,107
Ln(FDI)	0,298	2,437	0,021**
Ln(Open)	-1,866	-2,575	0,015**
Ln(DI)	1,643	2,710	0,015**
Ln(Enrol)	1,004	2,546	0,016**

Notes: indicate ***, **, * significance at the 1%, 5%, 10% level

The results of the long-term estimates that are shown in the Table 5 that all coefficients are statistically significant at 5% level. In fact, FDI has a positive and significant influence on the GDP growth. Thus, the 1% increase in the FDI growth rate leads to an increase in the GDP growth rate of (0.298%). In addition, we find that the coefficient of trade openness is negative and statistically significant, so a 1% increase in the rate of trade openness reduces the GDP growth rate by (1.866%). In addition, the rate of domestic investment has a positive impact, so the increase in the rate of domestic investment of 1% leads to an increase in GDP growth rate of (1,643). The enrollment rate has a positive and significant impact on the growth rate with an elasticity of (1.004%). In other words, a 1% increase in enrollment rate increases the GDP growth rate by 0.43%.

According to our long-term estimates, we can also see that the estimated coefficient of the dichotomous variable Break, which takes the value (0) before 1988 and (1) afterwards, admits a negative and insignificant coefficient. Our estimate did not give a significant relationship in the long run. This result can be explained by fluctuations in GDP during this period.

3.3.5. Short-term dynamics

The fact that the variables in our model are cointegrated provides support for the use of an error correction model mechanism (ECM) representation in order to investigate the short run dynamics . The unrestricted dynamic error correction model is expressed as follows:

$$\mathbf{D\left(Ln(GDP_t)\right) = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\, D\left(ln(GDP_{t-i})\right) + \sum_{i=1}^{q1} \alpha_{2i}\, D\left(ln(FDI_{t-i})\right) + \sum_{i=1}^{q2} \alpha_{3i}\, D\left(ln(Open_{t-i})\right) + \sum_{i=1}^{q3} \alpha_{4i}\, D\left(ln(DI_{t-i})\right) + \sum_{i=1}^{q4} \alpha_{4i}\, D\left(ln(Enrol_{t-1})\right) + \alpha ECM_{t-i} + \varepsilon_t \quad (4)}$$

All variables are defined previously. We denote by D: the first difference of the variables considered. ECM_ (t-i): Indicates the error correction term.The short-term coefficient estimates are presented in Table 6 below.

Table 6. Estimation of short-term coefficients

Variables	Coefficient	Statistic-T	Prob
CoinEq	-1,719	-6,566	0,000***
$Ln(GDP)_{(-1)}$	0,489	2,818	0,0089***
Ln(FDI)	0,512	2,223	0,0348**
Ln(Open)	-3,207	-2,483	0,0195**
Ln(DI)	2,828	2,620	0,014**
Ln(Enrol)	1,277	2,404	0,023**
Break	-0,872	-1,597	0,121
R-squared	0,532		
Dw-statistic	1,660		

Notes :***, **, * denote significance at the 1%, 5%, 10% level.

However, according to the results of the table, we can notice that the short-term results remain almost identical to those of the long term. Indeed, the ECM_{t-1} error correction coefficient is negative and statistically significant..This implies that there is a a long-term relationship between among variables. This result also shows that the GDP rate of the previous year has a positive and statistically significant effect on the current GDP rate with a coefficient of (0.489).

In addition, the FDI growth rate has a positive and significant effect at 5% level on the GDP growth rate. Thus, the 1% increase in FDI results in an increase in GDP growth rate of (0.512%). Similarly, a 1% increase in the trade openess rate reduces the GDP growth rate by (3.207%). There was also a statistically significant and positive effect of domestic investment on the GDP growth rate. The same is true for the school enrollment rate. For the dichotomous variable break, which takes the value 1 for the year 1988 and 0 for the rest of the period is negative and insignificant.

Overall, FDI has a positive and statistically significant impact on economic growth in short and long-run at 5% level. These results are consistent with the work of Borensztein et al. (1998), Lean and Tan (2011), Insah (2013), Iqbal and Abbas (2015), Agrawal (2015). FDI has been an essential source that has directly supported the creation of various industrial sectors in Tunisia with high requirements for technology and value-added products, such as machinery manufacturing, energy, computers and telephones. More clearly, in the local market, the level of productivity is increasing in the sector where foreign firms are located. In this sense, when the foreign presence in the sector increases, this shows that there is an existence of positive externalities allowed by FDI. Similarly, Shahzad et al. (2013) found that FDI in a country has often been the subject of many economic benefits such as technology transfer, organizational framework, managerial skills, balance of payments and the promotion of employment, and the export of these countries UNCTAD (2011).

The coefficient of the domestic investment variable is positive and statistically significant at 5% threshold in the short and long run. This result is contradictory to the works of Omri and Kahouli (2014), Soltani and Ochi (2012), Shawa and Amoro (2014), Nam Hoaitrinch (2015) and Ahmed Abdulrahman (2014). In addition, the effects of domestic investment are reflected in the investment of a large part of the oil revenue in projects which increases the employment and attractiveness of the workforce and the improvement of economic growth.

In addition, domestic investment is likely to be reinvested in the country, so it is also an important determinant of economic growth. Moreover, the crowding-in effect generated by FDI on domestic investment can be a stimulant of growth levels in Tunisia. More clearly, the use of domestic input industries (goods and services), provided by foreign firms, improves their efficiency. On the other hand, the multiplier effects of FDI can be reflected by their

knowledge spillovers and new technologies in the production function as well as the job offers provided by multinationals. In fact, local expenditures on goods and services products are increasing, which is favorable for domestic investors as well as for growth.

Regarding the human capital variable, it is positive and statistically significant in the short and long run at the 5% threshold. This result is consistent with the literature showing that human capital has a positive effect on economic growth (Blankenau and Simpson (2004)).), Anwar and Sun (2011)). Tunisia's national human resources development policy is based on improving skills and know-how in order to better exploit the technological potential. More clearly, Tunisia's economic growth is highly dependent on capital inflows and improvements in human capital. Thus, according to the endogenous growth theory, human capital is a determinant of long-term economic growth.

In addition, we find that trade openness has a negative effect on Tunisia's economic growth in the short and long term. This relationship is confirmed by the work of Abdullah, Tariq Shah (2015), Saqib et al. (2013), Ahmed Abdulrahman (2014). This result is explained, firstly, by the fact that imports are larger than exports. Secondly, the majority of Tunisian exports are composed of natural raw materials and agricultural products which are not more competitive products.

The lagged GDP is positive and statistically significant in the short run. The importance of real GDP could be explained by the fact that real GDP in Tunisia is a true indicator of economic growth and / or market size. The strong market demand is linked to the fall in unemployment in the country. Indeed, strong economic growth leads to an increase in per capita income and to the improvement of the well-being of the population.

3.3.6. The stability test

Stability test also called structural change tests examines the stability of the estimated coefficients of the equation while showing the presence of a structural change in the correlation. The CUSUM test is adapted to test the hypothesis of stability of the long-run relations between GDP per capita and its determinants, especially FDI and other variables. We rely on the tests "CUSUM" and "CUSUM of squares" to test the constancy of long-term

parameters. Graphs 1 and 2 then show the stability of the coefficients during the estimation period.

Figure 1: « Plot of CUSUM »

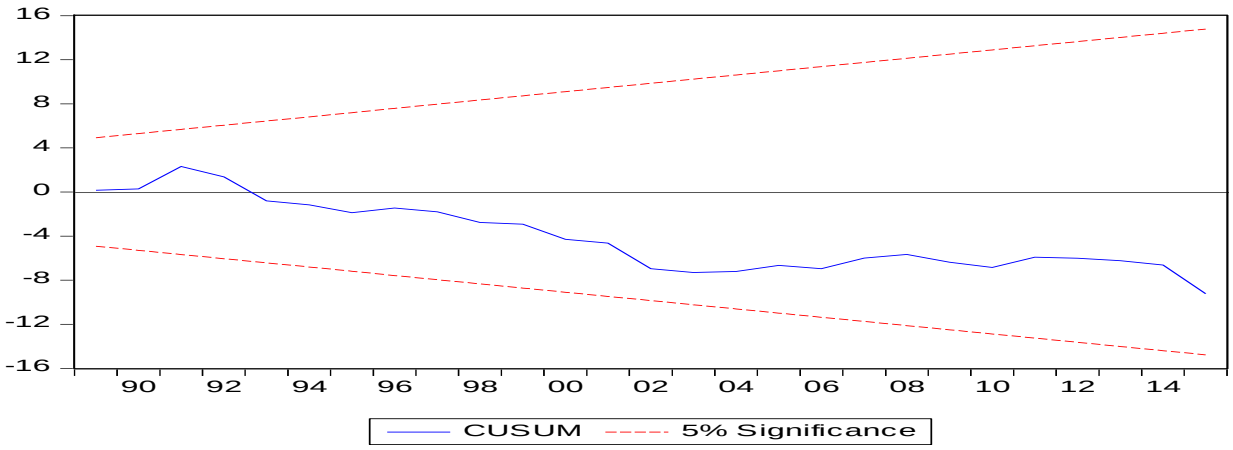
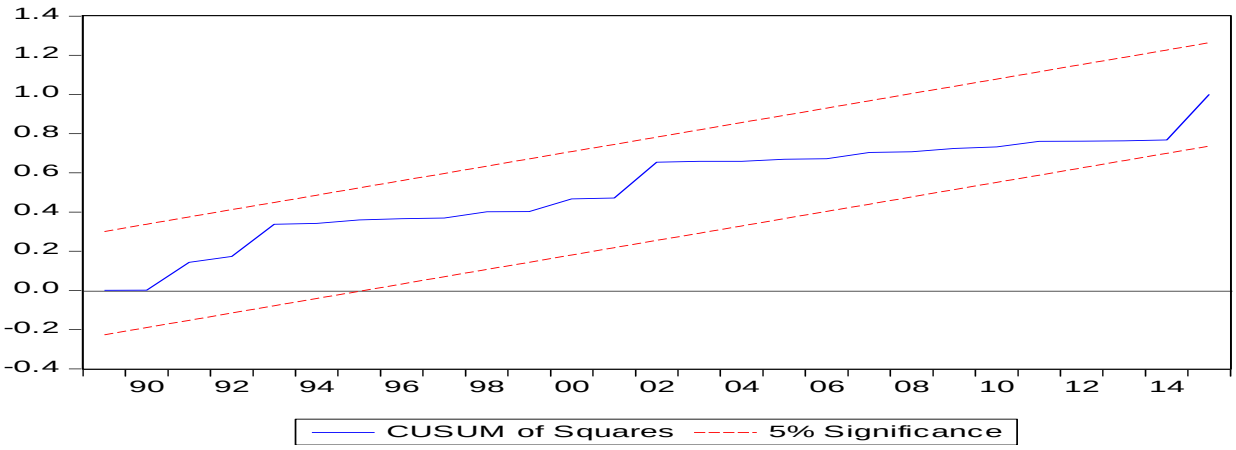


Figure 2: «Plot of CUSUM SQ»



3.3.7. The Granger causality test

The causality test was introduced in 1956 by Wiener and improved in 1969 by Granger and Christopher. Indeed, this test allowed us to determine the causal relationship between the variables. For there to be a causal relationship between the variables, the probability must be less than 5% or 10%.

Tableau 7 : The Granger causality test

Variables	Statistic-F					Direction of causality
	Ln-GDP	Ln_FDI	Ln_Open	Ln_Enrol	Ln_DI	
Ln_GDP		0,44034	0,43586	3,24155*	1,33216	Enrol-> GDP
Ln_FDI	1,54369		1,46982	1,43651	0,88011	-
Ln_Open	1,27094	0,11606		5,97504**	6,72000**	Enrol ->Open DI -> Open
Ln-Enrol	1,98976	3,29121*	0,0284		0,00594	FDI->Enrol
Ln_DI	1,38953	0,30467	0,75959	2,72018**	-	Enrol->DI

***, **, * significance at the 1%, 5%, 10% threshold.

The results obtained indicate the presence of a Granger causality relationship between the following variables: the enrollment rate (SC) causes the growth rate of (GDP) and the rate of domestic investment (DI) at 10% since the probability that is equal to (0.053), then, we can conclude that the hypothesis H0 is rejected and the rate of SC influences the growth rate of GDP and the rate of domestic investment in Tunisia. We also note that there is a causality between the schooling rate and the rate of domestic investment towards commercial openness. Moreover, there is a causal relationship between FDI and school enrollment.

4. Conclusion and policy implications

The objective of this paper is to study the impact of foreign direct investment on economic growth in Tunisia over the period from 1980 to 2015. To achieve this objective, we applied the ARDL Bounds in order to test the short-term and long-term relationship between the studied variables. The finding shows that FDI has a positive and significant impact on economic growth in Tunisian economy in the short run rather than in the long run. Indeed, an increase in FDI of 1 point helps to promote economic growth in Tunisia in the short run and long run respectively of 0.512 and 0.298 points. From the results of our study, we have also shown that domestic investment and the rate of schooling as proxy for human capital have had

a positive and significant impact on the economic growth of the Tunisian economy in the short and long run.

On the other hand, the rate of trade openness affects negatively economic growth. Also, GDP lagged by one period is positive and statistically significant. In fact, the one period lagged value of GDP is considered as an indicator of economic growth and / or short-term market size in Tunisia. The results obtained lead us to make the following recommendations to boost economic growth in Tunisia: The Tunisian economy should reduce the risks and uncertainty associated with foreign direct investment. It will also require greater integration especially with its neighbors. It should improve access to credit by creating and promoting national and regional development banks.

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