



Munich Personal RePEc Archive

The impact of FDI on economic growth in Tunisia: An estimate by the ARDL approach

Bouchoucha, Najeh and Ali, Walid

14 January 2019

Online at <https://mpra.ub.uni-muenchen.de/91465/>
MPRA Paper No. 91465, posted 16 Jan 2019 15:26 UTC

The impact of FDI on economic growth in Tunisia: An estimate by the ARDL approach

Najeh Bouchoucha¹

Walid Ali²

Abstract

This paper attempts to examine 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-term and long-term relationship between foreign direct investment and economic growth. The empirical findings show that FDI has positive impact on economic growth in both the short and the long term. 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 of the 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 short-term and long-term economic growth.

Keywords: FDI, economic growth, Tunisia, ARDL.

1. Introduction

Foreign direct investment has been identified and observed as an important factor affecting economic growth by stimulating technology transfer, improving human capital, domestic investment and foreign trade. Indeed, the major advantage for developing countries is the contribution of FDI to the provision and introduction of new technologies, skills, training and other relevant and vital materials for their economies, Hossain and Hossain (2012). When foreign companies expand to operate in host countries, they introduce efficiency into high-tech management and production. They give developing countries the ability to compete with foreign competitors and produce better quality goods and services in the future.

¹ Faculty of economic and management of Sousse, Tunisia

*contact email : najeh.bouchoucha@hotmail.fr

² Faculty of economic and management of Sfax, Tunisia

* contact email : walidisaeg@gmail.com

All the more, foreign direct investment can bring benefits for national companies. In fact, FDI is considered a source of development finance. They facilitate the transfer of technological and managerial knowledge to host countries, create employment opportunities and subsequently promote economic growth. Policy makers in a large number of countries have undertaken to study and provide incentives to attract investment flows as it is assumed that economic growth and development of the host country are complementary. 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 country more attractive for FDI.

In recent decades, many measures have been adopted by the Tunisian government to attract 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 program has characterized the progress of Tunisia's economic development. A policy of progressive liberalization of trade was pursued, first through the implementation of current account convertibility, then through accession to GATT agreements and by a free trade association with the European Union in 1995 entered into force on 1 January 2008. The objective of the agreement is to eliminate tariffs and other trade barriers on a wide range of goods and services.

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.

We organize this article as follows: we first present a brief review of the literature on the link between FDI and economic growth. Then we will present the econometric model and discuss the main results. 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 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 companies 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 on growth have focused on the influence of technological change on the GDP growth rate, 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, via 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 Roolah (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 growth, which, by developing its knowledge and skills, becomes a more productive element and creates increasing returns. In the same vein, the endogenous growth models developed by Romer (1990) and Lucas (1988) show that human resources 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 through FDI can be done through higher education. Similarly, Shahid (2015) also suggested that a higher level of education in the labor market can boost economic growth. In contrast, 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 can have impacts on 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) has 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. host country (Lee and Tcha (2004)). Indeed, the entry 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 can negatively affect local firms 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 directly affect 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.

Trade policies in the host country appear to affect the extent of FDI-induced growth since there is a general link between trade regimes and economic growth in the long term.

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. their distribution networks (Blomstrom and koko (1997)). 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), Pesaran and Shin (1999) and Pesaran et al. (2001) .The choice of this method is justified on two levels: it is the most appropriate for estimating long-term relationships for

small samples. Another important benefit of the ARDL Bounds, it allows 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 per capita gross domestic product that measures economic growth (GDP) and foreign direct investment (FDI), domestic investment (DI), enrollment rate (SC) and trade openness (OUV), by the cointegration method suggested by Pesaran et al. (2001). Thus, to highlight the impact of FDI on economic growth, we will present the following model:

$$\mathbf{GDP}_t = \beta_0 + \beta_1 \mathbf{FDI}_t + \beta_2 \mathbf{DI}_t + \beta_3 \mathbf{Open}_t + \beta_4 \mathbf{Enrol}_t + \varepsilon_t \quad (1)$$

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 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 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 fall of GDP because of the revolution and their consequences on the Tunisian economy during this period. Also, the net inflow of FDI in Tunisia represents a maximum of 9.42 with a minimum of 0.60 in 1988, this can be explained by economic instability during this period. Then, the openness trade 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 a fairly high average school enrollment rate of 63.44%, with a minimum of the variable school enrollment rate of around 25.16, while their maximum is 92.50. So education is becoming 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, we have all tried first to test the stationarity of the different series to make sure that none of them is integrated of order I (2) or more. Indeed, 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. The stationarity test

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 I0 or I1, in the case, an integration of order 2 or more this test becomes irrelevant (Pesaran et al., 2001). Thus, to see the level of integration of the model variables, we must first study all stationarity through several tests such as ADF tests, the Phillips-Perron test. These tests are based on the null hypothesis H0 is the hypothesis of nonstationarity. 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

Variables	ADF		PP	
	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.

From the results of Table 2, 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. While 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 test shows us 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:

$$\begin{aligned}
D(\ln(\text{GDP}_t)) = & \alpha_0 + \beta_1 \ln(\text{GDP}_{t-1}) + \beta_2 \ln(\text{FDI}_{t-1}) + \\
& \beta_3 \ln(\text{Open}_{t-1}) + \beta_4 \ln(\text{DI}_{t-1}) + \beta_5 \ln(\text{Enrol}_{t-1}) + \sum_{i=1}^p \alpha_{1i} D(\ln(\text{GDP}_{t-i})) + \\
& \sum_{i=1}^{q1} \alpha_{2i} D(\ln(\text{FDI}_{t-i})) + \sum_{i=1}^{q2} \alpha_{3i} D(\ln(\text{Open}_{t-i})) + \sum_{i=1}^{q3} \alpha_{4i} D(\ln(\text{DI}_{t-i})) + \\
& \sum_{i=1}^{q4} \alpha_{4i} D(\ln(\text{Enrol}_{t-i})) + \varepsilon_t \quad (2)
\end{aligned}$$

Where all the variables are as previously defined, with Ln: represents 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 Fisher 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
Statistics- F	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 criterion. The results of the long-term estimates that are shown in the table showing that the Fisher statistic calculated as FPIB (GDP / FDI, Open, DI, Enrol) = 4.74 is greater than the upper bound for the different significance thresholds (1%, 5%, 10%),thus imply the null hypothesis of absence of long-term relationship 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 model variables using the following equation:

$$\ln(\text{GDP}_t) = \alpha_0 + \sum_{i=1}^p \alpha_{1i} (\ln(\text{GDP}_{t-i})) + \sum_{i=1}^{q1} \alpha_{2i} (\ln(\text{FDI}_{t-i})) + \sum_{i=1}^{q2} \alpha_{3i} (\ln(\text{Open}_{t-i})) + \sum_{i=1}^{q3} \alpha_{4i} (\ln(\text{DI}_{t-i})) + \sum_{i=1}^{q4} \alpha_{4i} (\ln(\text{Enrol}_{t-1})) + \varepsilon_t \quad (3)$$

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 the 5% level. In fact, FDI has a positive and significant influence on the GDP growth rate. 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 negative trade openness is 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 and statistically significant 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

We examine the short-term relationship between model variables using the error correction model includes short-term dynamics with long-run equilibrium.

The unrestricted dynamic error correction model is expressed as follows:

$$D(\ln(\text{GDP}_t)) = \alpha_0 + \sum_{i=1}^p \alpha_{1i} D(\ln(\text{GDP}_{t-i})) + \sum_{i=1}^{q1} \alpha_{2i} D(\ln(\text{FDI}_{t-i})) + \sum_{i=1}^{q2} \alpha_{3i} D(\ln(\text{Open}_{t-i})) + \sum_{i=1}^{q3} \alpha_{4i} D(\ln(\text{DI}_{t-i})) + \sum_{i=1}^{q4} \alpha_{4i} D(\ln(\text{Enrol}_{t-1})) + \alpha \text{ECM}_{t-i} + \varepsilon_t \quad (4)$$

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 shown 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 term coefficient is negative and statistically significant. This coefficient indicates the speed of adjustment of the equilibrium repair in a dynamic model. Negativity and the significance of the error term prove the existence of a stable long-term relationship. 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 statistically significant effect at the 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 opening 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 short- and long-term economic growth at the 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 the 5% threshold in the short and long term. 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, first of all, by the fact that imports from Tunisia 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 model stability test

We assess the stability of the long-run relationship between economic growth, FDI and other variables. We rely on the tests "CUSUM" and "CUSUM-squared" 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 »

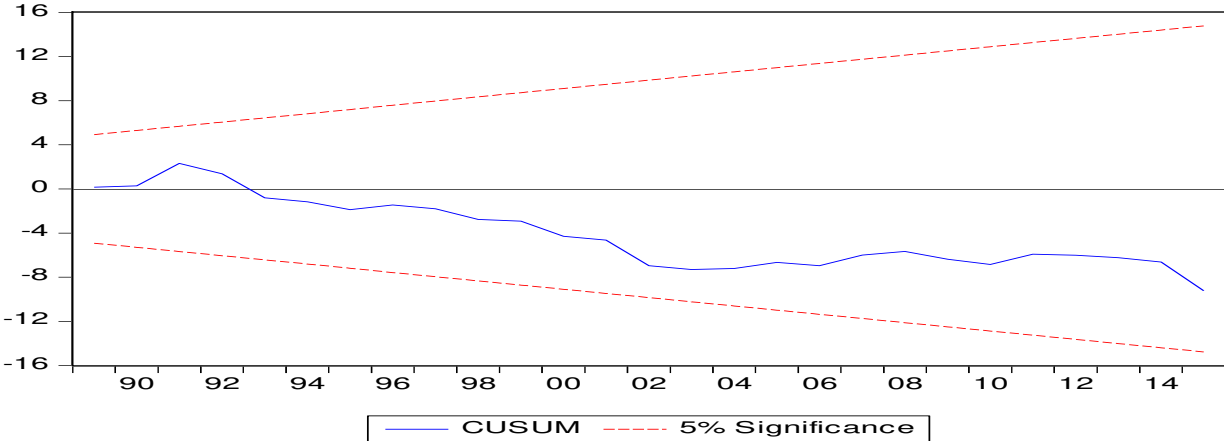
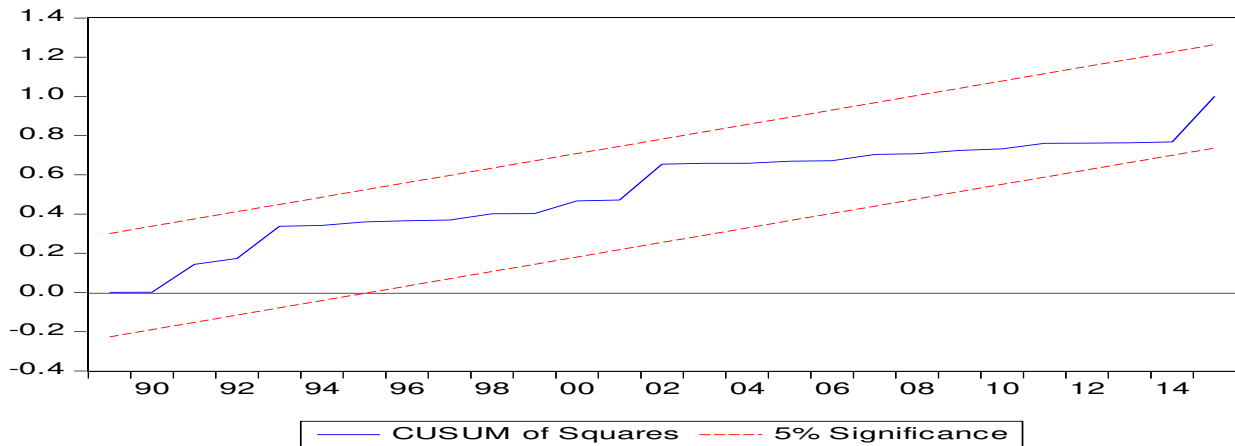


Figure 2: «Plot of CUSUM SQ»



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

This paper has investigated 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 term rather than in the long term. Indeed, an increase in FDI of 1 point helps to promote economic growth in Tunisia in the short term and long term 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 term.

On the other hand, the rate of commercial openness has a negative effect on economic growth. Also, GDP lagged by one period is positive and statistically significant. In fact, the GDP of the delayed year 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.

References

Agrawal, G., (2015). « Foreign Direct Investment and Economic Growth in BRICS Economies: A Panel Data Analysis », *Journal of Economics Business and Management*, vol.3(4).

Aitken, B., et Harrison, A., (1997). « Do Domestic Firms Benefit From FDI? Evidence From Venezuel », *American Economic Review*, vol. 89 (3), pp.605 – 618.

Alaya M., (2004). « Investissement Direct Etrangers et Croissance Economique : une estimation à partir d'un modèle structurel pour les pays de la rive Sud de la méditerranée », Centre d'économie de Développement, Université Montesquieu.

Anwar, S.,Sun, S.(2011). «Financial development, foreign investment and economic growth in Malaysia », *Journal of Asian Economic*, 22, pp .335-342.

Barro, J., Sala., X., (1995). « Economic Growth », Cambridge, MA.MC Growth Hill.

Blankenau, W., Simpson, N(2004). «Public education expenditures and economic growth», *Journal of development economic*, 73, pp.583-605.

Blomstrom M., ET KoKKo A., (2003). « Human Capital and Inward FDI », Working paper 167.

Borensztein E., De Gregorio J., Lee J.W., (1998). « How Does Foreign Direct Investment Affect Growth? », *Journal of International Economic*, vol. (45), pp.115-135.

Borensztein, E., De Gregorio, J., Lee, J, (1998). «How does Foreign Direct Investment Affect Economic Growth? », *Journal of International Economics*, vol.45, pp.115-135.

Bosworth, B. et S. Collins (1999). «Capital Inflows, Investment, and Growth », Tokyo Club Papers, vol. 12, pp. 55-72.

De Mello., (1997). « Foreign Direct Investment in Developing Countries and Growth: a Selective Survey », The Journal of Development Studies, vol. (34), pp.1-34.

Dritakis N., et Stamatiou P., (2014). « Exports, Foreign Direct Investment and Economic Growth for Five European Countries: Granger Causality Tests in Panel Data », Applied Economics Quarterly, vol. 60(4), pp .253-272.

Dunning., (1981). « Economic Analysis And Multinational Enterprises », Edition Allen et Unwin, londren.

Ford, T., Rork, J., et Elmslie, B., (2008). « Foreign direct investment, economic growth, and the human capital threshold: Evidence from US states », Review of International Economics, vol.16(1), pp.96–113.

Halpman E., (2006). « Trade, FDI, the Organization of Firms », Journal of Economic Literature, vol. XLIV, pp. 589-630.

Hansen, H., et Rand, J., (2006). « On the casual links between FDI and growth in developing countries », World Economy, vol.29 (1), pp .21 – 41.

Herzer, D., Klasen, S., et Nowak.D, F., (2008). « In Search of FDI-led Growth in Developing Countries: The way Forward », Economic Modelling, vol. 25(5), pp. 793-810.

Hossain, A., et Hossain, M. K., (2012). « Empirical relationship between foreign direct investment and economic output in South Asian countries: A study on Bangladesh, Pakistan and India », International Business Research, vol.5(1), p .9.

Insah, B. (2013). « Foreign Direct Investment Inflows and Economic Growth in Ghana », International Journal of Economic Practices and Theories, vol.3 (2), pp.115-121.

Iqbal,Z., et Abbas,K.(2015) . «An econometric Analysis of Foreign Direct Investment and Economic Growth of Pakistan, Developing country studies, 5(11), pp .16-25.

Kashif, Y., et Muhammad, R., (2013). « The Impact of Foreign Direct Investment on Pakistan Economic Growth », Interdisciplinary Journal of Contemporary Research in Business, Vol. (4), pp.11.

Kumar.,(2002).« Foreign Direct Investment, Externalites and Economic Growth in Developing Countries », RIS discussion, No.27.

Lean, H., et Tan, W., (2011). « Linkages Between Foreign Direct Investment, Domestic Investment and Economic Growth in Malaysia », Journal of Economic Cooperation and Development, vol.2(4), pp.75-96.

Lee, M., et Tcha, M., (2004). « The color of money: the effects of foreign direct investment Literature, vol. XLIV, pp. 589-630.

Lucas, R., (1993). « On the Determinants of Direct Foreign Investment: Evidence from East and Southeast Asia », World Development, vol. 21(3), pp.391-406.

Makki, S., et Somwaru, A., (2004). « Impact of Foreign Direct Investment and Trade on Economic Growth: Evidence from Developing Countries », American Journal of Agricultural Economics, vol.86(3), pp.795-801.

Mencinger, J., (2003). « Does foreign direct investment always enhance economic growth?», Kilkos, vol.56 (4), pp .491 – 508.

Moura, R., et Rosa. F., (2009). « The effects of foreign direct investment on the host country economic growth - theory and empirical evidence », Paper presented at the 11.th ETSG Annual Conference, Rome.

Nam Hoai Trinh., (2015). « The Impact of Foreign Direct Investment on Economic Growth:

Evidence From Vietnam », *Developing Country Studies*.

Nedfo N.F., (2003): « Impact des Investissements Direct Etrangers sur la Croissance : Quelque Résultats sur les pays Africains au Sud du Sahara », Banque de Etats de l'Afrique Centrale, N3.

Ngouhouo I., (2008). « Les Investissements Direct Etrangers en Afrique Centrale: Attractivité et Effets Economique », Laboratoire d'économie Appliquée au Développement.

OCDE., (1993). « Définition de références détaillées des investissements internationaux », Paris.

OCDE.,(2002). « Foreign Direct Investment for Development: Maximising benefits-Minimising Costs », France.

Pesaran H. and Y. Shin (1999). «An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis», In S. Strom (eds.) *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium* Cambridge University Press.

Pesaran M.H., Shin Y. and Smith R.J. (2001). «Bounds testing approaches to the analysis of level relationships», *Journal of Applied Econometrics* 16, pp. 289-326.

Pesaran, M.H., Shin, Y. et Smith, R.J., (2001). « Bounds testing approaches to the analysis of level relationships », *Journal of Applied Econometrics*, Vol. 16, pp. 289–326.

Pessoa, A., (2007). « FDI and host country productivity: a review », Working Paper da Faculdade de Economia da Universidade do Porto n° 25.

Ram, R., et Zhang, K., (2002). « Foreign direct investment and economic growth: evidence form cross-country data for the 1990 », *Economic Development and Cultural Change*, vol. 51 (1), pp.205 – 215.

Rogmans,T., et Ebbbers,H., (2013). « The Determinants of Foreign Direct Investment in The

Middle East North Africa region », *International Journal of Emerging Markets*, vol.8(3),pp .240-257.

Romer P., (1986). « Increasing Returns and long Run Growth », *Journal of Political Economy*, vol.94 (5), pp.1002-1037.

Saqib, N., Masnoon, M., Rafique, N(2013). «Impact of Foreign Direct investment on economic growth of Pakistan», *Advances in Management et Applied Economics*, 3(1), pp. 35-45.

Shahzad, A., Mithani, D. A., Al-Swidi, A. K., & Fadzil, F. H. (2012). « Political Stability and The Foreign Direct Investment Inflows in Pakistan », *British Journal of Arts and Social Sciences*, vol.9(2) pp .199-213.

Soltani ., Ochi.,(2012). « Foreign Direct Investment and Economic Growth : An Approach in Terms of Cointégration for The Case of Tunisia », *Journal of Applied Finance et Banking*, Vol(2), pp.4.

Vissak, T., et Roolaht, T., (2005). « The negative impact of foreign direct investment on the vol.16(1), pp.96–113.

Zhang, K. H., (2001). « Does foreign direct investment promote economic growth? Evidence from East Asia and Latin America », *Contemporary Economic Policy*, vol. 19(2), pp.175–185