

Do Transport Infrastructures Promote the Foreign Direct Investments Attractiveness? Empirical Investigation from Four North African Countries

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Abstract

The relationship among foreign direct investments and economic growth is a very controversial issue that has given rise to an abundant literature. Numerous research studies examine the bidirectional causal relationship and investigate the major determinants of these investments. In the same order of ideas, this article gives an empirical study from four North African countries to evaluate the role of transport infrastructures to improve the territorial attractiveness for the foreign direct investment. The present paper starts by a theoretical study explaining the role of transport as a major determinant of FDI. In a second section, we represent the empirical study. By using an econometric model with panel data, we found that traditional determinants of FDI have the most significant influence on the international investors' decision. However, the same findings verify a positive impact of transport and consider it as a new important factor with strategic issues that cannot be avoided. The empirical validation from the four countries leads to verify that it is necessary to adopt development strategies that take into account the transport infrastructures and logistics function

Keywords: Transport infrastructures, foreign direct investments, economic development, and territorial attractiveness

JEL Classification: C33, F21, H54, N7, R42

1. Introduction

In the last few decades, the foreign direct investments have become a crucial factor of economic development of nations. For host economies, multinational companies (MNCs) represent a major creator of jobs with higher salaries than those given by domestic firms. Also, they support the construction of a competitive local industry by enhancing the effects of demonstration, imitation and contagion and by the

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stimulation of competition between firms. For local ones, acquisition of advanced technologies is easier in an environment where the MNCs exist. Also, foreign companies help to increase the currency reserves by improving exports. For these reasons, host countries should develop a strong attractiveness based mainly on a set of traditional determinants (economic and political stability, natural resources, cost and qualification of manpower and tax measures proposed to motivate foreign investors and the degree of openness to the regional and international environment ...).

However, increasing competition to attract FDI pushes host countries to improve their competitiveness by adopting new strategies. Recently, MNCs consider transport as a new FDI determinant with growing importance. For this reason, host countries become increasingly interested to develop quality of their transport systems. For a long time, economists and environmentalists consider transport as major source of negative externalities; today they regard it as an important determinant of territorial attractiveness. This change, essentially caused by the internationalization of firms which increases the need for a transport system based on a modern and developed infrastructure. Several studies investigate the impact of transport infrastructure on the firms functioning. Erenberg (1993) sees that, if the State does not provide these types of infrastructures, the national private sector and multinational companies operate less efficiently. Actually, in a context of hard international competition, firms give more importance to their supply chain management. Indeed, a delivery just in time, stocks at zero level, goods more sensitive to climatic conditions are all factors which make transportation a production element as well as capital and labor.

The economic importance of public infrastructure is largely discussed in an extensive literature Bobircă et al. (2008) for Romania, Varun and NVM (2016), Gaurav et al. (2017) for India, Saidi and Hammami (2017) for Tunisia. However, the role of the transport infrastructures is lightly treated by economists who prove that the transport contributes strongly to economic growth and affects economic activities in different ways. In the same order of ideas, we try in the present study to investigate the role of transport infrastructure to enhance the territorial attractiveness of the FDI. In an econometric model using panel data over the period 1990-2016, we introduce the transport with other economic factors to demonstrate its importance in FDI attractiveness for four countries of North Africa (Morocco, Algeria, Tunisia, and Egypt). In what follows, the structure of the discussions in this paper is organized as follows. Section 2 presents the literature review. Section 3 outlines the econometric modeling approach and describes the used data. Section 4 reports and discusses the empirical results. Section 5 concludes the article and offers some policy implications.

2. Literature review

Public Infrastructure Investment is always counted to be a crucial component of economic development and growth. Varun and NVM (2016) investigate the impact of investment in public infrastructure on economic development of India during 1999-2015. By applying panel unit root and cointegration tests, and estimate a panel error correction model, they have examine the particular impact of public investment in transport, education, irrigation, energy, sport, art and culture, public health, water supply and sanitation. The results prove the long-run relationship between the different sub-sectors and show an important effect of these investments on economic development of India. Abiad et al. (2016) examine the role of public investments on macroeconomic sector in developed countries. They conclude that in these economies, the public investments raise the output, boost the private investments and reduce the unemployment. Similarly, Saidi and Hammami (2017) analyze the effect of public investments in both economic and social infrastructures on economic growth and private investment in Tunisia between 1975 and 2014. By using a simultaneous equation models, they found that the impact of these investments is positive and crucial for overall growth as well as for private investments.

Ang (2008) prove that the public infrastructure have a positive role to increase the economic activity in developing countries. He used time series data analysis to examine the impact of total government spending on economic growth in Malaysia between 1960 and 2005. Ang (2008) argues that the transport and communication infrastructure as well as trade openness affect positively and strongly the FDI attractiveness in Malaysia. In other study, Babatunde (2011) treat the linkages among infrastructure, trade, growth and foreign direct investment for Sub-Saharan African countries over the period between 1980 and 2003. Using panel data of 42 countries, they conclude that trade openness and GDP per capita affect positively the FDI inflows, also they show that the interaction between trade openness and infrastructure increases FDI inflow slightly.

The quality and capacity of transport infrastructures (airports, roads, public transport, etc...) in a host country are inherent factors in the decision-making process of delocalization of multinational corporations. To explain more the role of transport, Brainard (1997) finds that the transportation costs, the customs duties, and the economies of scale in the company help the American ones to increase their investments abroad. By using an econometric model and a comparative index of FDI attractiveness, Pantelidis and Nikolopoulos (2008) examine the main factor of FDI in Greece over the period 1976-2004. Comparing Greece's territorial attractiveness with the rest of the EU countries, they argued that FDI inflows are negatively affected by inefficient transport infrastructure, inefficient public

governance and general macroeconomic conditions. To analyze the long-run relationship between transport infrastructure, growth and FDI in India over 1970-2012, Pradhan et al., (2013) apply the autoregressive distributed lag and vector error-correction model. They found that the three variables are long-run cointegrated and bidirectional causal relationship exists between all of them.

Also in a given host country, the effective management of transport systems is indispensable to improve the firm's' competitiveness. In localization project of activities abroad, the company demands the best possible transportation service providing the least expensive connectivity between the various subsidiaries. For MNCs, a good management of transport systems is an important factor of competitiveness in a world where the time constraints and flexibility must be managed effectively. To study the impact of transport on economic development, Khadaroo and Seetanah (2008) used the VECM to investigate the interrelationship among transport and growth in Mauritius over 50 years (1950-2000). They conclude that the transport infrastructure may affect positively the economic activity by increasing accessibility and reducing production costs. Also, Khadaroo and Seetanah (2008) argue that the transport infrastructure is new determinant of FDI attractiveness with increasing importance. Indeed, the non-excludable and non-congestible qualities of the transport infrastructures decrease the costs of doing business and likely to enhance the attractiveness of FDI. In the same vein, Barzelaghi et al. (2012) found that the inefficient transport systems are a major obstacle to both domestic and foreign private investments. They investigate the impact of transport infrastructure on the territorial attractiveness of Iran during 1974-2007. They used the Johansen Juselius econometric methods to examine the role of transport infrastructure, trade and size of Iranian market to enhance the FDI inflows in short and long-run. Their findings prove a positive and significant impact on the long-run despite a weak effect on the short-run.

However, the impact of transport costs on the selection of location for new subsidiary varies from one activity to another. In the industrial sector, the new localization depends directly on these costs if their part increases significantly the production charge. Minimizing transportation cost remains always a major objective; it is one among the most important factors to analyze. In addition, most firms believe that the transport logistics helps to minimize expenses. Today, they have an increasing requirement concerning infrastructure and conditions of transport in which they will organize the movement of goods and staff. Each company seeks to satisfy efficiently its transport needs in order to maintain its proper functioning, which often postulates the choice between several modes of transport.

Currently, the modern economy depends to labor quality and flexible production strategies. In the context of globalization and markets' integration, strengthening the competitiveness of firms requires efficient, competitive and connected transport systems. Indeed, an industrial company chooses its production site based primarily on the access degree to markets, inputs and quality of transportation services that will be needed. Dupuch and Milan (2002) indicate that the delocalization of new factories near the national network facilitates the production processes "Just in Time" and completes the accessibility attraction.

Several countries appreciate the importance of transportation to attract FDI. They improve the quality and capacity of their transport infrastructure to enhance their competitiveness and increase their attractive effects exerted on MNCs. For example, in the countries of North Africa, European investment, intended to develop subcontracting relationships, is the most promising in terms of employment and technology transfer, but the development of these activities is intimately related to infrastructure and logistics platform building (Saidi and Hammami, 2011). In addition, several firms internationalize their added value chains and transfer operations abroad; consequently their needs of movement between different subsidiaries increase. Also, a good transport logistics is crucial to ensure the best connectivity between clients and suppliers and to improve their efficiency and productivity and thus the overall competitiveness of the firm.

Moreover, maritime transport is the backbone of the commercial exchange between these countries and European Union. Upgrading the port systems of the North African countries to international standards is a carrier of productivity gain for supply chains and competitiveness of local economies. However, even these projects increase the port capacity and facilitate trade between the two Mediterranean shores, the problem of logistics infrastructure in the MATE countries (Morocco, Algeria, Tunisia, and Egypt) does not stop there, they also turn to the situation of land infrastructure. Indeed, in this region roads remain insufficient and rail freight is weak and unable to provide a good access to the port areas.

For host countries, the developed transport infrastructures represent important elements for building a successful intermodal transport system. They help to create a favorable environment for foreign direct investment and therefore for MNCs. Subsequently, these firms act as an accelerator of international trade and generate a wider development of industrial clusters around by providing a significant level of economic activity. In the same vein, several research studies find that time is a major determinant of competitive advantage, since the production networks of multinational companies are integrated on a global scale and that consumers become more and more pressing and demanding. Indeed, rapid access to a logistics

platform and quality of land transport infrastructure appears as an important implementation factor. In this context, the most important contribution of transports is that they are an essential element of connectivity and a major asset of FDI attraction strategy.

This situation is being changed with large political works to give more importance to logistics functions. The highway modernization, the projects connecting ports with rail networks and the creation of connected transport systems help MNCs to manage better the extended supply chains. But MNCs increasing number in the world generates larger and more complex supply chains. The efficient management of these chains requires developed logistics zones in the country home offering to MNCs the optimal exploitation of their resources.

Indeed, creating a logistics area needs a grouping of a large number of big warehouses on the same zone. This type of storage helps MNCs to reduce the warehousing costs and deliver commands with faster and more reliable ways. Concerning transport, costs decrease if the transported quantities increase, where from the shift towards larger tonnages modes such as rail. Another factor that must be carefully studied to build logistics zones is its location, which must meet some conditions and satisfy several constraints simultaneously. Indeed, it is necessary to ensure accessibility and connectivity of the area with the road and motorway networks, and a direct connection with the railways. Hakro and Omezzine (2011) investigate the relationship between foreign direct investment and governance infrastructure in Middle Easter and North African countries. They discovered that governance infrastructure has a significant positive impact on FDI inflows to the regions. It was also found that improvement in governance increases the returns on investments.

3. Analytical Framework

3.1 Econometric modeling

Using econometric specification to investigate the main factor of foreign direct investment is a widely used tool in the economic literature. They serve to study the attraction or repulsion dynamics of trade flows between the different regions of the world. On the other hand the actual world situation is not so easy to be represented by such a few factors. Moreover the habitual variables of GDP and distance, researches in this particular field have often employed other factors like population, economic openness, exchange rate and others. In the present study, we try to integrate the transport infrastructure in the host country as an explanatory factor of the FDI in the countries of the North Africa. We consider the transformed Cobb-Douglas production function. The basic model considered in empirical validation takes the following form:

$$\text{FDI} = (\text{POP}, \text{GDP}, \text{EO}, \text{XCH}, \text{TR}) \quad (1)$$

Where; the foreign direct investment (FDI) is function of total population (POP), gross domestic product (GDP), economic openness (EO), exchange rate (XCH), and transport infrastructures (TR). Since there is a panel data study, we use here the log-transformation of variables and we writ Eq. (1) with a time series specification, as follows:

$$\ln \text{FDI}_t = \alpha_0 + \alpha_1 \ln \text{POP}_t + \alpha_2 \ln \text{GDP}_t + \alpha_3 \ln \text{EO}_t + \alpha_4 \ln \text{XCH}_t + \alpha_5 \ln \text{TR}_t + \varepsilon_t \quad (2)$$

We use panel data which allows us to write Eq. (2) in panel data form as follows:

$$\ln \text{FDI}_{i,t} = \alpha_0 + \alpha_1 \ln \text{POP}_{i,t} + \alpha_2 \ln \text{GDP}_{i,t} + \alpha_3 \ln \text{EO}_{i,t} + \alpha_4 \ln \text{XCH}_{i,t} + \alpha_5 \ln \text{TR}_{i,t} + \varepsilon_{i,t} \quad (3)$$

In Eq. (3), we have lnFDI is the dependent variable representing the foreign direct investment (in thousands of current dollars), lnPOP is the total population in the host country (in million persons), lnGDP is the gross domestic product (constant 2010 US\$), lnEO is the economic openness (exports + imports/GDP), lnXCH is the exchange rate, lnTR is the transport infrastructure (km of roads).

3.2 Data

To obtain a clear idea about the nature and characteristics of used explanatory variables, we must treat the descriptive statistics (table 1). It is an essential element that can give a sense, an expression for the required information.

Table 1. Descriptive statistics

MATE PANEL	FDI	POP	GDP	EO	XCH	TR
Mean	1246.846	14852.55	98512.10	29.51468	24.56180	17.62517
Median	167.5197	10275.15	98416.27	28.53492	31.51962	16.45913
Skewness	-2.48351	1.94812	-1.74586	-2.15496	-2.48560	-1.94582
Inter-Quatile Range	1.846921	1.846242	0.984575	1.114580	0.978516	2.849623
Algeria						
Mean	1215.48	35.156	1899.26	1856.15	75.156	46.418
Median	1189.14	34.658	1904.26	1898.00	77.140	52.466
Skewness	-1.9648	1.6592	-2.4586	-1.2552	-1.0486	-1.7851
Inter-Quatile Range	1.6689	1.2523	0.9892	0.8693	1.4589	2.4835

MATE PANEL	FDI	POP	GDP	EO	XCH	TR
Egypt						
Mean	1541.77	98.153	1503.23	1547.12	68.459	35.485
Median	1624.10	95.485	1526.48	1602.58	69.556	33.638
Skewness	-0.8992	1.7485	-0.6593	-1.8194	-2.4593	-2.0014
Inter-Quatile Range	2.1042	1.8627	1.9800	2.0072	0.7489	1.7482
Morocco						
Mean	1376.83	33.169	1425.69	1148.47	81.452	29.486
Median	1420.96	34.418	1455.89	1211.65	80.418	31.400
Skewness	-1.3258	1.4869	-1.6684	-1.3486	-1.7744	-0.8980
Inter-Quatile Range	1.4877	1.6483	1.7495	1.4478	1.2282	2.0017
Tunisia						
Mean	1249.19	11.485	2409.45	2602.88	86.482	19.568
Median	1255.46	11.663	2428.53	2640.77	85.447	18.473
Skewness	-1.4880	1.4683	-1.7700	-1.1047	-1.6580	-1.7780
Inter-Quatile Range	2.1473	2.1540	1.8496	1.4478	1.5674	1.1147

The values of mean and median are close indicating that all variables used in this study have normal distribution. Also, the skewness negative coefficients indicate that the distribution is skewed to the left, with more observations on the right except the total population coefficient which is skewed to the right. In addition, the Inter-Quartile Range (IQR) statistics note the absence of outliers in our sample. These statistics give the same results of Magazzino (2016) for the six Gulf Cooperation Council (GCC) countries, Magazzino (2015) for Israel, and Jamel and Derbali (2016) for eight Asian economies. In addition, these results note that the FDI has a significant difference between the minimum and maximum values. Therefore, we can say that the volume of inward FDI in each country varies significantly and subsequently the territorial attractiveness depends on a number of factors.

Table 2. Correlation between variables

	FDI	POP	GDP	EO	XCH	TR
FDI	1.0000					
POP	0.05186	1.0000				
GDP	0.11567	0.1157	1.0000			
EO	0.21576	0.2849	0.3486	1.0000		
XCH	0.20148	0.3990	0.3285	0.3348	1.0000	
TR	0.48962	0.4158	0.2627	0.2784	-0.3042	1.0000

A rapid analysis of Table 2 shows clearly that all correlation levels between variables are low. Also, the FDI inflows are positively with all the exogenous variables. For this reason, we can consider that in our model the variables do not have auto-correlations that may risk the results and we can continue our estimation by applying the unit root and cointegration tests.

3.3 Stationarity and Cointegration Relationship

To study the stationarity of series, unit root tests are the most commonly used for empirical investigation. However, these applications in an econometric study using panel data are somewhat recent. Indeed, the panel unit roots test has played an increasingly important role in empirical analysis since the works of Levin and Lin (1992) and Quah (1994). In this section, we try to study the properties of non-stationarity by using Levin, Lin and Chu (LLC, 2002) and Im, Pesaran and Shin (IPS, 2003) tests. The results show that the set of data series is stationary in level, but in first difference it is affected by a unit root (see Table 3). It should be noted that the number of maximum lags is fixed to 3; the lag numbers selection for each individual is programmed for this test by Pedroni.

Table 3. Unit root test

	Levin-Lin-Chu (LLC)		Im-Pesaran-Shin (IPS)	
	level	first difference	level	first difference
FDI	-2.6292 (0.1056)	-2.5991 (0.0113)**	-2.1485 (0.3415)	4.2284 (0.0008)*
POP	-3.7308 (0.0523)	-6.2005 (0.0001)*	-2.8114 (0.3002)	5.7480 (0.0000)*
GDP	-2.8108 (0.0755)	-5.8184 (0.0002)*	-3.2644 (0.2102)	5.3265 (0.0000)*
EO	-4.1766 (0.0649)	-6.5374 (0.0000)*	-3.9486 (0.2007)	5.3265 (0.0000)*
XCH	-0.9843 (0.7368)	-4.2388 (0.0046)*	-4.2147 (0.1649)	6.2648 (0.0000)*
TR	-2.8174 (0.0746)	-6.1267 (0.0001)*	-0.9456 (0.5128)	3.8659 (0.0014)*

*, ** significant at the 1% and 5% levels, respectively.

Pedroni has developed seven cointegration tests on data from homogeneous and heterogeneous panel; these tests take into account the heterogeneity in the cointegrating relationship. These Pedroni tests are divided into two groups, a first consisting of four tests based on the dimension “Within” and a second one

component three tests based on dimension “Between”. These two categories are based on the null hypothesis of no cointegration, the distinction between the two groups is at the alternative hypothesis:

$$H_1 \begin{cases} \rho_i = \rho < 1 \forall i : \text{within} \\ \rho_i < 1 \forall i : \text{between} \end{cases}$$

Pedroni has shown that under appropriate normalization based on Brownian motion functions, each of the 7 statistics follows a normal distribution centered reduced for N and T important enough:

Table 4. Pedroni cointegration test

	V-stat*	Rho-stat*	Pp-stat*	Adf-stat*	Rho-stat**	Pp-stat**	Adf-stat**
MATE	-1.7858	-2.1486	-2.0218	-5.9458	-4.7452	-1.9880	-4.1542
Algeria	-2.1465	-2.4186	-1.9586	-2.4418	-1.8004	-1.6980	-1.7007
Egypt	-1.8810	-2.0041	-2.3085	-1.8774	-1.6883	-1.7008	-1.9090
Morocco	-1.8455	-2.4186	-3.0041	-3.1596	-2.1073	-2.6186	-3.4802
Tunisia	-2.4187	-2.4583	-2.1548	-3.4688	-1.8880	-2.1487	-2.7341

** Tests based on BETWEEN dimensions

* Tests based on WITHIN dimensions

From the results of Pedroni cointegration tests, we note that all the statistics are below the critical value of the normal distribution for a threshold of 5% (-1.64). Therefore, all of these tests require the existence of a cointegration relationship.

4. Results and discussions

To investigate the impact of transport infrastructures and some different economic factors on the territorial attractiveness of foreign direct investments, we use the following specification:

$$\ln \text{FDI}_{i,t} = \alpha_0 + \alpha_1 \ln \text{POP}_{i,t} + \alpha_2 \ln \text{GDP}_{i,t} + \alpha_3 \ln \text{EO}_{i,t} + \alpha_4 \ln \text{XCH}_{i,t} + \alpha_5 \ln \text{TR}_{i,t} + \varepsilon_{i,t} \quad (4)$$

Where, $\ln \text{FDI}_{i,t}$ stands for the foreign direct investment inflows in country i at time t , α_0 is the constant, α_i are the parameters to estimate, X' is the vector of core explanatory variables used to model foreign direct investments (POP, GDP, EO, XCH, TR), λ_{it} is the specific unobservable individual effects to the host country i at time t , and ε_{it} is the classical error term. To test this model, we adopt the method of ordinary least-squares.

Table 5. Regression results

Dependent variable: FDI				
variables	coefficient	Std.error	t-statistic	prob
C	18.12593	5.125498	3.536423	0.000000*
ln(POP)	0.084152	0.147846	0.569186	0.051862
ln(GDP)	0.298657	0.184695	1.614862	0.026483**
ln(EO)	2.956841	0.745862	3.964327	0.000000*
ln(XCH)	-0.278459	0.151492	-1.838110	0.011569**
ln(TR)	0.394582	0.176972	2.229629	0.000000*
R-squared	0.705614	Meandependent var		6.114862
S.E. of regression	1.124864	S.Ddependent var		2.764829
F-statistic	13.14967	Sumsquaredresid		385.2613
Prob(F-statistic)	0.000000	Durbin-Watson stat		2.016840

*significant at 1%;

**significant at 5%;

The results estimated by OLS method, in the case where we have a fixed effects model show that the model is significant ($R_2 = 0.7056$, and F-statistic = 13.14). Also, the obtained statistics show that the gross domestic product (GDP), economic openness (EO), exchange rate (XCH), transportation infrastructures (TR) are significant variables with different thresholds. While the variable related to population (POP) has a not significant influence on the variation of endogenous variable.

For the impact of population (POP), several studies show that it is among the major determinants of FDI (Lipse, 1999; Truman and Emmert, 1999; Love and Lage Hidalgo, 2000; Obwona, 2001). This variable represents the local market size and then the possibility of a higher domestic demand in these countries. In our case, this variable is not significant and it has a low coefficient. A magnitude of 0.084 implies that the FDI inflows in the North African countries increase by 0.084% if the population grows by 1%. This non-significance is justified by the vertical nature of FDI located in these countries. Also, this result confirms the idea of Basile (2004) that the market size of the host country affects more the horizontal FDI. According to traditional theory, several studies including those of Helpman (1984, 1985); Zhang and Markusen (1999) show that the differences between countries in terms of market size, factor endowments of production technologies and consumer's income encourage the vertical FDI flows.

Also, the GDP level reflects the qualities of the local market. Usually, a country with a relatively high GDP has a greater purchasing power. Several studies show that the difference in GDP between countries is also a very important determinant of FDI

precisely for the vertical type (Gao, 2003). The coefficient of 0.298 means that the 1% increase in the GDP of the local countries tends to augment the FDI stock by 0.298% per year. Also, a high GDP reflects the local market development and the well absorptency capacity of larger production quantities which is sought by the MNC. In the present case, we observe that the GDP level is not very important and the MNC is not very interested to this indicator. According these results, we can suppose that the FDI inflows are slightly dependent on GDP and population in the host countries if we talk about a vertical FDI. But in the other side, the two variables become two factors with an increasing importance to attract the horizontal FDI in the developing countries.

For these firms, the high economic openness degree (EO) is a good indicator of the implementation ease in a foreign country and represents the simplicity of procedures to achieve an export or import operation. In our model, the economic openness degree is significant at the 5% level. For the host countries in our sample, the volume of FDI raises by 2.95% if there an increase by 1% in the economic openness. Then, we have the variable (XCH), it is the exchange rate of the national currency in U.S. dollars. The instability of the exchange rate is an unfavorable element to the FDI attractiveness. Statistics related to this variable show that the exchange rate is a powerful determinant of FDI to developing countries. In the same order of ideas, Bénassy-Quéré et al. (2015) argue that the exchange rate can be counted among the most important economic determinants of FDI and each country should stabilize its currency against the countries may bring to him as much as possible FDI. A depreciation of the local currency may be attractive for foreign investors so that an assessment can lead to repulsion effects.

Also, there are many other variables which variation may increase or decrease considerably the volume of FDI inflows in a country. In several works, transportation is considered as mere geographical distance between investor and host countries. The authors indicate that the MNCs prefer always the implementation in the near countries which can offer the necessary investment conditions and refuse go to the most distant ones for many manufacturing reasons. In our study, we consider the road network (km of roads) as a proxy for transport infrastructure in the host country. A positive sign is expected because the MNCs are usually motivated by the good performance of the transport systems in the host countries (Coughlin et al., 1991; Loree and Guisinger, 1995). In our case, the transport appears as a key determinant of FDI. This result shows that a transport system can improve the territorial attractiveness of FDI in the host country in the same way as traditional determinants of FDI. A magnitude of 0.394 shows that the FDI inflows in the recipient countries augment by 0.394% if these countries develop their local road networks by 1%.

Indeed, the role of transport is very important for the firm or for any economic activity in the country. We can talk about transportation if we discuss its economic role, environmental externalities, the ability of moving vehicles, the quality of infrastructure, the creation of free trade zones, warehousing and logistics areas in the country. Also, the transport economic role has evolved rapidly in recent years and its importance in business continues to improve.

Finally, these two last results indicate that the transport infrastructure is an important factor which can play a major role to improve the FDI attractiveness power in the developing countries. Also, a high percentage of the vertical FDI in all countries of our sample explains the significance of transport as an explanatory variable in the model.

5. Conclusion

For a long time, the FDI attractiveness in the host countries is mainly based on traditional FDI determinants (economic, institutional). Recently, apart from these major factors, movements of FDI in the world depend on a new set of factors. Indeed, the liberalization and the rapid development of international financial markets, the use of transportation more efficient in loading capacity, the quality of service and the fast innovation in the field of ICT has caused a dramatic rise in global FDI flows.

In this work, we studied the major economic factors of FDI attractiveness in four North African countries (Morocco, Algeria, Tunisia, and Egypt). We have used a panel data in an econometric model with fixed effects over the period 1990-2016. The obtained results confirm that the impact of GDP and exchange rate is positive and significant at 5% level. Also, we found that the FDI inflows in the four countries depend positively to economic openness and transport infrastructure. The findings show that the impact is positive and significant at 1% level. Based on these results, we prove that the transport infrastructures have a great importance for the MNCs and the delocalization abroad is largely affected by the quality of transport systems in the host countries. Contrary, we found a positive but statistically insignificant impact for the population size in the North African countries.

Actually, developing countries consider the transport as a new FDI determinant with a growing importance. Recently, the concept of multimodal transport is becoming increasingly relevant and attracts more attention of developing countries and multinational companies at the same time. This transport system can have main impacts on economic activities in the less-developed countries. In addition, the domestic authorities in these countries should improve the quality and efficiency of the transport systems by adopting new strategies. They can create corridors for the

transport of goods in order to facilitate travel and to get the freight from road to rail transport. Also, the public investment in transport and telecommunication can boost significantly the economic growth in developing countries. In fact, these infrastructures have a particular impact on the development of the territorial attractiveness to the multinational companies.

Host countries have also the opportunity to develop urban logistics centers to encourage the delivery and collection of goods in towns and city centers. Recently, the concept of sustainable transport has become increasingly important in the development strategies in both developed and developing countries. Indeed, numerous measurements may be taken to improve sustainable transport of freight such as augmenting energy efficiency, reducing pollutant emissions, encouraging the renewable energy consumption, integrating new information and communication technologies in the transportation systems.

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