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The relationship of Arab economic integration to foreign direct investment in the Arab countries: Impact analysis using the augmented gravity model

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ABSTRACT

This study aims to make contributions to the development of foreign direct investment in the Arab countries and make it a tool to activate the Arab economic integration. And try to investigate the specificity of prosperous global, regional blocs such as the European Union and the North American bloc to know the factors of success. It is focused on the relationship between foreign direct investment flows and the stages of Arab economic integration, especially Arab intra-trade. The extended gravity model relied on the impact of foreign direct investment in Arab intra-trade flows, which is considered a stage of economic integration and analysis during 1995-2017 on some Arab countries where statistics and the use of panel data were available. The results 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 was 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. Through the results obtained, the Arab countries can benefit from them to attract the most significant possible amount of foreign investments, mainly Arab, as well as possible for large Arab companies to invest in Arab countries to achieve Arab economic integration. This study also presents a new proposition, which is to study the impact using the expanded gravity model of the state of Arab countries in a recent period.

1. Introduction

FDI inflows in the world increased from the beginning of 2000, and Arab countries did not benefit extensively from these inflows, due to the limited investment environment of the Arab countries and the belief in the high risks, at the same time, the oil countries, especially the Gulf countries, an increase in oil surpluses, and due to several factors, The most important of them are Arab cooperation. FDI inflows have started to rise somewhat, which has become necessary to develop these investments to activate the integration between Arab countries, to ensure a place among the regional blocs that are guiding the economy. The world, Arab countries should create a vital economic space for themselves by taking drastic and rapid steps to achieve Arab economic integration, which will achieve economic and social gains for the peoples of the region, reduce the gap in development and income between Arab countries and ensure full freedom of movement. Arab goods, services, and workforce guaranteeing their rights, providing opportunities to promote education and training, facilitating the transfer of competencies within Arab countries, taking advantage of existing competencies outside it, in addition to investing Arab economic power to serve Arabic Issues.

In this context, it is essential to employ the success factors of Arab economic integration from a

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legal framework that defines the rights and duties of member states and an institutional framework that oversees the enactment and implementation of agreements. In addition to pushing for the liberalization of intra-Arab investments and intra-Arab trade, which reflect positively on the development of productive capacities in the Arab countries, creative human capabilities and stimulate growth and job creation in the region and the dependence of the bloc countries on the provision of goods, services, and capital. In order to assess the degree of readiness of the Arab countries to achieve economic integration among them, we show how responsive the Arab countries to implement each stage of integration, especially among the existing models of Arab blocs, such as the Gulf Cooperation Council, the Arab Maghreb Union, and the Agadir countries, because if all In its phases, we can advance in the stages of Arab economic integration, through the inclusion of countries that are outside those blocs, and activate inter-Arab investments, mainly because of the possibilities and opportunities of Arab countries to activate those investments and make them an entrance to economic integration. How does the development of FDI contribute to Arab economic integration?

The importance of the study stems from the importance of foreign direct investment in the Arab countries, by reducing the development gap among Arab countries and working to establish an Arab economic system, which also contributes to the establishment of the new international order or at least be weighted in international resolutions, in addition to its importance in Creating links between Arab countries and coordinating economic policies, and more importantly, embodying the Arab economic integration that achieves many benefits for the integrated countries, which could not be achieved without it. It increases its economic strength and works to secure its needs for goods and services. It reduces the severity of Arab countries' dependence on the outside world, widens the fields of production and diversity, widens the market size, increases the rate of economic growth and increases the level of employment, develops the production base with the help of foreign direct investments in general and inter-Arab investments in particular, enhances economic and social cooperation and reduces the burden on the balance. Payments to integrated countries. Decision-makers in Arab countries can also benefit from FDI inflows in general and from Arab countries in particular to activate economic integration among Arab countries, thus promoting and developing their economies as a result.

This study attempts to contribute to the study of the relationship between foreign direct investment and Arab economic integration; They divided into five parts: First, Introduction; second, Literature review and hypotheses; third, Data and methodology; fourth, Empirical Results and Discussion is the essential part of the study, in the last, conclusion focus on implication, limitation and the future of research.

2. Literature review and hypotheses

2.1. Literature review

Previous studies on FDI and economic integration, each with its area of interest and a different focal point, are among the researches that are divided into two sections as follows:

2.1.1. Studies on FDI

There are studies that focused on their determinants in a group of countries, including the study of Louail (2019), which dealt with the determinants of foreign direct investment in the Arab countries during the period (1970-2016) and concluded that there is a positive and significant impact of both FDI for the year t-1 and GDP. The economic openness to the flow of foreign direct investment in the Arab countries and the negative and moral impact of inflation in the year t-4.

Jouili (2018) focused on the determinants of the maritime countries of 71 countries, found a positive and significant impact of both SC liner, LP logistics, GDP, and negative and significant effect of the real exchange rate. Hunady and Orviska (2014) dealt with determinants in a group of European countries, focusing on corporate taxes. Overloads, labor costs, and the global financial crisis.

Some have studied only one country. Anuchitworawong and Thampanishvong (2015) 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, Louail (2015) 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 Faeth (2009), and concluded most of the existence of a causal relationship between economic growth and foreign direct investment.

2.1.2. Studies on economic integration

Several studies were dealing with economic integration and differed from one region to another because of several economic blocs around the world, for example, the European Union, the North

American Free Trade Agreement, the Gulf Cooperation Council, and the Moroccan Union. Brown et al. (2019) entitled Networking Companies, Borders and Regional Economic Integration in 2004-2012, it concluded that borders reduce inter-provincial trade compared to intra-provincial trade, and the distance between provinces also has a negative impact on trade for network companies, since borders. It is not transformed as an obstacle either to trade but also to investment.

Díaz-Dapena et al. (2019) focused on economic integration and regional convergence: The effects of NAFTA on local convergence in Mexico during the period 1980-2008, which concluded that during the pre-NAFTA period there was a general convergence process, but mainly explained the fastest growth for municipalities near the US border. However, after the NAFTA, the convergence of the municipalities and the effect of distance to the American border disappeared reflected their markings, as expected in the Paelinck and Polèse´s model.

Although much of the study dealt with FDI in many respects, its relationship to Arab economic integration in the period 1995-2017 is a gap for our research, especially using the expanded gravity model.

2.2. Research hypotheses

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

H1: The instability of the legislative and regulatory frameworks of foreign direct investment in the Arab countries prevented the development of its investment climate.

H2: The development of investments among the Arab regional blocs such as the GCC countries, the Arab Maghreb Union, and the ratifying countries of the Agadir Agreement will contribute to activating the stages of Arab economic integration.

H3: The openness of Arab countries to each other is weak, due to the weakness of intra-Arab trade and intra-Arab direct investments, which contributes to disrupting Arab economic integration.

H4: Opportunities and areas of investment in the Arab countries that will develop inter-Arab investments and support Arab economic integration.

3. Data and methodology

In this study, we rely on the expanded gravity model to study the impact of foreign direct investment on foreign trade, which is the first stage of economic integration in the Arab countries, but before that, we describe the variables used in the model.

3.1. Data

Before constructing the model, we collected data based on the World Bank database (WDI) on study variables and identified the dependent variable, explanatory variables, and expected impact of each variable, and we summarized it in Table 1.

Table 2 shows that the most important statistical indicators of the variables used in the model, which are related to most Arab countries during the period 1995-2017.

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

Nature	Variable	Characteristic	Expected sign
Dependent variable	Lnexportijt	Logarithm of Export unit value index (2000=100)	
Independent variable	LNFDI_I_	Logarithm of foreign direct investment, net inflows (balance of payments, current US$)	Positive (+)
	LNFDI_J_		Positive (+)
	LNGDP_I_	Logarithm of gross domestic product (GDP) (current US$)	Positive (+)
	LNGDP_J_		Positive (-)
	LNINF_I_	Logarithm of inflation, consumer prices (annual %)	Positive (-)
	LNINF_J_		Positive (+)
	LNINFR_I_	Logarithm of fixed telephone subscriptions (per 100 people)	Positive (+)
	LNINFR_J_		Positive (+)
	DIS_IJ_	Distance between country i and country j	Positive (-)

Source: All data are from the world development indicators' data bank by the World Bank (databank.worldbank.org/wdi)

Table 2: Descriptive statistics of the variables in the study

	DIS_IJ_	LNFDI_I_	LNFDI_J_	LNGDP_I_	LNGDP_J_	LNINF_J_	LNINF_I_	LNINFR_I_	LNINFR_J_
Mean	3542.63	0.494144	9.274284	10.93023	10.84508	0.923598	0.997565	0.967842	1.007298
Median	3278.9	1.017583	9.699914	11.04584	10.85247	1.275043	1.276873	0.919549	1.051921
Maximum	7166.2	1.260914	10.33549	11.8317	11.83889	2.605766	1.696649	1.48219	1.51368
Minimum	470.9	-12.97962	-5.0206	10.09699	9.383118	-13.00228	-13.00228	0.110013	-0.50701
Std. Dev.	2142.329	2.454169	2.579134	0.338618	0.403639	2.268955	2.004031	0.259402	0.31368
Skewness	0.068068	-5.204667	-5.351257	-0.806017	0.070091	-5.946313	-6.823947	0.216035	-0.861324
Kurtosis	1.464818	28.64113	29.74523	2.717992	2.559724	36.59555	47.76972	2.194897	4.57688
Observations	351	351	351	351	351	351	351	351	351

Source: Output of EViews 10

In Table 3, which represents the correlation matrix between study variables, we note that there is no correlation between those variables. It increases the accuracy of the model, which uses the best unbiased linear capabilities.

Table 3: Correlation of the variables in the study

	LNFDI_I_	LNFDI_J_	LNGDP_I_	LNGDP_J_	LNINF_I_	LNINF_J_	LNINFR_I_	LNINFR_J_	DIS_IJ_
LNFDI_I_	1								
LNFDI_J_	0.02394164	1							
LNGDP_I_	0.0032283	0.00332509	1						
LNGDP_J_	-0.04186754	0.00118628	0.02578966	1					
LNINF_I_	-0.03886064	0.0241274	0.06210653	0.00843826	1				
LNINF_J_	0.01621138	0.00351111	0.00239824	0.0182193	0.0215936	1			
LNINFR_I_	0.01058203	-0.00320403	0.00546376	0.01762785	0.01717633	-0.00421678	1		
LNINFR_J_	-0.18547003	-0.04175391	-0.00184888	0.14737906	0.01718212	0.02392946	0.02402329	1	
DIS_IJ_	-0.17241101	0.00701436	-0.00724908	0.0194715	0.1630686	0.02138387	0.02029467	-0.03166897	1

Source: Output of EViews 10

3.2. Methodology

3.2.1. Background on the gravity model

Gravity model was first used by the Dutch Tinbergen, which derived from Newton's law of gravity, and has since been used to explain the flows of foreign trade and foreign direct investment between countries and regions. The distance between countries and the size of their economies. He used the mathematical formula described below:

$$F_{ij} = \frac{G \times M_i \times M_j}{D_{ij}} \quad (1)$$

where; F_{ij} is Foreign trade flows (exports or imports) from State i to State j; M_i is GDP of the State i; M_j is GDP of the state j; D_{ij} is Distance between state i and state j; G is Fixed.

3.2.2. Development of gravity model (Extended gravity model)

The previous model developed by a group of researchers (Baldwin and Taglioni, 2007; Caruso, 2003). Other variables that affect foreign trade flows introduced, so we can change Eq. 1 as follows:

$$F_{ij} = \frac{G \times X_i \times X_j}{D_{ij}} \quad (2)$$

where; F_{ij} is Foreign trade flows (exports or imports) from State i to State j; X_i is Determinants of State Foreign Trade Flows i; X_j is Determinants of State Foreign Trade Flows j; D_{ij} is Distance between state i and state j; G is Fixed.

To change Eq. 2 for a linear model, we enter the logarithm on it to form:

$$lnF_{ij} = lnG + lnX_i + lnX_j - lnD_{ij} \quad (3)$$

Since foreign trade flows have several determinants that can affect the performance of foreign trade, including GDP, foreign direct investment, and inflation, as well as the distance between the two countries.

After entering these parameters on Eq. 3 to become of the form:

$$lnEXPORT_{ij} = \alpha_1 + \alpha_2 lnFDI_i + \alpha_3 lnFDI_j + \alpha_4 lnGDP_i + \alpha_5 lnGDP_j + \alpha_6 lnINF_i + \alpha_7 lnINF_j + \alpha_8 lnINFR_i + \alpha_9 lnINFR_j - \alpha_{10} lnD_{ij} \quad (4)$$

4. Empirical results and discussion

This section is essential for our study because it gave us the most important findings and discussed and through it is made recommendations that will help decision-makers in the Arab countries in the development of their economies and the formation of a unified economic integration, so will be addressed as follows:

4.1. Stability study of time series (Unit root tests)

After studying the stability of the time series, we found that the study variables, some stable in the level, and some stable in the first level, we used the ADF test and the PP test and the result, as shown in Table 4.

Through Table 4, we note that both crude GDP and infrastructure are not stable at the level, but stable at the first difference I (1), while FDI, inflation, and distance between the two countries are stable variables at the level I(0). So Eq. 4 becomes as follows:

$$lnEXPORT_{ij} = \alpha_1 + \alpha_2 lnFDI_i + \alpha_3 lnFDI_j + \alpha_4 \Delta lnGDP_i + \alpha_5 \Delta lnGDP_j + \alpha_6 lnINF_i + \alpha_7 lnINF_j + \alpha_8 \Delta lnINFR_i + \alpha_9 \Delta lnINFR_j - \alpha_{10} lnD_{ij} \quad (5)$$

Table 4: Unit Root Tests results (ADF and PP)

		Ln FDI	lnGDP	LnINF	LnINFR	DIS
At level	ADF test	-29.77***	-	-11.07***	-	-1.85***
	PP test	-25.64***	-	-23.74***	-	-3.01***
At 1st difference	ADF test	-	-13.71***	-	-11.18***	-
	PP test	-	-30.79***	-	-25.11***	-
Order of Integration		I(0)	I(1)	I(0)	I(1)	I(0)

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

4.2. The results of the study

After estimating the model represented in Eq. 5, we concluded that the model is acceptable because the correlation coefficient was (0.39) when we estimated using Panel data using the fixed effects least squares dummy variable model. Moreover, (0.3) using the Random effects model (REM), as well

as the fact that the number of observations is also considered for the study, as well as for the statistic F Fisher is significant by 1% in both methods.

4.2.1. The fixed effects least squares dummy variable model

The results for the Fixed effects least squares dummy variable model were found to have a negative and significant effect of distance between two countries on foreign trade flows so that if the distance between the two countries increases by 1%, trade flows between those two countries would decrease by 1.98%, and the positive and non-significant effect of inflation, i.e., the opposite. Expected, there is also a positive and significant impact of the gross domestic product of the exporting country so that each increase of 1% of GDP in the exporting country leads to an increase in exports by 16.07%, which means that that country has increased its production and self-sufficiency and thus replaced exports to replace imports. Moreover, the negative impact of the GDP of the importing country, but it is not significant. The results also found a positive non-significant effect of FDI flows in exporting countries, and a negative and non-significant impact of FDI flows in importing countries (Table 5).

Table 5: Results of model estimation (Fixed effects least squares dummy variable model)

Variable	Coefficient	Prob
C	7.541688***	0.0000
LNFDI_I_	0.013830	0.6828
LNFDI_J_	-0.025426	0.4195
D(LNGDP_I_)	16.07321***	0.0000
D(LNGDP_J_)	-0.946966	0.1737
D(LNINFR_I_)	-0.286323	0.9021
D(LNINFR_J_)	0.412157	0.5858
LNDIS_IJ_	-1.985328***	0.0000
LNINF_I_	0.077748*	0.0547
LNINF_J_	0.030758	0.3820
R-squared	0.392015	
Adjusted R-squared	0.338890	
Durbin-Watson stat.	0.495800	
Number of observations	337	
F-statistic	7.379126***	0.000000

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

4.2.2. The random effects model (REM)

As for the method of Random effects model (REM), the results concluded that there is a negative and significant effect of distance between two countries on foreign trade flows so that if the distance between the two countries increases by 1%, trade flows between those two countries will decrease by 1.99%, and a positive effect. Any increase in inflation by 1% leads to an increase in foreign trade flows in the exporting country by 0.12% due to the increase in inflation contributes to lower interest rates and, thus, an increase in the investment of individuals' financial savings and consequently an increase in production. An increase in export for importing countries, a 1% increase in inflation, leads to an increase in imports by 0.068% and is considered weak.

However, the reason for this is that the increase in inflation leads to lower interest rates and thus an increase in investment in individuals' savings, which usually needs raw materials imported from abroad. It leads to an increase in exports by 13.97%, which means that the country has increased its production and self-sufficiency and thus replaced exports with imports. The negative impact of the GDP of the importing country but not significant, the results also found a positive non-significant impact of foreign direct investment flows in the exporting countries, and a negative and non-significant impact of foreign direct investment flows in the importing countries (Table 6).

Table 6: Results of model estimation (Random effects model (REM))

Variable	Coefficient	Prob
C	7.371737***	0.0000
LNFDI_I_	0.028217	0.3626
LNFDI_J_	-0.002395	0.9309
D(LNGDP_I_)	13.97254***	0.0001
D(LNGDP_J_)	-0.948890	0.1653
D(LNINFR_I_)	-2.318352	0.2732
D(LNINFR_J_)	0.317599	0.6702
LNDIS_IJ_	-1.997583***	0.0000
LNINF_I_	0.122628***	0.0005
LNINF_J_	0.067998**	0.0245
R-squared	0.306811	
Adjusted R-squared	0.287732	
Durbin-Watson stat.	0.482335	
Number of observations	337	
F-statistic	16.08142***	0.000000

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

4.3. Discussion of the study results

By estimating the results of the study and obtaining results through the use of two methods, the first is the method of fixed effects least squares dummy variable model and the second method of Random effects model (REM). The Hausman test and Table 7 illustrate this.

Table 7: Results of the Hausman test

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.768689	9	0.2267
Cross-section random effects test comparisons:			
Variable	Fixed	Random	Var(Diff.)	Prob.
LNFDI_I_	0.2906	0.000185	0.028217	0.013830
LNFDI_J_	0.1274	0.000228	-0.002395	-0.025426
D(LNGDP_I_)	0.0144	0.736187	13.972542	16.073205
D(LNGDP_J_)	0.9881	0.016585	-0.948890	-0.946966
D(LNINFR_I_)	0.0370	0.949509	-2.318352	-0.286323
D(LNINFR_J_)	0.4522	0.015822	0.317599	0.412157
LNDIS_IJ_	0.6533	0.000745	-1.997583	-1.985328
LNINF_I_	0.0261	0.000407	0.122628	0.077748
LNINF_J_	0.0400	0.000329	0.067998	0.030758

WARNING: The estimated cross-section random effects variance is zero
Source: Output of EViews 10

Through the Hausman test, we find that the probability value (P-Value=0.2265) is higher than 0.05, we accept the imposition of nil and therefore prefer the method of random effects of the model (Random effects model (REM)), which concluded

that there is a negative and significant distance between two countries on the flows of foreign trade and This is in line with the study of Kahouli and Maktouf (2015), and the positive and significant effect of inflation is the opposite of what was expected because the increase in inflation contributes to lower interest rates and thus an increase in investment of financial savings of individuals and thus increase production followed by an increase in export found by Boateng et al. (2015).

For importing countries, higher inflation leads to lower interest rates and hence increased investment in individual savings, which usually require raw materials imported from abroad, unlike the study of Boateng et al. (2015), there is also a positive and significant effect of the GDP of the exporting country, which means that the country has increased its production and self-sufficiency and thus replaced exports with imports and this is consistent with the study of Louail (2019) and the study of Jouili (2018). The crude output of the importing country, but not significant, which is contrary to the conclusion of the study of Louail (2015) and Zouita et al. (2019). The results also found that there was a positive non-significant effect of FDI flows in exporting countries, and a negative and non-significant impact of FDI flows in importing countries, which is contrary to the study of Africano and Magalhães (2005) (Table 6)

5. Conclusion

This study deals with the impact of attracting foreign direct investment in the Arab countries on the Arab economic integration in the period 1995-2017 and has made many contributions in this area first through the studied variables in an area that is important for the countries of the world is the Arab States region, second of the time period and the method of estimation, which is a new contribution to the studies of the Arab countries, was the study of Laabas and Abdmoulah (2009).

The results 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 was 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. Through the results obtained, the Arab countries can benefit from them to attract the most significant possible amount of foreign investments, mainly Arab, as well as possible for large Arab companies to invest in Arab countries to achieve Arab economic integration. This study also presents a new proposition, which is to study the impact using the expanded gravity model of the state of the Arab countries in a recent period.

The results of our study have many critical political implications, no doubt, Arab countries need to protect investors and improve political stability to minimize the adverse effects in the current developments, and thus enhance the attractiveness of the foreign direct investment. Moreover, Arab governments should accelerate reforms and sign more regional blocs and global trade agreements to send secure and positive signals to investors.

Finally, this paper is not without its shortcomings and should be used in other researches, first, not to neglect some of the variables that are specific to the Arab economic integration, and could have strengthened the results of the study, especially those relied on in studies similar to this study. Second, it would be useful to investigate the impact of FDI inflows on the two countries. Third, focus on FDI by sector that can contribute to Arab economic integration if these investments are complementary. Finally, our study focused on the countries where data is available, and this considered a shortcoming of this research because the Arab economic integration touches all Arab countries because they deal with each other economically.

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Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

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