THE FOREIGN DIRECT INVESTMENT AND THE EMPLOYMENT IN MAGHREB COUNTRIES: AN ECONOMETRIC STUDY BY USING THE COINTEGRATION TEST AND THE PANEL MODELS

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ABSTRACT

The study aims to determine the foreign investments effect on the employment rate in the Maghreb countries from 1990 to 2016, with the usage of Panel models (the cross-sectional time series) and Cointegration test. The labour demand function estimation results show there is a positive impact of foreign investments on the employment, increasing of 1% of foreign investments causes increasing of 5,49% of labour demand, in addition to that the Cointegration test results showed that there is a balance relationship between the direct foreign investments and the total labour demand, for long term, in the Maghreb countries. As results also, the rapidity of reaching balance is 41,27%, the absence of causation between them in short term.

KEY WORDS

Direct foreign investment, employment, labour demand, Panel data, Cointegration test.

JEL CLASSIFICATION : C22 ; E22 ; E24

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الاستثمار الأجنبي المباشر والتشغيل في دول المغرب العربي: دراسة قياسية باستخدام نماذج البانل واختبار التكامل المشترك.

ملخص

تهدف هذه الدراسة إلى تحديد أثر الاستثمار الأجنبي المباشر على مستوى التشغيل في دول المغرب العربي خلال الفترة 1990 و2016 باستخدام نماذج بانل (السلاسل الزمنية المقطعية) و إختبار التكامل المشترك، وقد خلصت نتائج تقدير دالة الطلب على اليد العاملة إلى وجود تأثير ايجابي للاستثمار الأجنبي المباشر على التشغيل حيث أن الزيادة بنسبة 1% في حجم الاستثمارات الأجنبية المباشرة ستؤدي إلى زيادة الطلب على العمل بنسبة 5.49%، كما أثبتت نتائج اختبار التكامل المشترك وجود علاقة توازنية طويلة الأجل بين الاستثمار الأجنبي المباشر والطلب الإجمالي على العمالة في الدول المغاربية مع نسبة سرعة الوصول إلى التوازن بحوالي 41.27%، في حين أكدت نتائج هذا الاختبار غياب العلاقة السببية بينها على المدى القصير.

كلمات مفتاحية

الاستثمار الأجنبي المباشر؛ التشغيل؛ الطلب على العمل؛ بيانات البانل؛ اختبار التكامل المشترك.

تصنيف جال: C22؛ E22؛ E24

L'INVESTISSEMENT DIRECT ÉTRANGER ET L'EMPLOI DANS LES PAYS DU MAGHREB ARABE : ÉTUDE ÉCONOMÈTRIQUE EN UTILISANT LES MODELES DE PANEL ET LE TEST DE COINTEGRATION

RÉSUMÉ

Cette recherche a pour objet d'étudier l'effet de l'investissement direct étranger sur l'emploi dans les pays du Maghreb arabe au cours de la période 1990 et 2016, à cet effet nous avons utilisé les modèles de panel (séries chronologiques longitudinales) et le test de cointégration. Les résultats de l'estimation de l'équation de la demande de main-d'œuvre montrent que l'investissement direct étranger a un effet positif sur l'emploi, puisqu'une augmentation de 1% de l'investissement direct étranger entraînera une augmentation de la demande de main-d'œuvre de 5,49%. Les résultats du test de cointégration ont prouvé l'existence d'une relation d'équilibre à long terme entre l'investissement direct étranger et la main-d'œuvre totale dans les pays du Maghreb avec un taux d'accès à l'équilibre se situant autour de 41,27%. Les résultats du test ont également montré l'absence d'une relation de causalité à court terme entre eux.

MOTS CLÉS

Investissement Direct Etranger ; Emploi ; Demande de Main-d'œuvre ; Données de Panel ; Test de Cointégration.

JEL CLASSIFICATION : C22 ; E22 ; E24.

INTRODUCTION

Foreign investments topic is crucial for the developed and emerging countries, it's a complementary to the local investment for realising growth and economic development. One of the mechanisms of economic reform is the foreign investment, within the market economy that countries adopt. The foreign investments are a form of international finance, as a replacement of the ineffective foreign debts,

of achieving the final economic policies purposes (Shabbir 2013, Enwiran, and Hamidi 2017) during the stifling indebtedness, and its negative consequences in all socioeconomic fields, that emerging countries suffer from. (Azazi 2010). Due to the benefits of foreign investments such as technology transfer, increasing production and providing vacancies, especially the directed, in the emerging countries, many of these countries have set strategies to attract these investments. (Osano, Benhame, and Koine 2016). In the Arab world, especially the Maghreb, the population rate increases then unemployment does also, gives importance to increase and improve the employment similarly to the other countries over the world. Lately, many structural economic reforms were adopted to provide an appropriate economic environment for attracting foreign investments, with facilities and incentives, in order to increase the employment and wages in sectors. Technology and capital are present with the direct foreign investments flaw to the host country, this effects the labour request and all the market indexes: the labour force composition, the labour productivity and the wages level. The problemtic of our study is "How effective is the direct foreign investments flaw on the employment in Maghreb (Algeria, Libya, Mauritania, Morocco and Tunisia?

For the treatment of this problematic, we concentrated on the theoretical side of the explanatory approaches of the investments and labour relation, and the most important standard studies related to the foreign investments impact on employment, especially in the emerging countries. After that, we did a standard study with the Panel models usage and Cointegration test to estimate the labour rate (Ratio of the workers (over 15) to the entire population) in the Maghreb. For this kind of studies, we relied on the Direct Foreign Investment, Real Gross Domestic Product in the standard model, and the total capital composition with constant prices as explanatory variables.

1- THE EXPLANATORY APPROACHES OF FDI AND EMPLOYMENT

There are direct and indirect impacts of FDI flow on the qualitative and quantitative indexes of the labour market, many employment conceptions and its dimensions must be determined to study the

relation between FDI and employment. The quantitative side shows the distribution, according to age and education, competence and size of labour chances while the qualitative side shows the quality of these jobs with its four dimensions:

Labour chances creation, social protection, workers rights and social dialogue. Theses indexes (qualitative and quantitative) are nmed "the employment quality" or " the appropriate job". (Burchell et Al, 2014, P 459).

1.1- FDI impact on employment in the host countries

Throughout three channels, according to Keynsian theory, the direct relation between the investment and employment occurs :

FDI flow directly causes increasing in employment throughout new investment activities, indirectly by giving chance of work in the distribution phase.

Without creating new jobs, just keeping the employment level, the same labour remove to the foreign enterprises that run mutual projects with the local ones in the host country, as an impact of FDI flow. (Pinn et al., 2011, P78).

FDI sometimes decrease the employment in the host country, especially in the emerging countries, it's due to the competition in the market that pushes the local enterprise to withdraw because its inability in front of the foreigner enterprises. Even the different abilities of the FDI to create jobs, according to the sectors, such as in the service sector the job chances creation is higher than in the extractive industries sector.

1.2- FDI impact on the labor productivity in the host country

FDI flow effects productivity in an entire economy or a specific economic sector, throughout the labor productivity in the foreign enterprises branches or their indirect spreading in the host country. The branches productivity increases because of the production tools brought from the mother company and having immaterial assets such as knowledge capital, marketing and administrative capacities, and the relations with providers of supplements and clients. In other studies,

it's contrary, (Harris and Robinson 2003) (Okamoto 1999) , the branches productivity decreases , at least in the short term because of the insufficient time to adapt to the new cultural environment , and, in some host countries, the policies of unwelcoming the foreign investors. The low productivity is also a result of the nature of the economic activities, some multinational companies keep the high added value activities in the mother company country while the low added value activities in the host countries because of the low cost and labour element quality. (Vahter 2004, P 10).

1.3- FDI impact on the appropriate labour

For the economic combativité, the economic policies makers work to spread the idea of the appropriate job by providing good conditions of work and fair distribution of benefits. Generally, the high level of openness assists to establish good environment for an appropriate labour because of the pressure of the imultinational companies and the international organizations. Multinational companies are   financial channels, in form of FDI, and job chances creators but tools of improving the conditions of work according to the international standards , by providing safe conditions of work , wages equality and relying on competence principal to recruit its employees in this way the main dimension of appropriate job dimensions, is justice. (Ines 2018).

2- THE PREVIOUS STUDIES

There have been many studies about the effect of FDI on the employment in different countries over the world. It's worthy to say the results of these studies have differential from one study to another. Moreover, many studies we dealt with, had the same results of the positive impact of FDI on the employment in the countries of the study.(Fazekas 2005)(Driffeld and Taylor 2000) (Balcerzakv and Zurek 2011) (Edwin 2014) (Ines 2018) (Halimi 2018). However, the study of the countries, which joined the EU in 2004 (Diaconu and Sterbuleac 2017), showed that in 2003 FDI had improved the average of the sharing forces of labour and decreased the rate of unemployment among the youth in the countries of study. After joining EU, there was a negative effect of

FDI on the sharing forces of labour. A study of Boumedien Wakhroun, in 2019, showed the negative relation between FDI and employment in Algeria. Blonigen and Piger study, in 2014, found that labour is one of the FDI determiners in the sample. In addition, according to Ismail and Yosdouf, and Mogab et Al studies in 2003 and 2013 respectively, the relation between FDI and employment is determined by the host countries policies towards foreign investments and investors. There is not any impact of DFI on employment in China, India and Pakistan (Rizvi and Nishat 2009).

3- THE APPLIED STUDIES

We were based on, in this part of the applied studies, Panel data models to estimate the labour request function from 1990 to 2016 in the Maghreb countries (Algeria, Libya, Mauritania, Morocco and Tunisia) . It was derived from cobb-doughlas function, as following:

$(EPR)_{it} = (\gamma_1)_i + \gamma_2 \ln (FDI)_{it} + \gamma_3 \ln (GDP)_{it} + \gamma_4 \ln (GCF)_{it}$

Where as :

$(EPR)_{it}$ Labour volume, the ratio of the workers number to the population, over 15 years old, of each country.

$(FDI)_{it}$ Volume of FDI flow, the net internal flows, in US dollar, of each country.

$(GDP)_{it}$ It represents the gross domestic product, in the foundation year 2010 at constant rate of US dollars, of each country (i).

$(GCF)_{it}$ It represents the gross capital composition, in the foundation year 2010 at constant rate of US dollars, of each country (i).

ξ_{it} The stochastic error

3.1- The model variables analysis and study

3.1.1. The volume of the labor force, introduces by the ratio of employment, more than 15 years, to the volume of the total population:

In Chart n° 1, the ratio of the number of workers to the total population for the five countries under study, more than 15 years old, is introduced.

Chart1. The progress of the ratio of employment (more than 15 years) to the volume of the total population in the Maghreb countries in a graphic representation.
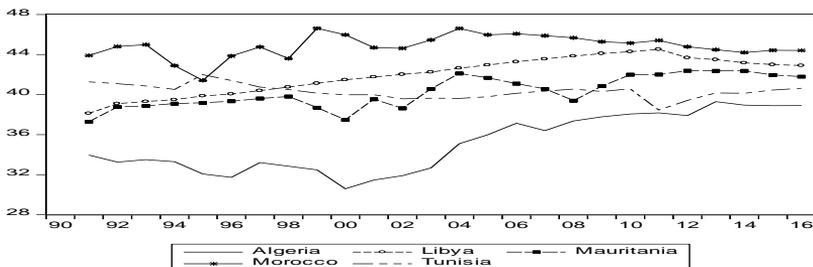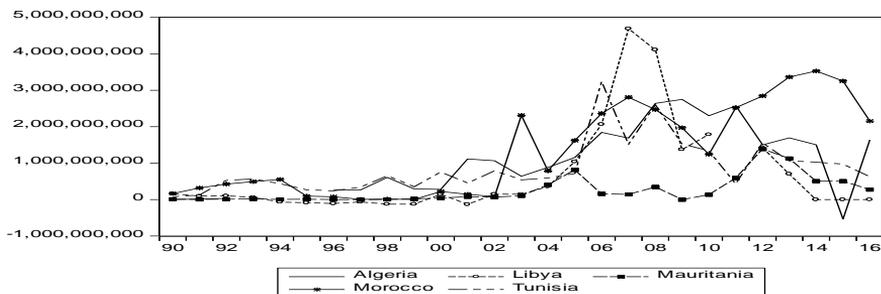

Source: Eviews outputs based on the World Bank database

Based on the graphic representation, the ratio of employment (more than 15 years old) to population volume of the Arab Maghreb countries, is stable at a range from 38 to 42% during the study period, except for Algeria that witnessed a significant decline in the level of employment from 1990 to 2004, then since 2005 these rates improved significantly, by reaching the rate of 39% in 2016.

3.1.2. The size of the flow of foreign direct investment, introduced as net inflows in US dollars

In chart No. 2 the flow of foreign direct investment for the five countries of study, from 1990 to 2017, is represented.

Chart2. Graphical representation of the evolution of FDI flows in the Maghreb countries.
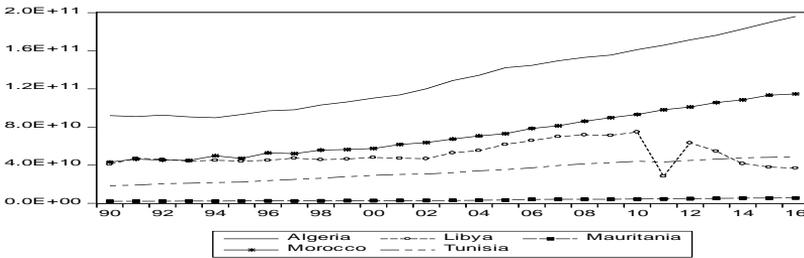

Source: Eviews outputs based on the World Bank database

The progress of foreign investment flows were stable at very low levels in the first years of the study (1990 to 2000) for all the countries of the Maghreb, after that there was great progress that reached its peak in the years 2007-2008, especially in Algeria and Libya, that was due to the rise of Oil prices, which prompted more investments in the hydrocarbon sector. The volume of investments quickly decreased dramatically, especially in light of the financial crisis that the global economy experienced in that period. As global flows of foreign direct investment fell to their lowest level in the second half of 2009 (World Investment Report 2010, p. 1). As it is introduced in the graphic representation.

3.1.3. Gross Domestic Product at constant rate of US dollars of the foundation year 2010.

As for the gross domestic product, graph No. 3 reflects the progress of this variable from 1990 to 2017 for the Maghreb countries.

Chart 3. Graphical representation of the progress of GDP in the Maghreb countries.

Source: Eviews outputs based on the World Bank database
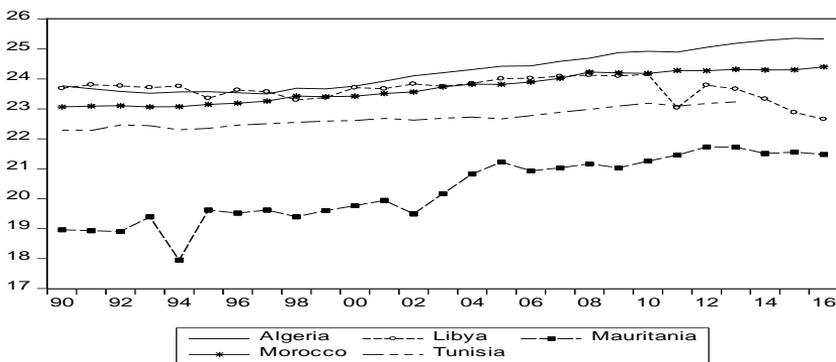
The volume of GDP in the countries of the Maghreb witnessed a gradual progress during the study period, especially for Algeria and Morocco, except for Mauritania which realised very low levels of GDP, and Libya which has known a decrease in the volume of output since 2011 due to the political crisis, it has gone through. As it is introduced in the graphic representation.

3.1.4. Gross capital composition at constant rate of US dollars of the foundation year 2010:

The progress of total capital composition of the five countries of the study, from 1990 to 2017, is represented in the following Chart n°. 4 .

Chart 4. Graphical representation of the progress of gross capital compsition in the Maghreb countries.

Source: Eviews outputs based on the World Bank database

The variable total capital composition witnessed relative stability during the study period for all the countries of the Arab Maghreb and its volume was close in these countries, except for Mauritania that realised low levels, especially in the first years of the study. As it is seen in the graphic.

3.2- The labor request equation estimation by the three panel models

Through the table No. 1, we will check again the three panel models (cumulative regression, constant effects and stochastic effects) obtained by the estimation of the labor request equation in the three models.

Table 1. Results of estimating the labor request equation through the three Panel models

Model	Variables		The dependent variable : the labour volume (epr)			
	The independent variables	Coefficients	The Coefficients Signification			Decision
			Value (t)	Sig		
Pooled Regression Model	Ln *FDI*	1.50E-09	5.188796	0.0000		Significant
	Ln *GDP*	-8.85E-11	-6.148354	0.0000		Significant
	Ln GCF	1.41E-10	4.238667	0.0000		Significant
	C	41.83386	95.05721	0.0000		Significant
	R²	0.323598				Significant model
	F Rate	18.97698 (significant rate : 0.000000)				
Fixed effects model	Ln *FDI*	5.49E-10	3.003028	0.0033		Significant
	Ln *GDP*	-5.12E-11	-2.315836	0.0223		Significant
	Ln GCF	1.30E-10	4.958706	0.0000		Significant
	C	40.67927	53.72485	0.0000		Significant
	R²	0.865577				Significant model
	F Rate	105.7873(significant rate : 0.000000)				
Random effects model	Ln *FDI*	6.69E-10	4.010270	0.0001		Significant
	Ln *GDP*	-6.90E-11	-3.856745	0.0002		Significant
	Ln GCF	1.47E-10	6.452460	0.0000		Significant
	C	41.19522	40.90926	0.0000		Significant
	R²	0.433133				Significant model
	F Rate	30.30857(significant rate : 0.000000)				

Source: Prepared by researchers based on the outputs of Eviews 8 program

It is noticeable from the regression table that the results of the estimation through the three panel models are significant, with the consideration that the significant (sig) value of the Fisher test is less than 0.05. We notice also that the effect of foreign direct investment on the request for work is positive, and significant in the three models because the significant value (sig) of its coefficient is less than 0.05. Therefore, statistical tests must be done to choose the most appropriate model for the study.

3.3- Choosing between a constant effects model and a stochastic-effects model

The Hausman test was used as the first phase to choose between the two models. The results of the test were, as following:

Table 2. The results of Hausman test.

Choice	The test rate	The test signification
Chi-Sq. Statistic	11.541371	0.0091

Source: Prepared by researchers based on the outputs of Eviews 8 program.

Depending on the table, it is remarkable that the test value (11.541371) is greater than the tabular value, and the significant value of the probability (sig) is less than 0.05. Therefore, we will accept the alternative hypothesis saying that the appropriate model for the study is the constant effects model.

3.4- Choosing between a constant effects model and an aggregate regression model

As a second stage, we will choose between the two constant effects models and the cumulative regression model by using Dummy endocrine variables to verify the hypothesis of heterogeneity between countries.

Table 3: Test for significance of coefficients of endocrine variables "Wald Test".

Choice	The test rate	The test signification
F-statistic	115.9174	0.0000
Chi-square	463.6695	0.0000

Source: Prepared by researchers based on the outputs of Eviews 8 program .

We accept the alternative hypothesis saying that the coefficients of the dummy variables are significantly different from zero because the value of both F and x^2 is greater than the significant tabular values, and the probability value (sig) is less than 0.05. Therefore, the most suitable model for the study is a constant effects model.

3.5- The estimated final form of the study

Based on the constant effects model chosen for the study, the estimation equation for the total request function for labor is, as following:

$$EPR = 40.67 + 5.49FDI - 5.12GDP + 1.3GCF$$

The regression equation results show that there is a positive, statistical significant relationship between the ratio of the labor force to the total population (more 15 years old) in each country, with the foreign direct investment (FDI) variable and the variable gross capital composition at constant prices (GCF). The two variables are respectively (5.49, 1.30) with the significant value (sig) for both parameters being less than 0.05. These results obtained are consistent

with the economic relationship that theoretically links the employment ratio with both foreign direct investment and total domestic investment represented by total capital composition. As it has been proven by many economic studies such as (Driffield and Taylor, 2000), (Fazekas, 2005), (Edwin, 2014) (Balcerzak and Zurek, 2011), (Enas, 2018) studies those confirmed that foreign direct investment has a positive impact on raising the employment rate by contributing to raising the productivity and competitiveness of local institutions, as a result of benefiting from technology transferred through foreign investment companies. The stimulation of the future local economy for these investments to create more of jobs, is an addition to the role of FDI in raising the efficiency of the allocation of economic resources and improving the balance of payments indexes, whether through the flow of capital to the host countries in the short term or through increasing exports in the long term (Duning, 1988).

While the regression equation shows a significant negative impact of the gross domestic product (GDP) variable, as its coefficient value was (- 5.12) with a significant value less than 0.05 that means the absence of any relationship between the change in GDP and the percentage of workers.

This result is not fit to economic theory and Okun's law, which states that an increase in economic growth as a result of an increase in production will lead to a greater reduction in the level of unemployment, which has been verified in the most studies, especially for developed countries.

However, there are other studies that treated many developing countries, their results are coordinated with the conclusion reached in this study that has confirmed that there is an absence of a relationship between production and the rate of employment or unemployment. (Moosa, 2008) and (Al-Talafha, 2012) studies treated the situation in Egypt, Algeria, Morocco and Tunisia , concluded that Oken's law is not fit in these countries, the reason for this according to these studies , is that the unemployment in these countries does not change according to the economic cycle, the labor markets are not flexible (the governments of these countries dominate over The labor market as a major source of

labor request) and the structures of these economies are not sufficiently diverse. Also, the study of (Shibi and Shakouri, 2008) and (Adriouche, 2013) on the Algerian economy proved that the unemployment rate did not respond to the rise in economic growth, but rather they were moving in the same direction in some years. Algeria depends only on the rise in oil prices. As for the study (Leshoro, 2014) on the Botswana economy, it showed negative employment elasticity in relation to production (GDP) as a result of the intensive use of capital compared to the labor force, and the study (Bankole and Fatai, 2013) demonstrated a positive relationship between economic growth and unemployment, which explains that the law of Oken also does not apply to the Nigerian economy.

The labour volume, in Algeria, is strongly related to the Oil prices, and the production instrument is very weak with limited capacities for these reasons the unemployment rate hasn't responded to the economic growth, they go towards the same direction. This is the result of Chebi and Chekouri 2008, and Iriuoch 2013 studies on the Algerian economy. Even in Botswana, the employment flexibility has been negative in relation to production because of the intensive usage of capital in comparison to the labour force. (Leshoro 2014). Bankole and Fatai 2013 study showed that there had been a positive relation, in Nigeria, between the economic growth and the unemployment, that explains that Owkn law isn't compatible with the Nigerian economy.

4- COINTEGRATION STUDY BETWEEN THE STUDY VARIABLES

In this phase, our target is to know if the study variables have a long term balanced relationship.

4.1- The variables stability study

The principal condition, to ensure the Cointegration relation, is that all the variables must be stable at the same degree, we relied on the related tests to the Panel data unit root test.
Tables 4, 5, 6 and 7.

Table 4. For the Dependent Variable : Employment Volume (EPR):

The model		At the level			The difference of the first degree		
The unit root test		the level	The constant " C "	C tren	the level	The constant " C "	C tren
LLC	T	1.204	-0.975	1.419	-6.411	-3.847	-3.054
	Sig	0.88	0.16	0.92	0.00	0.00	0.00
Breitung	T	/	/	2.412	/	/	-5.426
	Sig	/	/	0.99	/	/	0.00
Im,Pesaran,Shin	T	/	-0.349	1.015	/	-4.933	-3.865
	Sig	/	0.36	0.84	/	0.00	0.00
Fisher ADF	T	2.589	10.42	8.984	70.92	45.38	33.54
	Sig	0.98	0.40	0.53	0.00	0.00	0.00
Fisher- PP	T	2.246	17.84	10.77	120.3	91.26	93.36
	Sig	0.99	0.05	0.37	0.00	0.00	0.00
Decision		Unstable series			Stable series		

Source : Prepared by researchers based on the outputs of Eviews 8

Table 5. For the Independent Variable : Foreign Direct Investment (FDI)

The model		At the level			The difference of the first degree		
The unit root test		the level	The constant " C "	C tren	the level	The constant " C "	C tren
LLC	T	-1.933	-1.005	0.272	-9.400	-5.370	-3.957
	Sig	0.02	0.15	0.60	0.00	0.00	0.00
Breitung	T	/	/	-1.376	/	/	-3.370
	Sig	/	/	0.08	/	/	0.00
Im,Pesaran,Shin	T	/	-0.612	-0.042	/	-6.221	-4.876
	Sig	/	0.27	0.48	/	0.00	0.00
Fisher ADF	T	14.61	10.65	11.28	83.99	54.49	39.98
	Sig	0.14	0.38	0.33	0.00	0.00	0.00
Fisher- PP	T	16.92	16.08	16.20	137.0	99.58	87.37
	Sig	0.07	0.09	0.09	0.00	0.00	0.00
Decision		Unstable series			Stable series		

Source: Prepared by researchers based on the outputs of Eviews 8

Table 6. For the independent variable: Gross Domestic Product (GDP)

The model		At the level			The difference of the first degree		
The unit root test		the level	The constant "C"	C tren	the level	The constant " C "	C tren
LLC	T	7.787	3.962	-1.988	-2.168	-2.741	-2.327
	Sig	1.00	1.00	0.02	0.01	0.00	0.01
Breitung	T	/	/	1.314	/	/	-3.859
	Sig	/	/	0.90	/	/	0.00
Im,Pesaran,Shin	T	/	5.843	0.064	/	-3.691	-3.700
	Sig	/	1.00	0.52	/	0.00	0.00
Fisher ADF	T	1.428	1.712	8.586	33.22	33.40	32.59
	Sig	0.99	0.99	0.57	0.00	0.00	0.00
Fisher- PP	T	1.357	5.410	10.21	65.32	81.21	123.6
	Sig	0.99	0.86	0.42	0.00	0.00	0.00
Decision		Unstable series			Stable series		

Source: Prepared by researchers based on the outputs of Eviews 8

Table 7. For the Independent Variable : Gross Capital Formation (GCF)

The model		the level	The constant " C "	C tren	the level	The constant " C "	C tren
The unit root test							
		At the level			The difference of the first degree		
LLC	T	3.869	2.485	-0.889	-5.578	-5.375	-5.324
	Sig	0.99	0.99	0.18	0.00	0.00	0.00
Breitung	T	/	/	1.668	/	/	-1.902
	Sig	/	/	0.95	/	/	0.02
Im,Pesaran, Shin	T	/	3.881	0.969	/	-5.111	-4.980
	Sig	/	0.99	0.83	/	0.00	0.00
Fisher ADF	T	2.831	1.015	6.151	51.61	44.44	40.78
	Sig	0.98	0.99	0.80	0.00	0.00	0.00
Fisher- PP	T	2.562	2.125	6.184	85.66	72.14	63.41
	Sig	0.98	0.99	0.79	0.00	0.00	0.00
Decision		Unstable series			Stable series		

Source : Prepared by researchers based on the outputs of Eviews 8

According to the unit root test results, all the variables are unstable at the level in the three models because the (Sig) significant rate is bigger than 0.05 in the majority of the used tests, however the differences of the first degree the the (Sig) significant rate is smaller than 0.05 then the variables are stable in the first differences.

4.2- The Cointegration relations existence test

As long as all the variables are stable at (I (1)), we are permitted to search about the possibility of the existence of Cointegration balanced relations of Kong term between them by the usage of Fisher-Johansen test, the results are, as following :

Table 8. Fisher test results for co-integration

The test / The balanced relations	Trace test		Max-eigen test	
	rate Fisher	Sig	rate Fisher	Sig
None	70.19	0.0000	53.74	0.0000
At most 1	29.26	0.0011	19.98	0.0295
At most 2	17.99	0.0552	15.71	0.1081
At most 3	13.54	0.1952	13.54	0.1952

Source : Prepared by researchers based on the outputs of Eviews 8

Fisher-Johansen test results show that it's necessary to accept the hypothesis of the Cointegration balanced relations existence, in long term, between the variables because the significance level of (Sig) of the

two tests Max-eigen test .trace test) is bigger than 0.05 in more than two relations (At most 2) and in three balanced relations (At most 3) .

4.3- The determination of Cointegration relations

After the confirmation of the Cointegration balanced relations existence, in long term, between the variables study. We can determine the model of each one, as following:

The first relation

The Cointegration relation of the dependent variable, the labour volume. (EPR).
D(EPR)= - 0.050*(EPR(-1) - 1.84*GCF(-1) - 37.22) - 1.06*(FDI(-1) - 0.013*GCF(-1) - 663395833.59) - 3.29*(GDP(-1) - 0.17*GCF(-1) - 55118121864.2) - 0.07*D(EPR(-1)) - 0.17*D(EPR(-2)) + 8.99*D(FDI(-1)) + 1.37*D(FDI(-2)) + 3.48*D(GDP(-1)) + 5.69*D(GDP(-2)) + 2.11*D(GCF(-1)) - 4.51*D(GCF(-2)) + 0.088

The second relation

The Cointegration relation of the dependent variable, the Foreign Direct Investment (FDI).
D(FDI) =   - 0.41*(FDI(-1) - 0.013*GCF(-1) - 663395833.59) + 43095317.45*(EPR(-1) - 1.84*GCF(-1) - 37.22) + 0.004*(GDP(-1) - 0.17*GCF(-1) - 55118121864.2) - 0.06*D(FDI(-1)) + 0.05*D(FDI(-2)) - 35383986.86*D(EPR(-1)) - 57318359.92*D(EPR(-2)) + 0.02*D(GDP(-1)) + 0.08*D(GDP(-2)) - 0.02*D(GCF(-1)) - 0.03*D(GCF(-2)) - 66914264.18

The third relation

The Cointegration relation of the dependent variable, the Gross Domestic Product (GDP).
D(GDP) = 0.031*(GDP(-1) - 0.17*GCF(-1) - 55118121864.2) + 52407747.06*(EPR(-1) - 1.84*GCF(-1) - 37.22) - 0.32*(FDI(-1) - 0.013*GCF(-1) - 663395833.59) - 0.05*D(GDP(-1)) + 0.38*D(GDP(-2)) - 66389810.46*D(EPR(-1)) + 69956184.63*D(EPR(-2)) + 0.26*D(FDI(-1)) - 0.14*D(FDI(-2)) + 0.11*D(GCF(-1)) - 0.08*D(GCF(-2)) + 1507432802.96

The fourth relation

The Cointegration relation of the dependent variable, the General Capital Formation. (GCF)

D(GCF) = 0.015*(GCF(-1) - 5.56*GDP(-1) + 306709838025) - 99961998.91*(EPR(-1) - 1.02*GDP(-1) + 19.44) - 0.03*(FDI(-1) - 0.07*GDP(-1) + 3467510894.06) + 0.01*D(GCF(-1)) - 0.19*D(GCF(-2)) + 182015130*D(EPR(-1)) - 25587724.80*D(EPR(-2)) + 0.44*D(FDI(-1)) - 0.17*D(FDI(-2)) - 0.08*D(GDP(-1)) + 0.36*D(GDP(-2)) + 906824674.45

4.4- The confirmation of causation in the long term

To have causation in long term, there must be a significant and negative Cointegration coefficient of the dependent variable, in the regression equation with late degree.

Table 9. **Results of ascertaining long-term causal relationships**

	Cointegration relation	Cointegration coefficient	Coefficient signification	Decision
The 1st relation	The dependent variable : the labor volume (EPR)	-0.050521 (t* = -1.61) (sig =0.1070)	Negative and unsignificent	The absence of causation relation in the long term
The 2nd relation	The dependent variable: Foreign Direct Investment (FDI)	-0.412764 (t* = -4.15) (sig =0.0000)	Significant	*The presence of causation relation in the long term*
The 3rd relation	The dependent variable: the Gross Domestic Product (GDP)	0.03100	Positive	The absence of causation relation in the long term
The 4th relation	The dependent variable: The Gross Capital Formation (GCF)	0.0151	Positive	The absence of causation relation in the long term

Source: Prepared by researchers based on the outputs of Eviews 8

From the table, there is one causation in long term, that is related to FDI because the Cointegration coefficient of the dependent variable with late degree (FDI(1-)), in the regression equation, is negative (-0.4127) and significant (Sig <0.05). It shows that there is causation of long term with speed,to reach balance, of 41,27%. The rest of Cointegration relations of GCF, GDP, EPR showed the absence of Cointegration in long term because the Cointegration coefficients of the dependent variable, with late degree, were either positive or negative, but insignificant.

4.5- The causation relation confirmation in the short term

To confirm the causation relation in a short term, the independent variables, with late degrees in the regression equation, must be different than zero. For that reason, the Wald Test is used, the results are as following:

Table 10. Test results (WaldTest)

	Cointegration relation	The test rate (Chi-square)	The test signification	Decision
The 1ˢᵗ relation	The dependent variable : the labor volume (EPR)	3.570905	0.7345	The absence of causation relation short term.
The 2ⁿᵈ relation	The dependent variable : Foreign Direct Investment (FDI)	8.376989	0.2118	The absence of causation relation short term.
The 3ʳᵈ relation	The dependent variable : the Gross Domestic Product (GDP)	20.76379	0.0020	The presence of causation relation short term.
The 4ᵗʰ relation	The dependent variable : The Gross Capital Formation (GCF)	21.08813	0.0018	The presence of causation relation short term.

Source: Prepared by researchers based on the outputs of Eviews 8

Depending on the results table of Wald Test, two causation relatiopns, those are related to the Cointegration relation between GDP and GCF, are confirmed in the short term . The significant rate off the test (SIG) is equal to or less than 0.05. In the other Cointegration relations, the causation relation is remarkably absent. (FDI, EPR).

5- THE APPLIED STUDIES RESULTS

The econometric study has shown these following results:

There is a positive significant impact of FDI on the employment level Maghreb countries. Its coefficient reaches (5,49) , then the FDI level rises up to 1%, so the total demand for job moves up to 5,49%.

A negative significant impact of GDP on the labour demand. Its coefficient reaches (5,12-), according to the economy theory it's paradoxical that is due to the absence of the relation between GDP and the labour demand. This has been proven by many studies about Arabic countries (Moussa 2008, Eltalafha2012,Chibi and Chekouri 2008, Edriouch 2013 and Alhdiy et al 2015), studies about African countries

(Leshoro 2014, Moroke et al 2014, and Bankole and Fatai 2013), other studies about developing Asian countries (La et al 2010) and about MENA countries (Khrais and AlWadi 2016) .

A positive impact of the gross capital formation on the total employment volume, when GCF rises up 1%, the employment level moves up to 1.30%.

In the study model, the variables explain 86.55% of change of the employment percentage because the determination coefficient (R2) reaches 0.8655.

There is a proven balanced relation, by the Cointegration methodology, between the study variables in the long term.

There is a causation relation, in the long term among four balanced relations, of the Cointegration regression equation of FDI. The speed average of FDI to reach balance is 41,27%.

In the short term, there are two causation relations of the Cointegration regression equation of GDP and GCF. Causation relation of the Cointegration regression equation of FDI and the employment level is absent.

CONCLUSION

The results of this study have show many things, as following : how FDI participates in rising up thee employment level, the workers average rises up to 5,49% when FDI moves up to 1% for the over-15-years old population. There is a positive impact of FDI on the employment level, in the long term in comparison to the short one, whereas the Cointegration study results prove the existence of long term balanced relation between FDI and the labour volume with speed of balance reaching 41.

27% that confirms the ability of FDI to create jobs in different economic sectors. These investments are recently, with the causation relation absence, unable to reduce the unemployment rate, for many reasons: the financial and administrative corruption, the investment environment absence leading to the lack of economic liberty, and the weak economic contest.

Like the situation in the developing world, in Maghreb countries the production increasing participation is absent in rising up the labour volume, as it's been proven by the applied study. This absence iOS due to the structural problems in their economies that make the employment unable to respond to the changes of production, such as the economic growth diversity and the inflexible job market and the employment, in these countries, doesn't change in accordance to the economic circle. (Emad Moussa 2008). GCF has a positive impact, that means the GDP growth is not productive but excessively exploits the capital, in comparison to the investments in the public projects.

The positive results of FDI on the employment, in the long term, are reasons for the decisions makers to give importance of adopting economic policies for many reasons, as following:

- To provide an administrative, financial, judiciary and encouraging environment to set up foreign investments.
- It is necessary to get instructions for the foreign companies in order to transfer technology and train the host country workers.
- The private sector must be active in a partnership with these foreign companies to benefit from the privileges.
- Depending on the Maghreb countries capacities, most of the investments must be productive and industrial.

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Annexes

Annexe 1. Aggregate Regression Model

Dependent Variable: EPR
Method: Panel Least Squares
Date: 12/08/19   Time: 01:33
Sample (adjusted): 1991 2016
Periods included: 26
Cross-sections included: 5
Total panel (unbalanced) observations: 123

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	41.83386	0.440091	95.05721	0.0000
FDI	1.50E-09	2.89E-10	5.188796	0.0000
GDP	-8.85E-11	1.44E-11	-6.148354	0.0000
GCF	1.41E-10	3.33E-11	4.238667	0.0000
R-squared	0.323598	Mean dependent var		40.65837
Adjusted R-squared	0.306546	S.D. dependent var		3.513171
S.E. of regression	2.925554	Akaike info criterion		5.016825
Sum squared resid	1018.505	Schwarz criterion		5.108278
Log likelihood	-304.5347	Hannan-Quinn criter.		5.053973
F-statistic	18.97698	Durbin-Watson stat		0.199185
Prob(F-statistic)	0.000000			

Source : Eviews 8 outputs

Annex 2. Fixed Effects Model

Dependent Variable: EPR
Method: Panel Least Squares
Date: 12/08/19   Time: 01:34
Sample (adjusted): 1991 2016
Periods included: 26
Cross-sections included: 5
Total panel (unbalanced) observations: 123

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	40.67927	0.757178	53.72485	0.0000
FDI	5.49E-10	1.83E-10	3.003028	0.0033
GDP	-5.12E-11	2.21E-11	-2.315836	0.0223
GCF	1.30E-10	2.62E-11	4.958706	0.0000
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.865577	Mean dependent var		40.65837
Adjusted R-squared	0.857395	S.D. dependent var		3.513171
S.E. of regression	1.326680	Akaike info criterion		3.466066

Sum squared resid	202.4093	Schwarz criterion	3.648972
Log likelihood	-205.1631	Hannan-Quinn criter.	3.540362
F-statistic	105.7873	Durbin-Watson stat	0.500374
Prob(F-statistic)	0.000000		

Source : Eviews 8 outputs

Annex 3. Random effects model

Dependent Variable: EPR
Method: Panel EGLS (Cross-section random effects)
Date: 12/08/19   Time: 01:35
Sample (adjusted): 1991 2016
Periods included: 26
Cross-sections included: 5
Total panel (unbalanced) observations: 123
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	41.19522	1.006990	40.90926	0.0000
FDI	6.69E-10	1.67E-10	4.010270	0.0001
GDP	-6.90E-11	1.79E-11	-3.856745	0.0002
GCF	1.47E-10	2.28E-11	6.452460	0.0000
	Effects Specification			
			S.D.	Rho
Cross-section random			1.771646	0.6407
Idiosyncratic random			1.326680	0.3593
	Weighted Statistics			
R-squared	0.433133	Mean dependent var		6.058683
Adjusted R-squared	0.418842	S.D. dependent var		1.779135
S.E. of regression	1.373467	Sum squared resid		224.4831
F-statistic	30.30857	Durbin-Watson stat		0.488357
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.241476	Mean dependent var		40.65837
Sum squared resid	1142.161	Durbin-Watson stat		0.095983

Source : Eviews 8 outputs

Annexe 4. Hausman test results

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.541371	3	0.0091

Source : Eviews 8 outpus

Annex 5. The significance of the coefficients of endocrine variables test (Wald Test)

Wald Test:			
Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	115.9174	(4, 115)	0.0000
Chi-square	463.6695	4	0.0000

Source : Eviews 8 outputs

Annex 6. Fisher co-integration test results

Johansen Fisher Panel Cointegration Test
Series: EPR FDI GDP GCF
Date: 12/08/19   Time: 01:46
Sample: 1990 2016
Included observations: 135
Trend assumption: Linear deterministic trend
Lags interval (in first differences): 1 1
Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	70.19	0.0000	53.74	0.0000
At most 1	29.26	0.0011	19.98	0.0295
At most 2	17.99	0.0552	15.71	0.1081
At most 3	13.54	0.1952	13.54	0.1952

Source : Eviews 8 outputs

Annex 7. Cointegration Relationship Considering the Dependent Variable: Employment Volume (EPR)

Estimation Method: Least Squares
Date: 12/08/19   Time: 01:49
Sample: 1994 2016
Included observations: 105
Total system (unbalanced) observations 418

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.050521	0.031265	-1.615911	0.1070
Wald Test:				
System: Untitled				
Test Statistic	Value		Df	Probability
Chi-square	3.570905		6	0.7345

Source : Eviews 8 outputs

Annex 8. Cointegration Relationship of the Dependent Variable: Foreign Direct Investment (FDI)

System: UNTITLED				
Estimation Method: Least Squares				
Date: 12/08/19 Time: 01:56				
Sample: 1994 2016				
Included observations: 105				
Total system (unbalanced) observations 418				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.412764	0.099448	-4.150532	0.0000
Wald Test:				
System: Untitled				
Test Statistic	Value	Df	Probability	
Chi-square	8.376989	6	0.2118	

Source : Eviews 8 outputs

Annex 09. Cointegration Relationship of the Dependent Variable: Gross Domestic Product (GDP)

Wald Test:			
System: Untitled			
Test Statistic	Value	Df	Probability
Chi-square	20.76379	6	0.0020

Source : Eviews 8 outputs

Annex 10. Cointegration Relationship of the Dependent Variable: Gross Capital Formation

Wald Test:			
System: Untitled			
Test Statistic	Value	Df	Probability
Chi-square	21.08813	6	0.0018

Source : Eviews 8 outputs