Econometric Study to Foreign Investments and its Determinants in Arabic Countries (1980-2014)

دراسة قياسية للاستثمار الأجنبي ومحدداته في الدول العربية (1980ـ 2014)

إسماعيل بن قانة (*)

مخبر التطبيقات الكمية في العلوم الاقتصادية والمالية

كلية العلوم الاقتصادية والعلوم التجارية وعلوم التسيير

جامعة قاصدي مرباح، ورقلة — الجزائر

إبراهيم طاوسي (**)

المدرسة الوطنية العليا للإحصاء والاقتصاد التطبيقي— الجزائر

بوجمعة بلال (***)

كلية العلوم الاقتصادية والعلوم التجارية وعلوم التسيير

جامعة أحمد دراية، أدرار — الجزائر

Ismail BENGANA (*)

Laboratory for Quantitative Applications in Economics and Finance

Faculty of Economic, Commercial and Management Sciences

Kasdi MERBAH University, Ouargla; Algeria

Brahim TAOUSSI (**)

National High School of Statistics and Applied Economic; Algeria

Boudjemaa BELLAL (***)

Faculty of Economic, Commercial and Management Sciences

Ahmed DRAYA University, Adrar; Algeria

Abstract: We aim from this study to determine the factors that have an impact on the direct foreign investment in different Arabic countries. The possibility of existence a long-term equilibrium relationship between them was checked. We concluded that there are a lot of affecting variables on direct foreign investment, but we chose only the important ones by using Cluster Analysis technique than we tested whether is there a relationship between them after we checked the stationary of their time series data which seem to be Auto-Regressive Distributed Lag (ARDL) type. Its degrees and border interval have been determined.

Keywords: Cluster Analysis, Auto-Regressive Distributed Lags, Direct Foreign Investment, Arabic countries.

Jel Classification Codes : E22, C23, C5.

ملخص : هذه الدراسة تهدف إلى تحديد العوامل المؤثرة في الاستثمار الأجنبي المباشر لمختلف الدول العربية، من خلال البحث عن العلاقة طويلة الأجل بينها. وتوصلت الدراسة إلى إمكانية وجود العديد من العوامل والتي تم اختيار أفضلها باستعمال تقنية التحليل العنقودي، حيث تم دراسة استقرارية سلاسلها الزمنية وثبت أنها تتبع نموذج الانحدار الذاتي موزع الإبطاء الذي تم تحديد درجاته وتقدير معالمه ومن تم تشخيص حدوده.

الكلمات المفتاح : تحليل عنقودي، انحدار الذاتي موزع الإبطاء، استثمار أجنبي مباشر، دول عربية.

تصنيف JEL: E22، C23، C5.

I- Introduction :

Direct foreign investment considered one of the important external financing sources and it has a main role economic development projects in host countries if they choose well the projects and the foreign partners. Foreign investment can fill the gap in the unavailable resources in the country. It can also expand the investment base.

Direct foreign investment can also join national capital to increase production , cause a positive impact on the payment balance by increasing the exports and replacing foreign goods by its national peers, enhance the quality of local industries, contribute in the use of national natural sources and share advanced techniques in management, marketing…etc.

The usefulness of foreign investments include creating more jobs, strengthen the national labor, boosting their technical and manageable skills. But there are some economical, political, social and legal barriers against the flow of foreign investments.

We tried to answer the following problematic in this article: **what are the factors that govern the foreign investments flow into Arabic countries?. Is it possible to build a long-term econometric model ?**

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eMail : (*) Bengana@gmail.com & (**) Tb.taoussibrahim@yahoo.com & (***) Boudjemaabellal@yahoo.fr

- **The importance of the study**

The study is important by showing the flow of foreign investments into Arabic countries and identifying the influence of macroeconomics variables on this flow using Panel Data Analysis.

- **Limits of the study:**

The study included only 17 Arabic countries[1] from 22. It covered the period between 1980 and 2014. The data was provided by the International Monetary Fund and the World Bank.

II- Methods :

The bibliographic study showed that there are 9 quantitative variables control foreign direct investment (FDI),[2] they are: trade openness (OC), exchange rate (TC), current account balance (CC), domestic saving ratio of GDP (ISR), per capita GDP (PIBP), growth ratio (TCR), inflation rate (INF), spending ratio of GDP (GR), monetary mass ratio of GDP (MSR).[3] We used cluster analysis[4] for a period of 10 years each because the number of explanatory variables large (Fig.1).

As we can see from the above figure the number of explanatory variables has been reduced to only four.[5] We wrote the model as[6] :

$$FDI_{i,t} = \beta_0 + \beta_1 TC_{i,t} + \beta_2 TCR_{i,t} + \beta_3 OC_{i,t} + \beta_4 LOSAV_{i,t} + \varepsilon_{i,t}$$

Where β_0 is constant, β_i regressors parameters.

The existence of long-term equilibrium relationship between the dependant variable and explanatory variables was checked. First, we are going to study the stationary of time series data of each variable. The following table summarizes the results (Tab.1).

It appears that TCR, TC, LOSAV are stable which means that these variables are integrated I(0). The rest (FDI, OC) are integrated from the first degree I(1). In this case the model has and ARDL type[7] which needs the following steps to estimate it:[8]

1- Determining the perfect degree of lag[9]:

It can be determined by the lowest values of AIC, SC and HQ . it seems that the best model is ARDL(4,4,4,4,4,4) according to AIC which means that the dependant and independent variables have lag degrees until the fourth degree (Fig.2), before that we should check the existence of long-term equilibrium relationship.

2- Bound test:

The results of this test shows that the calculated values to the four regressors are within the upper and lower limits at all significance levels 90%, 95% and 99% (Tab.2). According to Pearson tables these results mean that the issue still inconclusive.

3- Wald test:

To see whether there is synronized integration we test the null hypothesis H_0 : there isn't covariance between the variables in the model (Tab.3). Which means that a long-term equilibrium relationship is absent ($\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$) against the alternative hypothesis

$H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$

We accept the alternative hypothesis because the p-value of chi-square and Fisher equals to zero. This means there is a long-term equilibrium relationship.

4- Estimating the short and long term relationship of the model:

As long there is auto-covariance between the model variables, we are going to estimate the long-term relationship, where the long-term parameters represent elasticities. The following table shows the estimation results using Eviews 9.0 (Tab.4).

III-Results and Discussion :

The results of estimating the long-term relationship for a sample of Arabic countries point that an increase in local savings by one unit is going to increase foreign direct investment by 30.01 units, this can be explained as 30.01 units of local savings are directly invested while the rest is directed towards foreign capital. The rest of regressors have no effect on the dependent variable. The model's residuals are normally distributed (at it is shown in the annex, the values of Pearson, skewness, kurtosis and Jarque-Berra confirm that).

A correlation between the two variables in the long-term is evidence on the weak movement of the international capital in Arabic countries, this goes along with the reality. According to Fledstein-Horioka puzzle, if any country finds a large international market for capital to supply its savings or to finance its investments there will be no long-term equilibrium relationship between investment and saving. This is what justified the correlation between the variables. Foreign trade provides financial abundance from petroleum exports and petroleum raising finance public and private investment projects.

IV- Conclusion:

The following recommendations and suggestions are base on the above results:
➢ Arabic countries should enhance investments laws and make it more transparent. They should also provide investors all the detailed data of their economics and the most promising investments opportunities using modern promotion.
➢ Arabic countries should adopt good governance, fight corruption and respect fundamental rights to assure security and political stability which are important determinants to foreign investments.
➢ Arabic countries need to make actual macroeconomics reforms because there is a strong correlation between the flow of foreign direct investment into the country and its economic development level. As long the economy is able to grow and develop, it can attract more investments. Economic integration between Arabic countries is necessary to exchange experiences and assure the flow of investments by putting investment plans that considers every country.
➢ Human capital and investment in education should get the top priority in Arabic countries because it is going to increase efficiency and spread the use of technology and encourage innovation. Investment in human resources benefits from the surplus associated with direct foreign investment. So attracting foreign investment in education can produce labor characterized by international qualities.

- Appendices :

Tab.1: The results of unit root tests

Breitung	IPS	PP/F	ADF/F	LLC	Test / variable		
-	1.000	0.204	0.764	1.000	Intercept model	level	FDI
1.000	0.554	0.001	0.0001	0.999	Intercept and trend model		
0.000	0.000	0.000	0.000	0.000	Intercept model	First differentiation	
1.000	0.000	0.000	0.000	0.000	Intercept and trend model		
-	0.000	0.000	0.000	0.000	Intercept model	level	TCR
0.000	0.000	0.000	0.000	0.000	Intercept and trend model		
-	0.000	0.000	0.000	0.000	Intercept model	level	TC
0.516	0.000	0.000	0.000	0.000	Intercept and trend model		

-	0.004	0.014	0.0008	0.0002	Intercept model	level	LOSAV
0.040	0.0011	0.000	0.004	0.001	Intercept and trend model		
-	0.043	0.129	0.031	0.166	Intercept model	level	OC
0.046	0.050	0.319	0.094	0.050	Intercept and trend model		
-	0.000	0.000	0.000	0.000	Intercept model	First differentiation	
0.000	0.000	0.000	0.000	0.000	Intercept and trend model		

Tab.2: Bound test for variables

Variable	Coefficient	90% CI		95% CI		99% CI	
		Low	High	Low	High	Low	High
TC	-0.100245	-0.408775	0.208286	-0.468329	0.267840	-0.585444	0.384955
TCR	13.53468	-1.756897	28.82626	-4.708576	31.77794	-10.51308	37.58244
OC	-0.322046	-1.793295	1.149203	-2.077285	1.433192	-2.635754	1.991661
LOSAV	30.01158	26.11827	33.90489	25.36675	34.65640	23.88890	36.13426

Tab.3 : Wald Test for variables

Probability	df	Value	Test Statistic
0.0000	(4, 234)	44.17882	F-statistic
0.0000	4	176.7153	Chi-square

Null Hypothesis: C(1)=C(2)=C(3)=C(4)=0

Std. Err.	Value	Normalized Restriction (= 0)
2.357595	30.01158	C(1)
0.890915	-0.322046	C(2)
0.186831	-0.100245	C(3)
9.259815	13.53468	C(4)

Tab.4 : Estimation a parameters of model

Prob.*	t-Statistic	Std. Error	Coefficient	Variable
		Long Run Equation		
0.0000	12.72974	2.357595	30.01158	LOSAV
0.7181	-0.361478	0.890915	-0.322046	OC
0.5921	-0.536554	0.186831	-0.100245	TC
0.1452	1.461658	9.259815	13.53468	TCR
		Short Run Equation		
0.0013	-3.264391	0.113820	-0.371553	COINTEQ01
0.5833	0.549377	0.098369	0.054042	D(FDI(-1))
0.6276	0.485722	0.116379	0.056528	D(FDI(-2))
0.4182	-0.811013	0.068000	-0.055149	D(FDI(-3))
0.9251	0.094149	38.78755	3.651797	D(LOSAV)
0.7833	-0.275331	37.44269	-10.30915	D(LOSAV(-1))
0.8858	0.143821	27.33531	3.931403	D(LOSAV(-2))
0.0267	-2.229734	12.70840	-28.33635	D(LOSAV(-3))
0.1278	1.528185	17.81621	27.22647	D(OC)
0.1035	1.634379	20.11437	32.87451	D(OC(-1))

0.2999	1.038875	38.56714	40.06642	D(OC(-2))
0.4408	0.772208	17.13754	13.23374	D(OC(-3))
0.3196	0.997500	3.28E+11	3.27E+11	D(TC)
0.3219	-0.992729	2.50E+11	-2.49E+11	D(TC(-1))
0.3088	-1.019891	2.09E+11	-2.13E+11	D(TC(-2))
0.4705	-0.722814	69973.70	-50577.99	D(TC(-3))
0.5861	-0.545257	27.14649	-14.80181	D(TCR)
0.0737	-1.796535	30.43701	-54.68114	D(TCR(-1))
0.1392	-1.483892	28.55973	-42.37955	D(TCR(-2))
0.2152	-1.242700	25.24983	-31.37797	D(TCR(-3))
0.3951	0.851888	89.40506	76.16309	C

1503.686	S.D. dependent var	72.89594	Mean dependent var
14.00037	Akaike info criterion	1149.870	S.E. of regression
16.66301	Schwarz criterion	3.09E+08	Sum squared resid
15.03727	Hannan-Quinn criter.	-3804.112	Log likelihood

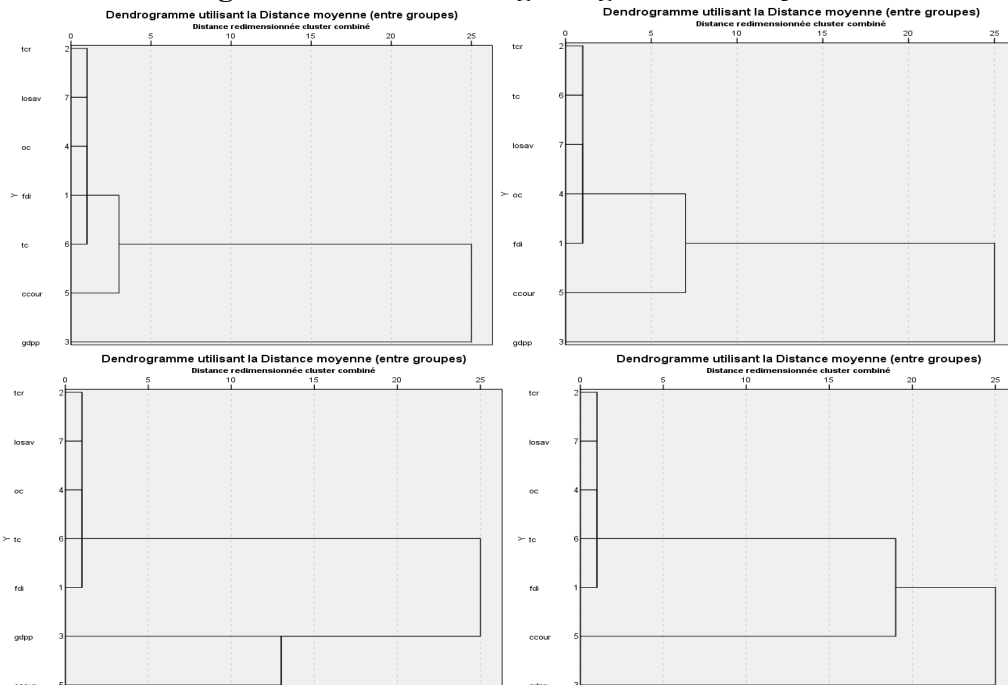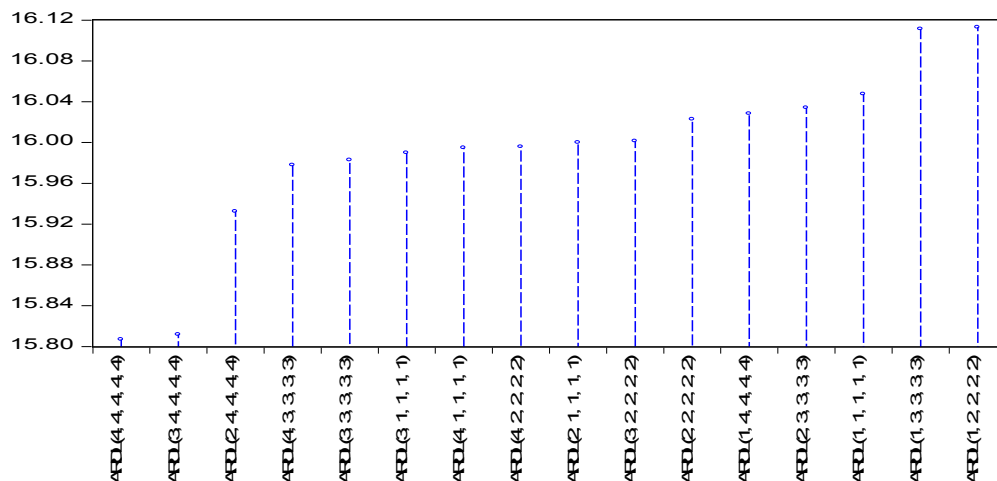## Fig. 1: Variables ranking using cluster analysis

Fig.2: Determining the perfect degree of lag

-References :

[1]. Bahrain, Algeria, Saudi Arabia, Egypt, morocco, Tunisia, Mauritania, Jordan, Sudan, Djibouti, Iraq, Kuwait, Lebanon, Qatar, UAE, Libya, Yemen

[2]. Amira Hasb-Allah, **determinants of foreign direct and indirect investment in Arabic environment (comparative study between Turkey, South-Korea and Egypt)**, Aldar Aljamaia, Alexandria, 2005, P 19.

[3]. You can see :

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[4]. Instead of the famous principal components Amira Hasb-Allah, **determinants of foreign direct and indirect investment in Arabic environment (comparative study between Turkey, South-Korea and Egypt)**, Aldar Aljamaia, Alexandria, 2005, P 19.

[4]. Instead of the famous principal components analysis which does not show us the effecting variables on foreign direct investment.

[5]. We excluded some variables because they don't appear in foreign investment cluster in all times.

[6]. Mathematical modeling is linear because the point cloud of independent variable with FDI.

[7]. It is relatively new, it is presented by Pearson and all in 2001. It studies stable time series at 0 and 1. It gives better estimation when the sample size is small and reduces autocorrelation.

[8]. You can see:

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[9]. We worked with AIC criterion, if other criterions go along with it in some degree we take it otherwise we take the lowest value of AIC.