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Determinants of Foreign Direct Investment in Algerian Country during the Period 1990-2017

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Abstract: The importance of the research is to identify the determinants of foreign direct investment in Algeria and to determine them accurately based on previous studies. We used a model of regression Multiple to identify significant determinants of FDI in the period 1990-2017. The results indicate having a positive and significant effect for both the GDP and economic openness on the outside world. Moreover, the effect negative significant for inflation and economic openness (LNINF*LNOPNESSG). The effect was positive but not significant for the increase in population and GDP per capita. Some of the variables that could affect the results and give better results neglected and this is considered a deficiency in this research and could be problematic for future research. Decision-makers in Algeria can benefit from the results of this research to attract the most foreign direct investment. The study period and the method of estimating the model for the case of Algeria considered as a gap that can add new to the subject of foreign direct investment in Algeria.

Keywords: Foreign Direct Investment; Regression Multiple Model; Algeria Economy; Economic Growth; Economic Openness

JEL Classification: F21, C13, O55, O4, F19

Introduction

Foreign direct investment has become one of the significant milestones in the performance of the global economy. And the most prominent manifestation of its globalization (ZERRIN KILIÇARSLAN, 2018). Through the expansion of the influence of multinational companies that encouraged the emergence of new economic blocs.

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Moreover, the trend towards economic liberalism by overtaking the social market economy. And the socialist economy after the failure of the socialist experiment. As well as the critical change that The nature of production and capital also occurred due to the scientific and technological progress that has become distinguished by the latter, which made its original developed countries achieve three-quarters of the global trade and embody 70% of foreign direct investment and The widening of the gap between them and the developing countries.

The Arab countries race to attract foreign direct investment and their governments' keenness to exert more efforts to improve the climate of stable and safe investment work, was to achieve fundamental changes in the sources of growth: from oil to non-oil sectors, diversification of economic activity and Public sector activities to private sector activities, and from activities to replace imports with national production, to export-oriented competitive activities. In order to increase the rates of economic growth, upgrade knowledge of technological uses, and increase employment opportunities, in addition to adopting it as a reliable alternative foreign financing means the consequences for their economies compared to that traditional method (external loans) whose consequences were severe, and thus the real response to the terms and requirements of integration into the global economy.

Several theories have developed to model the private investment decision to explore the most critical factors assigned to it, and Keynes was the first to draw attention to an independent decision regarding investment at the level of aggregate economics, and that this decision depends on the concept of the marginal efficiency of the capital that the investor expects compared to the interest rate as a cost Alternative to invested money. Many researchers have addressed the determinants of foreign direct investment, and most of them have agreed that there are common factors or near agreement on some of the determinants and drivers of foreign investment. Moreover, Algeria does not represent an exception, as foreign and direct foreign investments, several factors define it, and this is what addresses the problem of this article:

What are the factors attracting foreign direct investments in Algeria during the study period?

This paper aims to clarify the factors attracting Arab foreign direct investment to Algeria during the period 1995-2019, which witnessed economic reforms, a significant increase in oil prices, and the presence of Arab intentions to invest in the Arab countries. The results indicate positive and significant effect for both the GDP and economic openness on the outside world. Moreover, the effect negative significant for inflation and openness (LNINF*LNOPNESSG). The effect was positive but not significant for the increase in population and GDP per capital decision-makers in Algeria should direct foreign direct investment to value-added economic activities, which have positive effects on the performance of the Algerian economy, such as reducing unemployment, technology transfer, familiarity with it and other positive effects. Moreover, other studies that preceded it, this study contains deficiencies that can corrected in the future as new research.

This study attempts to contribute to the literature on inward FDI determinants in four different and simultaneous aspects. First, Introduction; Second, Literature review and hypotheses; Third, Data and methodology. Fourth, Empirical Results and Discussion is the essential part of the study, and in Fifth, Conclusion Focus on Implication, Limitation and the future of research.

Literature review and hypotheses

Before dealing with previous studies and hypotheses, we give a snapshot of the subject of the study.

Background

Foreign direct investment has given an essential impetus to the path of global integration by contributing to linking capital and labour markets and increasing wages and capital productivity in its host countries.

Definition of foreign direct investment

It is that investment that involves a long-term relationship, reflecting permanent interests and the ability to control management between a company in the home country (the country to which the investing company belongs) and a company or production unit in another country (the receiving country for investment).

Determinants of foreign direct investment

We can divide it into the most critical economic determinants into applied studies, as follows:

Market size – According to the traditional theory of international trade, capital transfer refers to when the demand for goods and services produced by investment companies in investment-receiving countries increases. Multinational corporations prefer to invest in countries where production costs are low, but their local market must take into account. The indicators for the market and growth to market products (a vital determinant to attract FDI), and to determine the size of the market and its development as GDP, GDP per capita and Population.

Economic openness – Economic openness plays a vital role in attracting FDI, which leans toward more open economies because enterprises are perpetually looking for facilities – guaranteed in an economically open environment – customs and tariff concessions, and bilateral and international agreements.

Inflation – Inflation rates have a direct impact on pricing policies and profit volume, thus influencing capital flows. They also affect production costs, which are of great importance to multinational corporations. The profitability of the market is also affected by high inflation rates in countries, along with a bad investment climate (OMAR, 2000). Hence, foreign investors seek price stability. In high inflation scenarios, both national and foreign investments fall into a danger zone. Moreover, inflation distorts investment patterns, where investors tend to invest in short-term, rather than long-term, investments (SAID, 1992).

Literature review

The previous studies that dealt with the topic of FDI, each of which had its area of interest and a different fulcrum, and among the researches we have mentioned, we mention:

One Country Studies

ANUCHITWORAWONG and THAMPANISHVONG (2014) examined the determinants of FDI in Thailand: Are natural disasters important? It concluded that there was a significant positive effect for both real per capita income, real exchange rate, CPI, and negative impact of the degree of natural disaster servers for the year t-1 but not significant.

The studies that dealt with the relationship of foreign direct investment with other variables include studies that took the relationship between foreign direct investment and economic growth. Most of them concluded that there was a positive and significant impact of FDI on the economic growth of host countries. In this regard, the (LOUAIL, 2015) study concluded that there is a positive and significant impact of economic growth on the flow of foreign direct investment in Algeria. Some have studied the causal relationship (causation of Granger), such as the study of (REGER et al. 2019, FAETH, 2009) and the study (ABDOULI, 2016) and concluded most of the existence of a causal relationship between economic growth and foreign direct investment.

(ZOUITA et al. 2019) in this study using the ARDL bounds testing approach, the findings show a positive association between SMEs and FDI inflows in Algeria in the long-run. However, in terms of the role of IFRS adoption in mediating the impact of SMEs on FDI inflows in Algeria, the findings of this paper report a negative contribution of IFRS adoption on the association between SMEs and FDI inflows in both long and short run.

Cross-Section Countries Studies

The study of (LOUAIL, 2019) which addressed the determinants of foreign direct investment in the Arab countries during the period (1970-2016), and concluded that there is a positive and moral impact for both a foreign direct investment for year t-1 and raw internal output GDP and economic openness on the flow of foreign direct investment in the Arab countries and the negative and moral impact of inflation in the year t-4.

(LAABAS AND ABDMOULAH, N.D.) dealt with the determinants of inter-Arab investment and stated that gravity variables explain a small part of the changes in investment flows. The interpretation of the model is strong when it considers the heterogeneity of these flows between countries, that is, that the flows unevenly distributed among countries. Other determinants also contribute to increasing the inter-investment flows, such as proximity, language, and colonial history. However, the researcher neglected the variable of natural resources, especially for Arab countries that are rich in resources.

(BRAHIM AND DUPUCH, 2016) concluded that for a group of European countries, the determinants evolved, suggesting that competitiveness of the social and, mainly, the tax system affects the technological gap. coincides with the occurrence of a crisis, which generates greater volatility in FDI flows.

(RIACHE et al. 2020) concluded that there is a negative and significant effect of the distance between two countries on the foreign trade flows, a positive and significant effect of inflation, i.e. the opposite of what expected. as well as a positive and significant impact of the crude GDP of the exporting country. and a negative impact of the crude product of the importing country, but not significant. and a positive non-significant effect of the flows. FDI in exporting countries, the non-significant negative impact of FDI flows in importing countries. Since most of the studies on the subject did not address this impact, which makes this study useful for decision-makers in the Arab countries to take advantage of them to promote Arab economic integration, especially those countries seeking to open to the outside world.

Many studies dealt with foreign direct investment in several aspects, for example, we mention the study of (FAETH, (2009), GUI-DIBY, 2014, JOUILI, 2018, MOOSA, (2009), NNADI and SOOBAROYEN, 2015 AND SAINI and SINGHANIA, (2018)), and therefore the duration of the study and the country that I studied, and how the topic addressed as an addition to the previous studies.

Hypotheses

To answer the previous problem and achieve the desired research objectives, we propose the following set of hypotheses:

H1: There is a positive relationship between FDI and market size in Algeria Economic.

- **H2**: There is a relationship between FDI and FDI for the past year.
- **H3**: There is a positive relationship between FDI and the educational level in Algeria Economic.
- **H4**: There is a positive relationship between FDI and political stability in Algeria Economic.
- **H5**: There is a negative relationship between the flow of FDI in Algeria Economic and the global financial crisis.
- **H6**: There is a negative relationship between FDI and corruption in Algeria Economic.

Data and Methods

In this study, we used a model of regression Multiple to identify significant determinants of FDI. Moreover, we used the EViews ten software for analysis.

Data

All variables used in this study include an Algeria country as well as a times-series component (1980–2017). Data a taken from the World Bank's database for all the variables during the study period and the consolidation of data sources. The variables summarized in Table 1.

Table 1: Variables used in the panel data regression model and their expected effects

Nature	Variable	Characteristic	Expected sign
Dependent variable	LNFDI	The logarithm of foreign direct investment, net inflows (balance of payments, current US\$)	
	LNGDP	The logarithm of gross domestic product (GDP) (current US\$)	Positive (+)
	LNPOP	P The logarithm of population, total	
Indonandant	LNGDPpc	The logarithm of GDP per capita (current US\$)	Positive (+)
Independent variable	LNOPENNESS	Logarithm of [import value index (2000 = 100) + export value index (2000 = 100)]/GDP	Positive (+)
	LNINF The logarithm of inflation, consumer prices (annual %)		Negative (-)
	LNREER	The logarithm of the real effective exchange rate index $(2010 = 100)$	Positive (+)/ Negative (-)

Source: All data are from the World Development Indicators' Data Bank by the World Bank (databank.worldbank. org/wdi).

Methodology

Stability of the time series

The stability of the time series should be studied. Then, the model should tested, obtained, and explained by following these by Unit Root Tests. Table 2 shows the results of the integration tests of the study variables using the Augmented Dickey-Fuller test (ADF) and the Phillips–Perron test (PP) (SAID & DICKEY, 1984). For the unit root, the results show that the dependent variable (LnFDI) is integrated into the first level I(1), whereas the independent variables: LnGDP, LnINF, LnOPNESSG have integrated a level I(0), and LnGDPpc, LnPOPG are integrated into the first level I(1).

Table 2: Unit Root Tests results (ADF & PP)

	At Level		At First I	Order of	
	ADF Test	PP Test	ADF Test	PP Test	Integration
LNFDI	-3.23**	-	-	-	I(1)
	-	-	-	-7.32***	I(0)
LNGDPG	-3.79***	-3.9***	-	-	I(0)
LNGDPpc	-	-	-3.24**	-3.31**	I(1)
LNPOPG	-4.65***	-	-	-	I(0)
LNINF	-3.75***	-3.75***	-	-	I(0)
LNOPNESSG	-4.4****	-4.45***	=	=	I(0)

Note: *, **, and *** indicate rejection of the null hypothesis at 1%, 5%, and 10 % levels, respectively.

Model

The functional form of the model is as follows:

$$\Delta LnFDI_{t} = \alpha_{1} + \alpha_{2}LnGDPG_{t} + \alpha_{3}\Delta LnGDPPC_{t} + \alpha_{4}\Delta LnPOPG_{t} + \alpha_{5}LnINF_{t} + \alpha_{6}LnOPNESSG_{t} + \varepsilon_{t}$$
(1)

Where:

 $\Delta LnFDI_t$: First Difference of logarithm FDI in Algeria at time t.

 $LnGDPG_t$: The logarithm of GDP Growth in Algeria at time t.

 $\Delta LnGDPPC_t$: First Difference of logarithm GDP Percapital in Algeria at time t.

 $\Delta LnPOPG_t$: First Difference of logarithm Population growth in Algeria at time t.

 $LnINF_t$: The logarithm of Inflation in Algeria at time t.

 $LnOPNESSG_t$: The logarithm of Opness economic in Algeria at time t.

 ε_t : Error term.

 $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$: The Parameter of Model.

Statistics Descriptive

The Table 3 shows that the most important statistical indicators of the variables used in the model, which are related to the Algeria Economic for the 37 years of the study period; this means 36 observations that are acceptable primarily to the nature of this study.

Table 3: Descriptive statistics of the variables in the study

	LNFDI	LNGDPG	LNGDPPC	LNINF	LNOPNESSG	LNPOPG
Mean	18.64465	4.633086	8.277238	4.712546	4.603854	0.693137
Median	19.47078	4.637506	8.253713	4.698749	4.591734	0.674148
Maximum	21.73375	4.674714	8.48871	5.035579	4.936312	1.138598
Minimum	12.72193	4.583947	8.090984	4.486502	4.326574	0.236834
Std. Dev.	2.882558	0.022355	0.11758	0.107035	0.115935	0.308109
Jarque-Bera	4.386921	1.315426	2.472279	3.022377	4.751444	2.712818
Probability	0.11153	0.518035	0.290504	0.220648	0.092947	0.257584
Observations	36					

Source: Output of EViews 10.

In Table 4, which represents the correlation matrix between variables, we observe that there is no correlation between the variables of the model. This indicator increases the accuracy of the model, which uses the best linear unbiased estimators.

Table 4: Correlation of the variables in the study

	LNFDI	LNGDPG	LNGDPPC	LNINF	LNOPNESSG	LNPOPG
LNFDI	1					
LNGDPG	0.12726508	1				
LNGDPPC	0.43441351	0.31486233	1			
LNINF	-0.21261148	-0.33653331	-0.47072738	1		
LNOPNESSG	0.09172823	-0.28671796	-0.0796083	0.1237769	1	
LNPOPG	-0.78121719	-0.29661605	-0.15888708	0.14868309	-0.18922857	1

Source: Output of EViews 10.

Empirical results

After estimating the model, we used the tow model of estimation, and we obtained the results presented in Table 5, which we sum up in Equation (2) and Equation (3) as follows:

Model 1

The results through the first Model indicate that it is acceptable according to the statistics of DW and AIC and that 33.4% of the variables of the model explain FDI flows in Algeria, in addition to having a positive and significant effect for both the GDP, GDP per capita and commercial openness on the outside world. The effect was negative but not significant for inflation, while the increase in population was known to be positive but not significant see Table 5.

$$\Delta LnFDI_{t} = 544.65 + 113.52 * LnGDPG_{t} + 85.7 * \Delta LnGDPPC_{t} + 2.85 * \Delta LnPOPG_{t} - 0.09 * LnINF_{t} + 4.27 * LnOPNESSG_{t}$$
 (2)

Model 2

While the second model indicated that the model is acceptable, according to DW and AIC statistics, moreover, 45.6% of the variables in the model explain FDI inflows in Algeria. Also, there is a significant and positive impact of both GDP and economic openness on the outside world—moreover, the effect negative significant for inflation and openness (LNINF*LNOPNESSG). The effect was positive but not significant for the increase in population and GDP per capita. See Table 5.

$\Delta LnFDI_t = -564.3 + 82.4 * LnGDPG_t t + 55.5 * \Delta LnGDPPC_t$	
$+ 2.28 * \Delta LnPOPG_t - 0.69 * LnINF_t + 206.37 * LnOPNESSG_t$	
$+ 206.37(LnINF_t * LnOPNESSG_t)$	(3)

Table 5: Results of model estimation

Dependent Variable: LNFDI					
Variable	Mod	del 1	Model 2		
	Coefficient	Prob.	Coefficient	Prob.	
с	544.6513***	0.0047	-564.3062	0.24	
LNGDPG	113.5282***	0.0052	82.3954**	0.0328	
D(LNGDPPC)	85.70078**	0.019	55.50747	0.1127	
D(LNPOPG)	2.854578	0.5325	2.281553	0.5876	
LNINF	-0.091721	0.9637	-0.6884**	0.0179	
LNOPNESSG	4.275104**	0.0278	206.3762**	0.0201	
LNINF*LNOPNESSG			-44.4447**	0.0179	
R- sq	0.333978 0.456795			6795	
Adjusted R-squared	0.219146 0.340394			0394	
observations	35				
AIC	3.28	5354	3.13866		
DW	2.42	9744	1.979421		
F-statistic	2.90	8417	3.924323		
Prob(F-statistic)	0.03	0.030128 0.005707			

Note: Probabilities are in parentheses. *, ***, and *** show significance at the 10%, 5%, and 1% levels, respectively. Source: Output of EViews 10.

Discussion and conclusions

Among the two models mentioned in the previous section, the second model chosen because its results are better than the first model. Because the correlation coefficient was better with the second model, 0.45 and Fisher's statistic was significant. The results indicate a positive and significant effect for both the GDP and economic openness on the outside world. Moreover, the effect negative significant for inflation and openness (LNINF*LNOPNESSG). The effect was positive but not significant for the increase in population and GDP per capita. Whereas, if the GDP increases by 1%, then foreign direct investment will flow to Algeria by 82.4%, which indicates that the GDP is essential for FDI. On the other hand, trade openness also has a decisive role in foreign direct investment. Every increase of 1% to economic openness leads to an increase in the flow of foreign direct investment to Algeria by 55.5% because trade openness encourages the foreign investor that his production can be issued and that it meets all his needs by import. While inflation hurts the flow of foreign direct investment to Algeria, he discussed that every decrease in inflation rates by 1% contributes to an increase in the flow of foreign direct investment by 69%, likewise, if we link inflation with trade openness, it affects negatively, because trade openness, if followed by an increase in prices, reflects negatively on foreign direct investment flows. So, we can say that the determinants of foreign direct investment in Algeria are both gross domestic product, trade openness and inflation.

Based on the importance of foreign direct investments, the interest and decision-makers and decision-makers in the Arab countries and Algeria among them have increased and attracted these investments, through the issuance of a set of laws that focused in their executive regulations on incentives and advantages for foreign investors, in order to encourage this type of investment.

The results indicate a positive and significant effect. For both the GDP and economic openness in the outside world. Moreover, the effect negative significant for inflation and openness (LNINF*LNOPNESSG). The effect was positive but not significant for an increase in population and GDP per capita. This result corresponds to the study of (ANUCHITWORAWONG and THAMPANISHVONG, (2015) and HUNADY and ORVISKA, (2014)).

So we can say that the determinants of foreign direct investment in Algeria are both raw domestic product, economic openness, and inflation. This result is according to this study. Perhaps some variables that could have affected the results. Moreover, give better results have been neglected, and this is considered a deficiency in this research. It could be problematic for future research.

The study period and the method of estimating the model for the case of Algeria considered as a gap that can add new to the subject of foreign direct investment in Algeria. Decision-makers in Algeria can benefit from the results of this research to attract the most foreign direct investment.

Declarations

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Conflicts of interest/Competing interests

There is no conflict of interest/Competing interests

Availability of data and material

The data that support the findings of this study are openly available in the website of World Bank (www.worldbank.org).

Code Availability

The computer program results are shared through the tables in the manuscript.

Authors' Contributions

Bilal LOUIL: Conceptualization, Methodology, Software.

Bilal LOUIL: Data curation, Writing- Original draft preparation.

Fouad MAHFOUDI: Visualization, Investigation.

Bilal LOUIL: Supervision.

Bilal LOUIL and Fouad MAHFOUDI: Software, Validation.

Fouad MAHFOUDI and Bilal LOUIL: Writing- Reviewing and Editing.

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