



FOREIGN DIRECT INVESTMENT AND GROWTH IN THE MAGHREB COUNTRIES

الاستثمار الأجنبي المباشر والنمو في بلدان المغرب العربي

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Abstract

Keywords

The authors aim to investigate the effects of foreign direct investment (FDI) on the economic growth of Maghreb countries, specifically Algeria, Morocco, Tunisia, Libya, and Mauritania. This research utilizes UNCTAD data from 1982 to 2016, employing the PANEL-VECM model. The findings indicate that FDI appears to have a negative impact on the economic growth of these Maghreb economies.

FDI;
GDP;
BP;
PANEL;
VECM.

JEL Classification Codes : F21 ; E23 ; C51 ; C33; C32

الكلمات المفتاحية

الملخص

يقترح المؤلفان دراسة أثر الاستثمار الأجنبي المباشر على النمو الاقتصادي لدول المغرب العربي وهي الجزائر والمغرب وتونس وليبيا وموريتانيا. أجريت هذه الدراسة من بيانات الأونكتاد 1982 - 2016 باستخدام نموذج PANEL-VECM. وبحسب نتائج الدراسة يبدو أن الاستثمار الأجنبي المباشر له أثر سلبي على النمو الاقتصادي لاقتصاديات المغرب العربي.

تصنيف JEL : F21 ; E23; C51; C33; C32

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1. INTRODUCTION

The Maghreb countries have mono-export economies of hydrocarbons and ores with a dominant public sector (petroleum for Algeria and Lybia, phosphate for Tunisia and Marocco, iron for Mauritania). These resources constitute the main sources of funding their development. Every sudden fall in world prices of oil or ores is reflected in a budget deficit compromising the finance of the growth. FDI is viewed as a new source of financing that supports growth and structural policies, facilitating the shift from a rentier economy to a more productive one.

FDI, like domestic investment, is considered to be a growth factor through the Keynesian multiplier effect of investment. Theoretically, FDI can foster growth in less developed countries by facilitating capital accumulation and enabling knowledge transfer through multinational companies (MNCs). New inputs and technology are included into production function of the host country; workforce is educated and trained to acquire job skills; new management, methodology and technics are adopted, ... In summary, FDI increases the productivity by adopting more capital-intensive production, enhances the competitiveness of local compagnies so that can be able to compete on international markets, improves employment, creates added value which consequently improves Balance of Payment of host countries.

Sadly, the empirical studies are not conclusive on the subject. Authors highlight some requirements of FDI impact such as host country environment (humain capital, infrastructure, market openness, ...), home country of the capital, ...

Based on the Fdi's tiny entries to the Maghreb countries over the period of the study 1982-2013 (they represented on average 0.42% of world FDI amount and 1.32% only of the FDI developing countries amount [unctad, 2016], The authors seek to assess the impact of FDI on the growth of Maghreb countries in response to those who advocate for FDI as a means of integrating these nations into the Arab Maghreb Union (AMU) framework.

II. THEORITICAL FRAMEWORK AND PREVIOUS STUDIES

FDI came after the Second World War. Until then, economic theories have focused on the export of goods. The pioneering work on FDI goes to Hymer S.H.

The macroeconomic theory of FDI focuses on the country and its specificities. It includes the capital market theory, the institutional capacity aptitude and the location approach. The microeconomic theory of FDI, in turn, focuses on the company and its strategies. It's apprehended by the 'OLI' paradigm.

For New Keynesians, any growth requires a revival of aggregate demand AD. The growth equation for this current is:

$g = s \cdot r$ / g = growth rate ; s = saving rate and r = profit rate.

Two major growth strategies are then proposed: growth through profits and growth through wages. The first strategy is based on the revival of AD by means of increased investment, which leads to a reduction in wages which forces the promotion of exports. The second strategy is based on a revival of AD by means of a revival of consumption, which implies the decrease in investment which requires the promotion of FDI.

In the empirical literature, the impact of FDI on growth is not universally accepted.

- BRICS countries: According to Xu B., the effect is positive in China. For Mishra A., the impact is positive only in China and Brazil while it is negative for the rest of the BRICS countries.
- African countries: Awolusi O. D. studied a random sample of African countries and concluded that the impact was negligible.
- developing countries (DC): Makki S.S. stated that FDI has a positive impact on growth but its size varies according to the level of human capital, domestic investment, infrastructure, macroeconomic stability and continuing trade policies. Li X. studied a sample of 84 countries through a PANEL model and concluded that the interaction of FDI with human capital has a strong impact on the growth of developing countries while the interaction of FDI with a technological gap reacts negatively.
- Maghreb countries: Belloumi M. examined the relationship between FDI and growth in Tunisia using the "bounds test" of the ARDL model. The findings indicated no short-term causality between FDI and economic growth in Tunisia. Si Mohamed K. assessed the impact of FDI on Algeria's economic growth from 1970 to 2014. His findings led to the conclusion that Algeria's political and macroeconomic stability is not sufficient to attract FDI that will help non-hydrocarbon sectors to boost growth.

III. METHOD AND PROCEDURES

The study period has covered 32 years : from 1982 to 2013. The data concerning the gross domestic product (GDP), foreign direct investment (FDI), importations (M) and exportations (X), for the Maghreb countries, have been collected from the UNCTAD statistics, 2016. The preprocessing of the data resulted in the deflated GDP, FDI, M and X series. The basic software used was Eviews 9.

The appropriate model to study the relationship between FDI and growth (GDP) in the Maghreb countries over the time period 1982-2016, is the PANEL model presented below :

$$GDP_{it} = \alpha_{1i} + \beta_{1i} FDI_{it} + \beta_{2i} M_{it} + \beta_{3i} X_{it} + w_{it}$$

GDP_{it} = gross domestic product in real price base US dollar 2001

FDI_{it} = foreign domestic investment, in real price base US dollar 2001

M_{it} = importations of goods and services, real price base US dollar 2001

X_{it} = exportations of goods and services, real price base US dollar 2001

w_{it} = perturbations

α_{1i} = intercepts to determinate

$\beta_{1i}, \beta_{2i}, \beta_{3i}$: variables coefficients to determinate

The PANEL-VECM model that is used to analyze the long and short run causality between GDP, FDI, M and X is formalized as following :

$$\Delta GDP_{it} = \gamma_{1i} + \sum_{k=1}^P \beta_{11ik} \Delta GDP_{it-k} + \sum_{k=1}^P \beta_{12ik} \Delta FDI_{it-k} + \sum_{k=1}^P \beta_{13ik} \Delta M_{it-k} + \sum_{k=1}^P \beta_{14ik} \Delta X_{it-k} + \lambda_{1i} ECT_{it-1} + v_{1it} \quad (1)$$

$$\Delta FDI_{it} = \gamma_{2i} + \sum_{k=1}^P \beta_{21ik} \Delta FDI_{it-k} + \sum_{k=1}^P \beta_{22ik} \Delta GDP_{it-k} + \sum_{k=1}^P \beta_{23ik} \Delta M_{it-k} + \sum_{k=1}^P \beta_{24ik} \Delta X_{it-k} + \lambda_{2i} ECT_{it-1} + v_{2it} \quad (2)$$

$$\Delta M_{it} = \gamma_{3i} + \sum_{k=1}^P \beta_{31ik} \Delta M_{it-k} + \sum_{k=1}^P \beta_{32ik} \Delta GDP_{it-k} + \sum_{k=1}^P \beta_{33ik} \Delta FDI_{it-k} + \sum_{k=1}^P \beta_{34ik} \Delta X_{it-k} + \lambda_{3i} ECT_{it-1} + v_{3it} \quad (3)$$

$$\Delta X_{it} = \gamma_{4i} + \sum_{k=1}^P \beta_{41ik} \Delta X_{it-k} + \sum_{k=1}^P \beta_{42ik} \Delta GDP_{it-k} + \sum_{k=1}^P \beta_{43ik} \Delta M_{it-k} + \sum_{k=1}^P \beta_{44ik} \Delta FDI_{it-k} + \lambda_{4i} ECT_{it-1} + v_{4it} \quad (4)$$

$$ECT (-1) = GDP (-1) - \beta_1 FDI (-1) - \beta_2 M (-1) - \beta_3 X (-1) - \beta_0$$

$ECT (-1)$: lagged error correction term

Δ : first difference operator

$$i = \overline{1,5} \quad t = \overline{1,32}$$

$\lambda_{1i}, \lambda_{2i}, \lambda_{3i}, \lambda_{4i}$: speeds of ECT to estimate

$\gamma_{1i}, \gamma_{2i}, \gamma_{3i}, \gamma_{4i}, \beta_0$: intercepts to estimate

$\beta_{11ik}, \beta_{12ik}, \dots, \beta_{44ik}$: short run equations coefficients to estimate

$\beta_1, \beta_2, \beta_3$: long run equation coefficients to estimate

$v_{1it}, v_{2it}, v_{3it}, v_{4it}$: serially uncorrelated error terms

k : lag length of the variables

IV. STUDY RESULTS (ANALYSIS AND DISCUSSION):

After performing the LLC, ADF and PP stationarity tests, it appeared that GDP, FDI, M and X are of the form I (1) [Table 1]. These levels of variables integration allow us to consider the PANEL-VECM model. To avoid the spurious regression, we undertake the Johansen panel cointegration test of the variables which confirms the existence of a long-term relationship,

between the dependant variable GDP, and the independent variables FDI, M and X [Table 3]. We consider then the PANEL-VECM model.

The optimal of this PANEL-VECM model has one lag [Table 2] and one cointegration equation [Table 3]. This model estimated (Table 4 and 5) is, for the most part, robust and stable [Annexes 1 and 2]. Otherwise, The Wald causality test asserts that there is no short-term causality from FDI, M and X conjointly to GDP, particularly from FDI to GDP [Table 6].

Given the values of the coefficients of the long run cointegration equation (Table 4), firstly, the FDI coefficient is significant ($t=6.41$) and really negative (-91.87); This means that there is, in the long run, a negative relationship from FDI to GDP, as an increase in FDI is reflected in decay of GDP (growth). In the other hand, the importation (M) coefficient is significant ($t=-4.46$) and really positive (7.13); this means that there is in long run a positive relationship from M to GDP, as an increase in importations (M) results in increase of GDP.

According the table 5 of short run equation, firstly, the coefficients of all the explanatory variables of D (GDP) are insignificant; this confirms the Wald causality. The test suggests that there is no short-term causality from FDI, money supply (M), and exports (X) together to GDP, particularly from FDI to GDP (refer to Table 6).

Secondly, In D (FDI) equation, the coefficients of $d(fdi(-1))$ and $d(x(-1))$ are significant and equal respectively to -0.553 and 0.047. This means there would be a negative impact of FDI at time $t-1$ to FDI at time t and a positive impact of exportations X at time $t-1$ to FDI at time t . Thirdly, in the $D(M)$ equation, The coefficient of $d(fdi(-1))$ is significant and equal to -1.237. This means there would be a negative impact of the FDI at $t-1$ to importation (M) at time t . In other words, essentially, one unit increase in FDI in time $t-1$ would lead to a decrease of 0.553 unit in FDI and 1.23 units in importations (M) at time t .

In summary, the increase of FDI in Maghreb countries is reflected in improvement of short term foreign trade (decrease of importations) only without any effect on GDP in short or long term.

V. CONCLUSION:

This paper examines the influence of foreign direct investment (FDI) on the economic growth of Maghreb countries from 1982 to 2013. It aims to identify alternatives to hydrocarbons and minerals as sources of financing for economic growth, facilitating the transition of these countries from rentier economies to more productive ones.

This study was conducted through the PANEL-VECM dynamic model. This allowed us to affirm, in one side, the existence of a long run causality from foreign direct investment (FDI) to growth and, in another side, through the Wald test, the inexistence of short-term causality from FDI to the growth of the Maghreb countries economies.

According to our results, the impact of this policy (attracting FDI) would have a negative long-term effect on the Maghreb countries economic growth. The FDI could not be a means of integrating these countries into the AMU framework. The main reasons of the impact FDI failure

would be the inexistence of the FDI prerequisites in these countries: infrastructure, market openness, small technological gap, education,...

We mention at the end that our results are similar to the works done on the Maghreb countries : Algeria (Si Mohamed), Morocco (Azeroual M.) and Tunisia (Belloumi M.). Contrary to the widespread opinion on FDI as a source of generating externalities on the host country, our empirical results invalidate this hypothesis in the case of Maghreb countries. We plan, in a future article, to introduce infrastructure, trade openness, technological gap, education,... as complementary explanatory variables.

Table (01): The Johansen Cointegration Test

Method	D(FDI)		D(DGP)		D(M)		D(X)	
	statistics	prob	stats	prob	stats	prob	stats	prob
Levin,Liu& Chu	-18.8	0.0	-9.1	0.0	-7.5	0.0	-10.8	0.0
ADF	391.3	0.0	92.1	0.0	69.7	0.0	107.8	0.0
PP	421.4	0.0	161.1	0.0	120.7	0.0	161.2	0.0

Source : built from results of Eviews9

Table (02) :Maxlag of VAR

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5590.146	NA	1.94e+29	78.79079	78.87405	78.82462
1	-5076.528	991.0662	1.76e+26	71.78208	72.19839*	71.95125
2	-5048.546	52.41562*	1.48e+26*	71.61333*	72.36269	71.91784*
3	-5034.684	25.18719	1.53e+26	71.64343	72.72585	72.08328

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source : built from results of Eviews

Table (03): Johansen Fisher cointegration test

Series : GDP FDI M X

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Fisher Stat.*		Prob.
		Prob.	(from max-eigen tes...	
None	43.39	0.0000	29.02	0.0012
At most 1	20.82	0.0224	15.69	0.1088
At most 2	11.06	0.3527	7.451	0.6823
At most 3	10.16	0.4269	10.16	0.4269

* Probabilities are computed using asymptotic Chi-square distribution.

Source : built from results of Eviews9

Table (04): Panel-vecmestimation : long run equation

<i>Cointegrating equation</i>	<i>Cointeq1</i>	<i>t-satistic</i>
<i>GDP(-1)</i>	1	
<i>FDI(-1)</i>	91.87	6.41
<i>M(-1)</i>	-7.13	-4.46
<i>X(-1)</i>	2.18	1.82
<i>C</i>	-35621.86	

Source : built from results of Eviews9

Table (05): Panel-vecmestimation : short run equation t-statistics in[]

—Error Correction:	D(GDP)	D(FDI)	D(M)	D(X)
CointEq1	0.030781 (0.01098) [2.80437]	-0.001055 (0.00071) [-1.48248]	0.021540 (0.00328) [6.57259]	0.015156 (0.00723) [2.09706]
D(GDP(-1))	-0.102303 (0.13957) [-0.73301]	-0.013501 (0.00905) [-1.49257]	-0.061424 (0.04167) [-1.47397]	-0.204732 (0.09190) [-2.22779]
D(FDI(-1))	-0.943847 (1.18473) [-0.79668]	-0.553486 (0.07678) [-7.20852]	-1.237008 (0.35374) [-3.49692]	-0.372439 (0.78010) [-0.47742]
D(M(-1))	0.216527 (0.29314) [0.73864]	0.004646 (0.01900) [0.24452]	-0.013001 (0.08753) [-0.14854]	-0.071131 (0.19302) [-0.36851]
D(X(-1))	-0.074320 (0.20861) [-0.35627]	0.047429 (0.01352) [3.50811]	0.092678 (0.06229) [1.48793]	0.043044 (0.13736) [0.31336]
C	1112.275 (545.625) [2.03853]	65.07558 (35.3619) [1.84027]	631.4987 (162.915) [3.87624]	752.0772 (359.274) [2.09333]

Source : built from results of Eviews9

Table 6 Short run causality test

—Error Correction:	D(GDP)	D(FDI)	D(M)	D(X)
CointEq1	0.030781 (0.01098) [2.80437]	-0.001055 (0.00071) [-1.48248]	0.021540 (0.00328) [6.57259]	0.015156 (0.00723) [2.09706]
D(GDP(-1))	-0.102303 (0.13957) [-0.73301]	-0.013501 (0.00905) [-1.49257]	-0.061424 (0.04167) [-1.47397]	-0.204732 (0.09190) [-2.22779]
D(FDI(-1))	-0.943847 (1.18473) [-0.79668]	-0.553486 (0.07678) [-7.20852]	-1.237008 (0.35374) [-3.49692]	-0.372439 (0.78010) [-0.47742]
D(M(-1))	0.216527 (0.29314) [0.73864]	0.004646 (0.01900) [0.24452]	-0.013001 (0.08753) [-0.14854]	-0.071131 (0.19302) [-0.36851]
D(X(-1))	-0.074320 (0.20861) [-0.35627]	0.047429 (0.01352) [3.50811]	0.092678 (0.06229) [1.48793]	0.043044 (0.13736) [0.31336]
C	1112.275 (545.625) [2.03853]	65.07558 (35.3619) [1.84027]	631.4987 (162.915) [3.87624]	752.0772 (359.274) [2.09333]

Source : built from results of Eviews9

Annexe1. Serial correlation test of VECM residuals

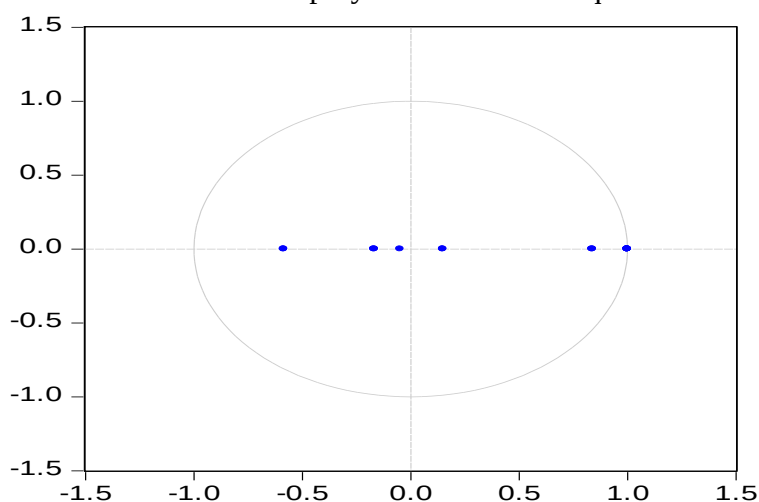
Lags	LM-Stat	Prob
1	15.97284	0.4549
2	18.98511	0.2694
3	15.85879	0.4629

Probs from chi-square with 16 df.

Source : built from results of Eviews9

Annexe2. Model stability test

Inverse des racines du polynôme caractéristique



Source : built from results of Eviews9