

Analysis of the Relationship between Quality Institutional and Foreign Direct Investment in Algeria - Econometric study -

تحليل العلاقة بين النوعية المؤسسية والاستثمار الأجنبي المباشر في الجزائر

- دراسة قياسية -

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Abstract:

This paper aimed to study the relationship between Quality Institutional and Foreign Direct Investment in Algeria for the period 1996-2016 using three Indicators of Quality Institutional: Government Effectiveness, Regulatory Quality, Rule Law, by the application of ARDL model. The empirical study has shown that there is a co-integration relationship between FDI and Quality Institutional; besides the GDP impact negatively on FDI in long run, while the Rule of law has a positive impact on FDI inflows in the long and short term.

keyword: ARDL; FDI; Quality institutional.

JEL classification code : B23, B25, F21.

ملخص:

تهدف هذه الورقة إلى دراسة العلاقة بين النوعية المؤسسية والاستثمار الأجنبي المباشر في الجزائر للفترة 1996-2016، باستخدام ثلاثة مؤشرات للجودة المؤسسية: فعالية الحكومة، والجودة التنظيمية، وقانون الحكم، من خلال تطبيق نموذج ARDL. تبين أن هناك علاقة تكامل مشترك بين الاستثمار الأجنبي المباشر والنوعية المؤسسية؛ إلى جانب أن GDP له تأثير سلبي على تدفقات الاستثمار الأجنبي المباشر في المدى الطويل، في حين أن قانون الحكم له تأثير ايجابي على الاستثمار الأجنبي المباشر في المدى الطويل والقصير.

الكلمات المفتاحية : ARDL؛ النوعية المؤسسية؛ الاستثمار الأجنبي المباشر.

تصنيف JEL: B23، B25، F21.

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1. Introduction :

One of the most notorious features of the trend towards globalization in recent times has been the increased importance of foreign direct investment (FDI) around the world.

The continuous international capital inflows to developing countries, and especially FDI is expected to contribute to increasing efficiency and productivity, and to further growth opportunities in recipient countries such as technology transfer, export development, job and skill creation, and the upgrading of management knowledge and skills. As both advanced and developing countries are both showing growing interest in attracting FDI, the competition for attracting FDI inflow has become stiffer. UNCTAD (1998) emphasized that institutional factors are one of the important determinants of FDI. Institutions are important for encouraging private entrepreneurship, promoting fair competition, providing reliable information about economic activities and restricting the effects of nonmarket actors on the market. This study aimed to answer the main question:

Does Quality institutional impact on FDI inflows in Algeria?

For this purpose we will test the following hypotheses:

- There is a cointegration relationship in the long term between the quality institutional indicators and the inflows of FDI in Algeria.
- The existence of good rules law and efficient of government attract more foreign investors to invest in Algeria.

There are many scholars who studied the relationship between FDI and Quality Institutional by the use of different types of institutional variables and different data and model of econometric, such as (Hausmann, 2000), they studied the effects of institutional variables on the composition of capital inflows, using different variables compiled by Kaufmann et al (1996) *, The authors found that better institutions lead to a reduction of the share of inflows represented by FDI.

* The institutional variables from Kaufmann et al(1996) are: regulatory quality, voice and accountability, government effectiveness, political stability and lack of violence, control of corruption and rule of law.

Their summary index of institutions, the first principal component of the six institutional variables of Kaufmann et al, does not have significant effects on the ratio of FDI to GDP.

(DAUDE, 2007), The authors studied the role of quality institutions as a determinant of the location of FDI, using bilateral stocks from OECD countries around the world, The result shown that better institutions have overall a positive and significant effect on FDI, Especially unpredictability of policies, excessive regulatory burden, deficient enforcement of property rights, and lack of commitment on the part of the government play a major role in deterring FDI flows. Matthias (Busse, 2005), The result showed that government stability, the absence of internal conflict and ethnic tensions, basic democratic rights and ensuring law and order are highly significant determinants of foreign investment inflows. (Marson, 2010)the result showed the important and significant role of institutional quality in the attracting FDI inflows into ASEAN. (Acaravci, 2018)examined the relationship between institutional quality, real income and FDI of Turkey by using of ARDL method for the period 1990-2015, the findings of this study emphasize that institutional quality is a matter for FDI inflows as well, So enhancing efforts of institutional quality encourages the FDI.(BAŞAR Özbozkurt, 2018), confirmed that the existence of a long-run relationship between Political Stability and FDI in Turkey for the period 2002-2016 and there is also strong evidence to that movement of FDI will affect Political Stability.

Our study differs from the existing studies on FDI and Quality Institutional in at least two ways:

- 1- Uses more recent data of FDI and Quality Institutional for the period of 1996to 2016.
- 2- Applies the ARDL model in time series analysis to investigate the link between FDI and Quality Institutional in Algeria.

2. The Economy of Algeria:

The hydrocarbons sector is the locomotive of the Algerian economy; the contribution of the oil sector in Gross Domestic Product has not ceased to rise, jumping from less than 15 % in 1969 to more than 43.6% in 2011, the share of hydrocarbon fiscal revenues in total government revenues rose from 21% in 1970 to more than 68 % in 2013.

Furthermore, public investment has played an important role in economic development since Algeria's independence in 1962 and more recently after the extraordinary oil windfall for the early 2000s.

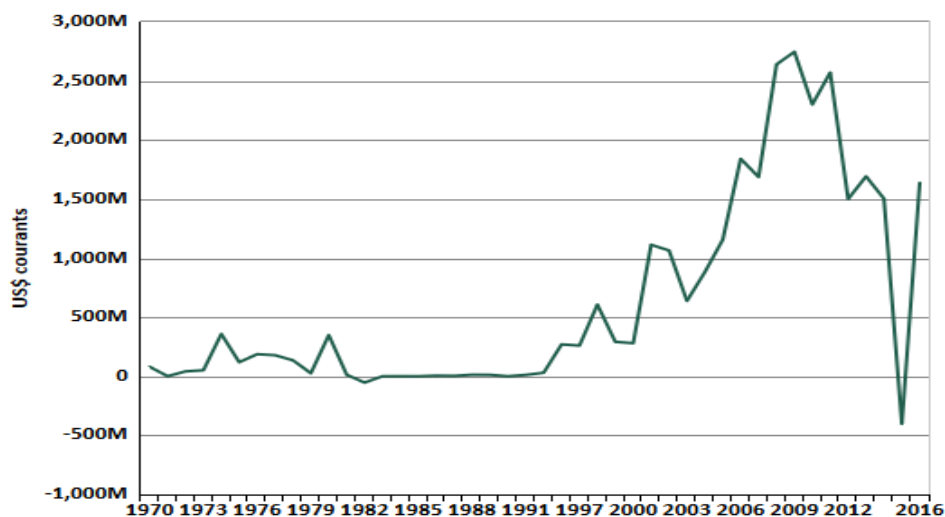
However, in recent years, oil has seen a steady decline in its price, which making the Algerian state re-interest in other sectors to diversify its revenues. Algerian authorities have significantly reduced the budget deficit in 2016 and adopted an ambitious fiscal consolidation plan for 2017-2019. They have made progress in improving the business climate and are working on a long-term strategy to reshape the country's growth model to foster greater private sector activity and economic diversification (FMI, 2017).

FDI inflows are considered to be one of the resources of economic growth in the world generally and in Algeria specifically .They can be considered as a mechanism which generates employment, foreign exchange revenues and income.

2.1. Algeria Foreign Direct Investment - Net Flows:

Foreign Direct Investment in Algeria increased by 0.27 USD Billion in the third quarter of 2017. Foreign Direct Investment in Algeria averaged 0.62 USD Billion from 2001 until 2017, reaching an all time high of 1.85 USD Billion in the fourth quarter of 2009 and a record low of -1.33 USD Billion in the first quarter of 2015 (Trading economics, 2018).

Fig.1 : Algeria Foreign Direct Investment - Net Flows for the period of 1970-2016



Source:<https://knoema.fr/atlas/Alg%a9rie/topics/%c3%89conomie/Balancedes-paiements-Compte-de-capital-et-dop%a9rations-financi%a8res/Investissement-direct-%a9tranger-entr%a9es-nettes-de-capitaux-BdP-UdollarS-courants>

2.2. Algeria GDP:

The Gross Domestic Product (GDP) in Algeria was worth 170.37 billion US dollars in 2017. The GDP value of Algeria represents 0.27 percent of the world economy. GDP in Algeria averaged 63.35 USD Billion from 1960 until 2017, reaching an all-time high of 213.80 USD Billion in 2014 and a record low of 2 USD Billion in 1962 (Trading economics, Algeria GDP, 2018).

3. Study Methodolgy:

The paper examines the relationship between FDI and QI in Algeria using annual data for the period 1996-2016. The econometric objectives of this study can be summarized as follow: the first objective is to examine the stationarity of the variables; the second is to give additional evidence on the long-run relationship between the variables using the analysis of Autoregressive Distributed Lag (ARDL) model, developed by (Pesaran, 2001).

3.1. Data and Variables :

Different sets of variables have been defined in the various studies conducted on Quality Institutional such as Government Effectiveness, Regulatory Quality, and Rule law.

Government Effectiveness: facilitates foreign investors' activity through the reduction of heavy bureaucracy, procedures and the overall time it takes for any agent to complete them (Inter American Development Bank,2001, OECD,2002).

Regulatory Quality: encourages the entry of foreign investors by dominating market unfriendly policies such as price controls, government intervention, and retractions on capital movement (Fazio & Talamo, 2008).

Rule of law: stimulates current decision maximizes the long term value of assets because future returns will be protected in the presence of the rule of law (Hoff, 2005).

To investigate the link between FDI inflows and Quality Institutional in Algeria for the period of 1996 to2016, we took annual data from different data base sources.

Table1. Summarize the variables, their descriptions and the source of data.

Table.1: Description of the Data and Statistical Sources

<i>Variables</i>	<i>Description of the Data</i>	<i>Source</i>
<i>FDI:</i>	Foreign Direct Investment, net inflows (% of GDP)	WDI, IFS -
<i>RL :</i>	Rule Law	WGI
<i>GE:</i>	Government effectiveness	WGI
<i>RQ:</i>	Regulatory Quality	WGI
<i>GDP:</i>	Gross Domestic Product	ICRG,WDI

Source: by authors

3.2. Model:

The **ARDL** model is being used for decades to model the relationship between economic variables in a single equation time series setup. The linear logarithmic model is as follow:

$$\begin{aligned} \Delta FDI = & c + B_1 FDI_{t-1} + B_2 RL_{t-1} + B_3 GE_{t-1} + B_4 RQ_{t-1} \\ & + B_5 GDP_{t-1} + \sum_{i=1}^{p-1} \lambda_{1i} \Delta FDI_{t-i} \\ & + \sum_{i=0}^{q_1-1} \lambda_{2i} \Delta RL_{1t-i} + \sum_{i=0}^{q_2-1} \lambda_{3i} GE_{t-i} \\ & + \sum_{i=0}^{q_3-1} \lambda_{3i} \Delta RQ_{t-i} + \sum_{i=0}^{q_4-1} \lambda_{4i} GDP_{t-i} + \epsilon_t \end{aligned}$$

Where: Δ represents the first difference, ϵ_t is error term.

4. Study results:

The empirical results section starts by presenting tests for Unit Roots based on ADF test. Table2 summarizes the obtained results.

Table.2: Tests for Unit Roots Based on ADF test

Variables	Degree of Integration	Level		First Difference	
		Intercept	Intercept & Trend	Intercept	Intercept & Trend
<i>FDI:</i>	I(1)	-3.041(0.04)**	-3.03(0.14)	-5.06(0)***	-5.02(0)***
<i>RL :</i>	I(1)	-8.44(0.7)	-8.79(0.82)	-12.3 (0)***	-12.6(0)***
<i>GE:</i>	I(0)	-0.5(0.86)	-3.51(0.06)*	-1.85 (0.3)	-1.73(0.6)
<i>RQ:</i>	I(0)	-3.7 (0.01)**	-3.68(0.04)**	-6.79(0)***	-6.88(0)***
<i>GDP:</i>	I(0)	-3.94(0.007)***	-3.92(0.03)**	-9.22 (0)***	-9.47(0)***

Source: Output of Eviews10.

*** Indicates statistical significant at the 1 percent level

** Indicates statistical significant at the 5 percent level

*Indicates statistical significant at the 10 percent level

() Prob value

The reported in table 2 reveals that the hypothesis of a unit root can not be rejected in there variables in levels (RL,FDI), but we can rejected the hypothesis of level stationarty for (GE,RQ,GDP) variables. It is seen that we have a mixture of stationary I(0) and I(1) variables.

4.1. The results based on the bounds testing procedure (ARDL):

To test that there is no cointegration among the variables in the model, the null hypothesis and alternative hypothesis can be written as:

$$\begin{cases} H_0: B_1 = B_2 = B_3 = B_4 = B_5 = 0 \\ H_1: B_1 \neq B_2 \neq B_3 \neq B_4 \neq B_5 \neq 0 \end{cases}$$

If F- statistic is larger than the upper limit of the upper bound critical values suggested by Pesaran et al(2001), then we would be able to reject the null hypothesis that there is no cointegration among the variables in the model. On the other hand, we accept the the null hypothesis that there is no cointegration among the variables in the model if the value of F- statistic is lower than the lower bound critical values. The analysis will be indecisive if the F-statistic falls within the critical bound limits.

Table.3: ARDL Bound Test estimation Results

Test Statistic	F-Bounds Test Value	Null Hypothesis: No levels relationship		
		Signif	I(0)	I(1)
F- statistic	7.407108	10%	2.2	3.09
		5%	2.56	3.49
		2.5%	2.88	3.87
K	4	1%	3.29	4.37

Source: Output of Eviews10.

According to the results of ARDL Bound Test, F statistic value=7.40 is greater than the upper limits of bound critical values suggested by Pesaran et al(2001), then the results remain that there exists a cointegration among the variables in the model.

4.2. Estimated long-run coefficients using the ARDL approach:

Once the existence of cointegration relationship among the variables is confirmed, model was estimated for the long-run coefficients of the selected ARDL (1,1,0,0,0) model based on the Schwarz Criterion (SIC) and its results are presented in Table4.

Table.4: Long term coefficients of ARDL (1,1,0,0,0) Model

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob</i>
GDP	-0.201555	0.098353	-2.049296	0.0629
GE	-1.955437	1.273079	-1.535990	0.1505
DRL	1.071065	0.598186	1.790521	0.0986
RQ	0.481770	0.401448	1.200080	0.2533
C	0.077327	1.103717	0.070061	0.9453

$$EC = DFDI - (-0.2016 * GDP - 1.9554 * GE + 1.0711 * DRL + 0.4818 * RQ + 0.0773)$$

Source: Output of Eviews10.

From the table above we see that GDP is statistically significant and it impact negatively on FDI inflows in the long term, where Rule of Law impact positively on FDI inflows in the long term.

GDP is generally used as an indicator of the general health of the economy, in this study we find that GDP impact negatively in FDI in the long term which means that the economy of Algeria is not performing well what it deter the foreign investors. Where the existence of a good Rule of law in Algeria attracts more FDI cause it assures the propriety rights of foreign investors.

4.3. Error correction representation for the selected ARDL model:

Table.5: Error correction Estimation ECM Results Of ARDL(1,1,0,0,0) Model

<i>ECM Regression</i>				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob</i>
DRL	0.689348	0.140007	4.923655	0.0004
CointEq (-1)*	-1.368066	0.172414	-7.934760	0.0000
R-squared		0.796358	Mean dependent var	0.066983
Adjusted R-squared		0.784379	S.D. dependent var	1.011749
S.E. of regression		0.469806	Akaike info criterion	1.426305
Sum squared resid		3.752194	Schwarz criterion	1.525720
Log likelihood		-11.54990	Hannan-Quinn criter.	1.443130
Durbin-Watson stat		2.350282		

Source: Output of Eviews10.

The results show that the coefficient of ECM is negative [CointEq (-1) = -1.368066] and statistically significant which means that there exists a long run cointegration among FDI and the independent variables in the study, the value of ECM indicates a rapid adjustment process, with almost the whole disequilibrium of the previous year's shock adjusting back to long run equilibrium in the current year by 136,8%. We see that the R-squared = 0.7963 which means that the independent variables can explain more than 70% of deviation in the dependent variable. In addition, the table shows that the coefficient of Rule of Law is significantly positive and an increase of RL by 1% would invoke FDI inflows an increase by 68.93% in the short term.

4.4. Diagnostic Tests for the ARDL model:

In this step up we check the estimated ARDL model for diagnostic tests which are LM test Jarque-Bera test, ARCH and Ramsey Reset Test, the results are presented in Table.6 below:

Table.6: Results of Diagnostic Tests

<i>Tests</i>	<i>Value</i>	<i>Prob-value</i>
<i>Serial Correlation LM Test</i>	F-statistic = 3.413117	0.0789
	Obs*R-squared = 8.195155	0.0166
<i>Jarque Bera</i>	1.121036	0.570913
<i>ARCH</i>	F-statistic = 1.421262	0.2506
	Obs*R-squared = 1.468476	0.2506
<i>Ramsey RESET</i>	F-statistic = 0.526464	0.4847
	t-statistic = 0.725579	0.4847

Source: Output of Eviews10.

From the results above we see that the serial correlation is tested by the Breusch-Godfrey LM test and its prob-value = 0.0789 > 0.05.

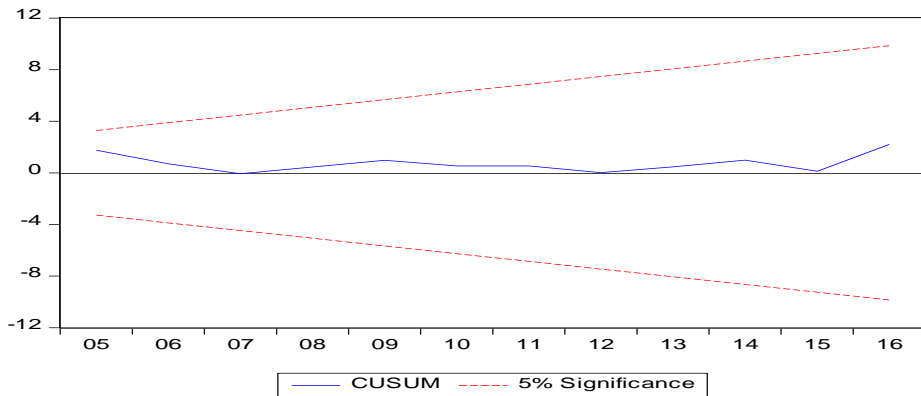
Therefore, we conclude that there is no autocorrelation. On the other hand, the test of the normal distribution of randomness errors "Jarque-

Bera” indicates that the prob-value =0.5709>0.005, which means that we accept the null hypothesis where the errors follow the natural distribution. From the result of the Heterokesdasticity test ARCH, we see that the prob-value = 0.2506>0.05 which allows us to accept the hypothesis of homogeneity of variance. Where the prob-value=0.4847 of Ramsey Rest test is upper than 0.05 which provides to accept the functional form of the model.

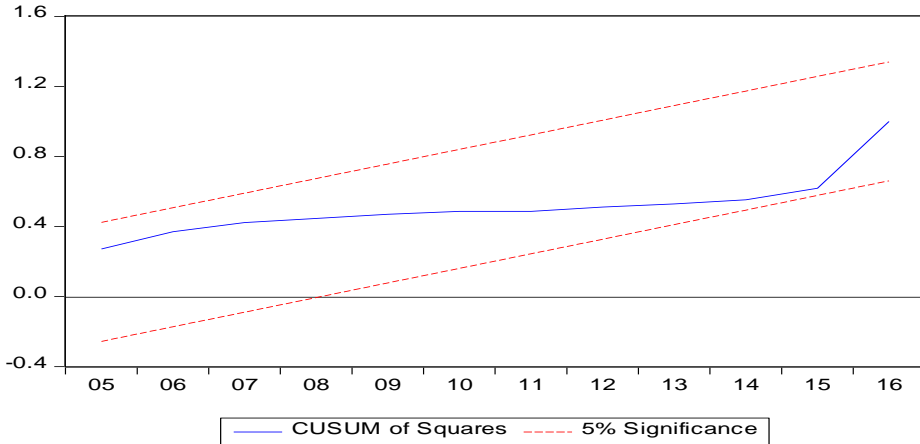
4.5. Stability Test (Plot of CUSUM and CUSUMSQ):

Finally, the model has passed through the stability test. The cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) are used as the last stage of ARDL estimation to check if all coefficients in ECM model are stable or not. The plots of CUSUM and CUSUMSQ statistics are shown in Figures (3&4) below:

Fig.3: Stability Test (Plot of CUSUM)



Source: Output of Eviews10.

Fig.4: Stability Test (Plot of CUSUMQ)

Source: Output of Eviews10.

These results presented in above figures indicates that estimated model parammeters are stable as CUSUM and CUSUMSQ statistic values fall within 5% critical bound values.

5. Conclusion:

FDI and growth economic have one of the most debated topics in economic literature. There are many papers about the relationship between FDI and Quality institutional, In this study, we examined the relationship between FDI and Quality institutional of Algeria for the period 1996-2016 by using autoregressive distributed lag(ARDL) method. Results are as follows:

- The stationary analysis results provide the preconditions for the ARDL cointegration test.
- ARDL bounds test results confirm that there is a long relationship between variables of Quality institutional and FDI inflows in Algeria.
- The GDP impact negatively in FDI in the long term which means that the economy of Algeria is not performing well what it deter the foreign investors. Where.

- While the existence of a good Rule in long term of law in Algeria attracts more FDI cause it assures the property rights of foreign investors.
- The ECM shown the existence of the short run relationship between RL and FDI in Algeria.

The findings of this study emphasize that institutional quality impacts on foreign direct investment inflows and this result is consistent with the aforementioned empirical studies. So, enhancing efforts of institutional quality encourage foreign direct investment inflows to Algeria.

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