E3 Journal of Business Management and Economics Vol. 7(2). pp. 064-071 August, 2016
Available online http://www.e3journals.org
ISSN 2141-7482 © E3 Journals 2016
DOI : http://dx.doi.org/10.18685/EJBME(7)2_EJBME-16-012

Full Length Research Paper

Impact of road transport on foreign direct investment and economic growth: Empirical evidence from simultaneous equations model

Samir SAIDI[1]

[1]Faculty of economics and management, University of Sfax, street of airport, Km 4.5, LP 1008, Sfax, Tunisia; Email: Samirsaidi05@yahoo.com

Accepted 20 April, 2016

The aim of this article is to analyze the impact of road transport on the economic growth through its participation in the attractiveness of the foreign direct investment to Tunisia over the period between 1975 and 2014. The generalized method of moments was used to estimate a simultaneous equations model containing a growth equation and a foreign direct investment equation. The obtained results indicate that the roads promote the entry of the foreign direct investment by consequence the economic growth in the long term.

Key words: Tunisia, generalized method of moments, foreign direct investment, road transport, growth.

INTRODUCTION

Several economists found that the transport infrastructures have important impact on economic growth. Chakraborty and Nandi (2011); Khandker and koolwal (2011) argued that the impact of the procurement of transport and communication infrastructure is a topic that has attracted considerable attention in the literature along the few last years. Yeaple, and Golub (2007) say that the transport infrastructures have the greatest potential to stimulate the economy in the long-run. In addition, several economists affirm that there is no doubt that there is a strong linkage between investments in transport infrastructures and economic productivity.

Several empirical researches suggest that transport infrastructure has a significant impact on productivity and cost structure of private firms (Aschauer, 1989; Morrison and Schwartz, 1996; Haughwout, 2001). Erenberg (1993) discusses the influence of road transport on the work of firms. He also believes that if the state does not provide these types of transport, the domestic private sector and multinational companies operate less efficiently each attempt on their part to provide their own networks would result in duplication and waste of resources. In the same order of ideas, economists say that the transport may be a major factor to attract the foreign direct investment (FDI) and can stimulate the growth. Indeed, better roads can reduce the costs associated with a construction of a new factory or transportation of heavy equipment. Also, if a private company uses the public road network to receive and ship its products, it can increase productivity by combining its own capital with the public one, which reduces the unit cost of production and enhance the efficiency.

The goal of the present article is to study the contribution of transport, essentially the roads, on the economic growth by the amelioration of the attractiveness of the Tunisian territory to the multinational firms. In other

words, we try to demonstrate that beside the traditional direct effects, the transport can stimulate growth by an effective participation on the attractiveness of the FDI. The article starts by a theoretical study in which we explain the relationship between transports, foreign direct investment and economic growth. Then we have the empirical framework trough which we try to confirm the positive relationship between the three dimensions. The empirical framework concerns the Tunisian case based on an econometric treatment of data in chronological series for 35 years (1975-2014) taken from the database of the World Bank (WDI, 2015).

Literature review: The relationship between economic growth, road transport and FDI

To treat the nature of the relationship between growth and FDI, De Gregorio (1992) found a significant and positive relationship between FDI and economic growth for 12 countries in Latin America between 1950 and 1985. Similarly, he noted that FDI influences better the growth than the domestic investment and their effects become more important when the education level in the host country is higher. Abdul and Ilan (2007) used detailed sectorial data between 1997 and 2006 to study the impacts of FDI inflows on the economic growth of Indonesia. The results show that, generally, FDI has a positive effect on economic growth. Sjoerd et al. (2008) have tried to compare the impacts of the vertical FDI to those of the horizontal ones on growth of 44 host countries for the period going from 1983 to 2003 by using traditional figures of FDI as benchmark. They found that the effects of horizontal FDI are more important on growth.

In order to determine the direction of the relationship between FDI and growth, Zhang (2001) conducted a study for 11 countries in Asia and Latin America. He argued that there is no relationship between FDI and growth in Argentina in the short and long term, by against, in Brazil and Colombia there is an inverse relationship from growth to FDI. For Asian countries, the author found a short-term relationship from growth to FDI in Korea, Malaysia and Thailand. Among the 11 countries studied, Zhang (2001) found that in only 5 countries the growth is accelerated by FDI, while for others, there is no co-integrating relationship between FDI and growth.

By empirical evidence, Brewer (1991) showed that there is a negative correlation between economic growth and FDI. According to the author, the negative correlation can be explained by the dominance of multinational firms on domestic ones, which discouraging them to develop their own research and development activities. Borensztein et al. (1998) argued, from a panel data study of 69 developing countries, that an increase by 1% in the ratio of FDI to GDP increased the rate of GDP per head of the host country by 0.8%. Also, Faouzi (2004) demonstrates, from a sample of 28 emerging countries on a period between 1984 and 2002, the existence of a strong negative correlation between the country risk and FDI.

From an econometric study in dynamic panel data for 7 countries of the West African Economic and Monetary Union (WAEMU) over a period of 30 years (1972-2002), Batana (2005) showed that the domestic investment rate, public consumption and the volume of FDI existing actually in a given country are the most relevant factors in the explanation of FDI flows in the WAEMU countries. In other studies by using more specific measures of governance, Hellman et al., (2003) find that corruption reduces FDI inflows to selected countries. In a more recent study, Soltani and Ochi (2012) have used a traditional model of time series of annual data covering the period from 1976 to 2009 in Tunisia; the results from the model suggest that the FDI affect significantly and positively the accumulation of some key variables of economic growth such as human capital and financial development.

Concerning the relationship between transport and growth, several economists found that the transport infrastructures have the most important impact on economic development. They indicate that transportation cost becomes a major component in the production process of all goods. Indeed, it allows to expand the regions in which the products may be commercialized, for example, good roads help to save time for transportation of freight; this will allow companies to produce cheaper, to benefit from a gain on time and even on the equipment used. According to Fernald (1999); Yeaple, and Golub (2007), transport infrastructure has made the production and distribution process more efficient and the access to different markets easier (goods and services market, labor market).

Khanam (1999) studied the effects of road networks on the Canadian manufacturing industry between 1961 and 1994, by estimating a Cobb-Douglas function. The author found an elasticity of productivity of around 0.47. From his side, Fernald (1999) has shown (with data of 29 US industries between 1953 and 1989) that the decline in productivity registered in the United States after 1973 (period when there was less investment in infrastructure in the United States) is more important in high intensity vehicle industries. Moreover, he found that these industries benefited disproportionately of investments in road networks. For the case of developing countries, the World Bank (2002) indicates that the infrastructures' deficiency contributes greatly to the low productivity of the factors: the electricity blackouts, the deficiencies of telecommunications systems, the quantitative and qualitative lack of the roads are all obstacles to investment, growth and poverty reduction in these countries.

To demonstrate the role of road transport in the development of economic activity, Yeaple, and Golub (2007)

present their study for 12 developed and developing countries. In their study, they estimated the effects of three types of infrastructure (roads, telecommunications, and electricity) on total factor productivity in 10 industrial sectors between 1979 and 1997. They found that among the three types of infrastructure, roads have the greatest effect on productivity in different industries. Indeed, an increase in road networks is associated with a statistically significant increase in total factor productivity of 9 among 10 industries. While the networks of electricity and telecommunications are associated with a statistically significant increase in only two industries.

For the importance of transport to FDI attractiveness, few researches try to discuss the role of the transport infrastructures as determinant of the FDI (Lamarche, 2003; Borja, 2007; Saidi and Hammami, 2011). Wheeler and Mody (1992) explain that the transport infrastructure is directly related to the nature of production, which requires the availability of roads, railways, ports and other facilities for operational efficiency. Also, with increased competition, companies are looking to distinguish themselves by some of their offers. They choose the localization near ports and in well equipped logistics areas to ship easier their products in the best conditions. Currently, the modern economy is dependent on labor quality and flexible production strategies called "just in time". In the context of globalization and markets' integration, the competitiveness strengthening of the regional clusters and networks requires efficient transport systems, competitive and connected. Indeed, minimizing the times of supplying and delivery increases the competitiveness of firms. For Hidane et al. (2002) "The localization of a factory near the national network facilitates the production processes just in time and completes the appeal forms of accessibility."

In addition, the road transportation is the only way that allows a transportation service from door to door. It provides a direct shipment of the goods from the enterprise of the exporter to the importer's one without the need for any other mode. The industrial firms use frequently the roads to realize their local and international exchanges. The large exploitation of this mode is said to its benefits offered to shippers in terms of speed, adaptability to cargo, autonomy and flexibility. Bouinot (2010) say that the road transport infrastructures, especially highways, are assumed to directly determine the localization of new facilities. For these reasons, developing countries give more importance to the construction of new roads providing new ways for the MNCs to retain continuous production systems at low costs and making deliveries in the shortest possible delays.

Although the relationship between transports and growth is largely treated, we try in this present work, to study the particular impact of road transport on the economic growth through the channel of FDI. In others words, we seek, in the beginning, to evaluate the role of road transport to attract the FDI and then in a second step, we try to demonstrate the contribution of these investments in the economic development.

THE ECONOMETRIC MODELING

The econometric model based on the idea that public investments in transports affect economic growth mainly through the FDI channel. Indeed, it is recognized that increasing the stock of public capital reduces production costs and improves labor productivity and capital efficiency (Agénor, 2009). Yeaple, and Golub (2007) indicate that the transport infrastructures have the greatest potential to stimulate the economy in the long-run. Also, others economists argued that the public investments, essentially in the transport infrastructures, affect significantly the economic growth. In the empirical study, we define a growth equation inspired by the augmented model of Solow as specified by Mankiw, Romer and Weil (1992). In such models, human capital is treated as an additional factor of production to physical capital, population, and technology as shown in Equation 1 below:

$$Y(t) = K(t)^{\alpha}\, H(t)^{\beta}\, A(t)\, L(t)^{1-\alpha-\beta} \qquad (\mathbf{1})$$

Y, K, H, A and L are respectively the production level (GDP), physical capital, human capital, technology and labor. If we replace human capital by public capital we get the production function defined in equation 2 below,

$$Y(t) = K_t^P\,(t)^{\alpha}\, K_t^G\,(t)^{\beta}\, A(t)\, L^{1-\alpha-\beta} \qquad (2)$$

in which we have made a distinction between the private capital $(\mathrm{K_t^P})$ and public capital $(\mathrm{K_t^G})$. The accumulation functions of private capital and public capital are given by equations 3 and 4:

$$k_P(t) = (S^P)\, y(t) - (n + g + \delta)\, k_p\,(t) \qquad (3)$$

$$k_G(t) = (S^G)\, y(t) - (n + g + \delta)\, k_G\,(t) \qquad (4)$$

y= Y/AL, $k_P = K_P/AL$, $k_G = K_G/AL$ represent respectively; production, physical capital and human capital per effective working unit. Also, n and g are the population and technology growth rates. We assumed that private capital and public capital depreciate at the same rate δ. S^P and S^G are the production parts invested in private capital and public capital. The combination of the production function and the accumulation equations gives the equation 5 defined by:

$$Ln\left(\frac{Y_t}{L_t}\right) = \ln(A_0) + g_t + \frac{\alpha}{1-\alpha}\ln\,(S_t^P) + \frac{\beta}{1-\alpha}\ln\,(S_t^G) - \frac{\alpha}{1-\alpha}\ln\,(n_t + g + \delta) \qquad (5)$$

Table 1: unit root tests

	In level		In first difference	
	ADF	**PP**	**ADF**	**PP**
LGDP	-2.25*	-2.84*	-1.815***	-1.256***
LINVG	-1.248	-1.557	-6.462*	-6.682*
LINVP	-2.352	-2.554	-4.963*	-4.8978*
LFDI	-1.651	-1.951	-6.741*	-6.850*
LTRSP	-1.754	-1.748	-4.967*	-4.012*
Ln	-1.849	-2.842	-5.728*	-5.100*
LDEBT	-2.748	-1.629	-4.658*	-4.501*
LOPEN	-1.956	-1.341	-6.960*	-6.364*
LINF	1.018	1.112	-5.002*	-5.851*

(*), (**), (***) significant at 1%, 5% and 10%.

Equation 5 shows that GDP per capita in each period depends on the technology, private investment, public investment and population growth. The equation to estimate may appear as follows:

$$LGDP_t = \alpha_0 + \alpha_1 LINVG_t + \alpha_2 LINVP_t + \alpha_3 Ln_t + \varepsilon_t \quad (6)$$

In equation (6), we made distinction between the foreign direct investment and the domestic private investment. We obtain the equation (7).

$$LGDP_t = \alpha_0 + \alpha_1 LINVG_t + \alpha_2 LFDI_t + \alpha_3 LINVP_t + \alpha_4 Ln_t + \varepsilon_t \quad (7)$$

The "L" placed before each variable is its logarithm. GDP is the GDP per capita (constant 2005 US%), FDI_t is the volume of foreign direct investment attracted by Tunisia a time t (constant 2005 US%), $INVP_t$ is the gross fixed capital formation of the private sector as a percentage of GDP (constant 2005 US%), $INVG_t$ is the gross fixed capital formation of the public sector as a percentage of GDP (constant 2005 US%), and n_t the growth rate of the active population.

Considering that foreign direct investment in the equation 7 is an endogenous variable, we can also set an investment equation. Several studies have used econometric models to explain growth and FDI (see, inter alia, Anwar and Nguyen, 2010; Anwar and Sun, 2011; Lee, 2013; Lucas 1993). The authors demonstrate that the FDI may be potentially affected by the economic growth, energy consumption and other variables, namely, gross fixed capital formation, labor force, Trade openness, measured as exports plus imports as a percentage of GDP and real exchange rate. Inspired by these works, we define a function of FDI in Tunisia, where the dependent variable, foreign direct investment, depends on the real GDP, the public investment, the external debt, the degree of economic openness, the inflation and the road transport. Equation 8 is as follows:

$$LFDI_t = \beta_0 + \beta_1 LGDP_{t-1} + \beta_2 LINVG_t + \beta_3 LDEBT_t + \beta_4 LOPEN_t + \beta_5 LINF_t + \beta_6 TRSP_t + \varepsilon_t \quad (8)$$

In equation (8), we have used annual data for the foreign direct investment net inflows (constant 2005 US$) as the endogenous variable. Also, we have introduced as exogenous variables the GDP per capita (constant 2005 US$), the gross fixed capital formation of the public sector (constant 2005 US$), trade openness (% of exports and imports of GDP), inflation rate and road transport (number of kilometers of paved roads). Based on the equations (7) and (8), we define the equation system (system 9) in which the GDP and foreign direct investment are the two endogenous variables.

$$\begin{aligned} LGDP_t &= \alpha_0 + \alpha_1 LINVG_t + \alpha_2 LFDI_t + \alpha_3 LINVP_t + \alpha_4 Ln_t + \varepsilon_t \\ LFDI_t &= \beta_0 + \beta_1 LGDP_{t-1} + \beta_2 LINVG_t + \beta_3 LDEBT_t + \beta_4 LOPEN_t + \beta_5 LINF_t + \beta_6 TRSP_t + \varepsilon_t \end{aligned} \quad (9)$$

Estimation technique

To start the econometric analysis, we must realize, in a first step, the stationarity test which is considered as necessary step to avoid spurious estimations. The Augmented Dickey-Fuller test (ADF), the Phillips-Perron (PP) test and the KPSS test are the usual tests most used to verify the stationarity of different series. In our estimation, we use the Augmented Dickey-Fuller test and the Phillips-Perron test. By using the ADF and PP test, the obtained results of the unit root test (Table 1) show that all variables are non-stationary in levels. But, at first differentiation variables become stationary in first differentiation, so integrated at order 1. Although this technique can evacuate the long-run relationship between the variables, it allows us to avoid spurious regressions.

Table 2: Estimation of GDP and FDI equations

Explanatory variables	Endogenous variables	
	GDP	FDI
Constant	0.364** (0.028)	0.217** (0.046)
D(LGDP-1)	–	0.207*** (0.055)
D(LFDI)	0.241** (0.018)	–
D(LINVG)	0.161*** (0.034)	0.071*** (0.045)
D(LINVP)	0.201** (0.016)	–
D(Ln)	0.113 (0.046)	–
D(LDEBT)	–	-0.034 (0.021)
D(LOPEN)	–	0.066* (0.014)
D(LINF)	–	-0.187*** (0.052)
D(LTRSP)	–	-0.142** (0.042)
R^2	0.742	0.798
R^2 ajusted	0.692	0.706
SCR	0.895	0.882
Durbin -Watson	1.945	1.834

(*), (**), (***) significant at 1%, 5% and 10%.

The estimation of the system (9) may be realized with the method of ordinary least squares. One of the conditions of the OLS estimation is that all explanatory variables are exogenous, that is to say they are not correlated with the error term. If this condition is violated, the OLS estimators become biased and are not converging. To remedy this problem, it is advisable to use the method of instrumental variables of finding a variable that is highly correlated with the endogenous variable source, but that is not correlated to the error term. Only the growth rate of the labor force was seen as a purely exogenous variable. External debt as a percentage of national income has been used as an instrument of public investment for other variables; the lagged values were used as instruments in accordance with the method proposed by Arellano and Bond (1991).

Also, the using of the method of instrumental variables requires that the number of instruments is at least equal to the number of endogenous variables in each equation (Johnston and Dinardo, 1997). The exogenous variables in the strict sense can be used as instruments for themselves. The generalized method of moments (GMM) provides robust estimators since it requires no information on the exact distribution of errors. This method is robust even when heteroscedasticity and autocorrelation are of unknown form. The most estimators are considered as a special case of the generalized method of moments. Therefore, this method appears to be the most appropriate to the use of instrumental variables, and it is chosen for the next estimations.

RESULTS AND RECOMMENDATIONS

The treatment of different impacts of the road transport on the economic growth through the channel of FDI, we study each one of the two equations of the system 9. Starting by the first, we study the contribution of the FDI to improve the Tunisian economic growth and then we discuss the role of road transport as a determinant of the FDI. Table 2 contains the results of the estimation of the system 9.

The results in Table 2 provide good information about the statistic significance and the explanatory power of the model. Regarding the value of the R-square (0.742), we

can say that the model is statistically significant and it may provide considerable information about the relationship between the economic growth in Tunisia as an endogenous variable and the sample of exogenous variables. Also, for the second, where we have the FDI as an endogenous variable, the statistical significance is well confirmed by the value of the R-square (0.798).

In the first column of table 2, we present the different coefficients of the explanatory variables such as private investment *(INVP),* public investment *(INVG)*, foreign direct investment *(FDI)* and active population *(n)*. We find that the coefficients are significant at different thresholds. For the public investment introduced in the estimation as the gross fixed capital formation of the public sector as a percentage of GDP, the growth increase by 0.161% if the public investments increase by 1%. In other words, we can say that if the Tunisian authorities augment the public investments, essentially in the basic infrastructures, the GDP increases and may be more accelerated. Then, we have the impact of the domestic private investment on the growth. Presented as the gross fixed capital formation of the private sector as a percentage of GDP, the private investment may increase positively the economic growth. The results in the table 2 indicate that when the Tunisian private investment enhance by 0.1%, the growth increases by 0.201%, it is significant at 5% level. Similarly, the impact of the population size is positive and statistically significant. The coefficient value of the population reveals that 1% increase in the population raises the growth by around 0.113%.

The impact of the foreign direct investment is confirmed by a coefficient equal to 0.241. The magnitude of 0.241implies that a 1% increase in the volume of FDI increases the economic growth by around 0.241%. So, we can say that the effect of the FDI is positive and significant at 5%. The positive relationship between FDI and growth is largely demonstrated. Nguyen and Nguyen (2007) confirm the existence of a positive causal relationship between growth and FDI. Also, Anwar and Nguyen (2010) argued the two-way linkages between economic growth and FDI in 61 provinces of Vietnam over the period 1996-2005. In 2010, Alfaro et al. have shown that FDI leads to higher additional growth in developed economies. Lee and Chang (2009) reported that FDI has a large direct effect on economic growth and extends the potential gains associated with FDI. For the Tunisian case, the findings are in accordance with those of Driss, (2007); Toumi, (2009) and Karray and Toumi (2007) who try to treat the different determinants of the FDI in Tunisia and to study their influence in the economic development.

In the next step, to discuss the importance of transport to attract the FDI, we treat the importance of roads among the different determinants of the FDI attractiveness. The magnitude of -0.034 and -0.187 implies that a1% increase in external debt and inflation decreases the foreign direct investment by around 0.061% and 0.187% respectively. The negative relationship was treated largely in the development economics. Bruno and Easterly (1998), Anwar and Sun (2011) among others, empirically test the impact of inflation on economic growth and these studies show that inflation hasa negative and significant influence on economic growth subsequently on the foreign direct investment attractiveness. The effect of trade openness on the FDI attractiveness is positive and significant at 5% level. A 1% increase in the trade openness in Tunisia raises the FDI inflows by 0.066%, so we can say that the coefficient is significant at 5% level.

Also, according to the same results we find that the economic growth has a significant impact on the FDI inflows in Tunisia. The magnitude of 0.207 indicates that a 1% increase in the GDP gives an enhancement by around 0.207% in the FDI inflows. The results confirm those of Hsiao and Shen (2003) who argued that economic growth is one of the important factors of the FDI attractiveness, in particular in developing countries. The impact of public investment (INVG) on the endogenous variable appears positive and statistically significant at 5%. A magnitude of 0.071 confirms that each augmentation of the public spending by 1% raises the FDI inflows by 0.071%. The positive relationship may be explained by the needs of multinationals firms to effective infrastructures necessary to a good functioning therefore to the high competitiveness.

In the last step, we have the impact of road transport to the FDI attractiveness. We find in the table 2 that when the total size of the road network in Tunisia increases by 1%, the volume of the FDI inflows may increase by 0.142%. Also, we can say that the territorial attractiveness of the FDI is significantly influenced by the transport infrastructures essentially the roads. The findings are in accordance with those of Saidi and Hammami (2011) who demonstrate the role of transport and logistic in the attractiveness FDI in the developing countries. Several authors. Hrman and Gagné (2011); Yeaple and Golub (2007) among others confirm the important role of transport to attract international investors. Indeed, the impact of roads on territorial attractiveness in Tunisia is very important and they are considered as key factors to promoting Tunisia attractiveness to the foreign investors.

In recent years, Tunisia has worked to obtain transport infrastructures, essentially the roads, in the international standards which are capable to support the investment in all regions of the country, strengthening the competitiveness of existent enterprises and the integration of the national territory. So, transport influences more and more the spatial analysis and the urban and regional planning which allows the determination of economic characteristics of Tunisia. These results confirm those of Maguire et al., (2005); Stilwell and Birkin, (2008); Wilson and Fotheringham, (2008) whose demonstrate the positive role of transport

in the territorial management therefore in the economic growth. The transport infrastructures in general and the roads in particular have an important role to improve the participation of rural regions in the economic activity. These regions may be integrated better in the production process if they are well connected with others region of Tunisia.

Conclusion

The relationship between transport and economic growth has always been subject of study for economists. Traditionally, literature became interested in estimating the contribution of transport infrastructure into economic growth. In developing countries, the realization and maintenance of basic infrastructure and specifically those of transport is regarded as essential factors of economic growth. This idea is largely supported by the authors who emphasize the role of transportation as factor of FDI attractiveness (Erenberg, 1993; Wei, 2000; Zhou, Delios and Yang, 2002).

In other side, the relationship between the foreign direct investment attractiveness and transport has become a very controversial issue that has given rise to much debate and an abundant literature. Some authors tend to think that investments in transport infrastructure promote the entry of FDI in a given country and therefore its economic development. However, this belief is not supported by other authors who would seem to indicate that the effects of such investment on FDI and economic development are low, at least in developed countries and can sometimes even be negative in some areas.

The objective of this study was to evaluate the impact of road transport on economic growth through the FDI channel. To do this, we estimated a simultaneous-equations model by the generalized method of moments. The study concerns the Tunisian case over a period of 40 years (1975 - 2014). The external debt has been used as an instrument of public investment and the lagged values as instruments of other variables.

The results show that for the growth equation, the domestic public and private investment affect significantly the growth at 5%. Concerning the foreign direct investment, the results demonstrate that the growth of Tunisia is mainly influenced by the entry of the multinational firms on the territory. For the equation of the foreign direct investment, we find that the public investment plays a major role to improve the territorial attractiveness of the international investors. Also, the private sector can contribute effectively to stimulate the entry of the multinational firms in Tunisia. Concerning the remaining factors introduced in the estimation, we find that the economic factors affect mainly the FDI and participate in the economic development. The role of transport to attract the foreign direct investment is well confirmed by the obtained results. We find that the transport has a major role to ameliorate the attractiveness power of the Tunisian territory especially of the rural regions. Arriving at this stage, we can say that the transports, the roads in the present case, have an important role to stimulate the economic growth by the main contribution in the attractiveness of the FDI.

REFERENCES

Abdul K, Ilan N (2007). "Foreign Direct Investment and Economic Growth: Empirical Evidence from Sectoral Data in Indonesia," Working Papers 200726, University of Hawaii at Manoa, Department of Economics.

Agénor PR (2009), “Infrastructure Investment and Maintenance Expenditure: Optimal Allocation Rules in a Growing Economy”, J. Pub. Econ. Theor. Assoc. Pub. Econ. Theor. 11(2): 233-250, 04.

Alfaro L, Chanda A, Kalemli-Ozcan S, Sayek S (2010). “Does foreign direct investment promote growth? Exploring the role of financial markets on linkages”, J. Develop. Econ. 912: 242–256.

Anwar S, Sun S (2011). “Financial development, foreign investment and economic growth in Malaysia”, J. Asian Econ. 22: 335–342.

Anwar S, Nguyen LP (2010). “Foreign direct investment and economic growth in Vietnam”, Asia Pacific Bus. Rev. 16: 83–202.

Arellano M, Bond SR (1991). “Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations”. Rev. Econ. Studies 58: 277–97.

Aschauer AD (1989). « Is Public Expenditure Productive ? », J. Monet. Econ. 23(2): 177-200.

Batana YM (2005). “L’analyse des déterminants des flux d’investissements directs étrangers dans les pays de l’UEMOA ”, CREA, 56 p.

Borensztein E, De Gregorio J, Lee J-W (1998). "How does foreign direct investment affect economic growth?1," J. Intl. Econ. Elsevier. 45(1): 115-135.

Borja J (2007). « L’attractivité : les conditions locales de la réussite globale, l’attractivité des territoires regards croisés », Actes des séminaires, Février, Juillet 2007.

Bouinot J (2010). « Les facteurs de choix des localisations : les infrastructures de transport », Cybergeo : European Journal of Geography2010.

Brewer TL (1991). “Foreign Direct Investment in Developing Countries: Pattern, Policies and Prospects”, World Bank Policy Research Working Paper No. 712.

Bruno M, Easterly W (1998). “Inflation crises and long-run growth”, J. Monet. Econ. 41, 3–26.

Chakraborty S, Nandi S (2011). ‘Mainline’ telecommunications infrastructure, levels of development and economic growth: Evidence from a panel of developing countries”, Telecommunications Policy, 35(5): 441-449.

De Gregorio J (1992). "The effects of inflation on economic growth : Lessons from Latin America," Eur. Econ. Rev. Elsevier, 36(2-3): 417-425.

Driss S (2007). «l'attractivité des investissements directs étrangers industriels en Tunisie. », Région et Développement n° 25-2007.

Erenberg SJ (1993). “The real effects of public investment on private investment”. Applied Economics 23: 831 837.

Faouzi B (2004). " Risque pays, IDE et crise financière internationale : Evaluation et étude empirique " Document de Recherche n° 2004-12.

Fernald JG (1999). "Roads to Prosperity? Assessing the Link Between Public Capital and Productivity" The American Econ. Rev. 619-638.

Haughwout AF (2001). “Infrastructure and social welfare in metropolitian America”, Econ. Pol. Rev. 7(3): 43–54.

Hidane A, Bernoussi F, Tiurkmani M (2002). Diagnostic de l'attractivité du Maroc pour les Investissements Directs Etrangers, document de travail no 82, Novembre

Hrman A, Gagné R (2011), “les infrastructures au Québec : évolutions des investissements et impact sur la croissance de la productivité » février 2011.
Hsiao C, Shen Y (2003). “Foreign direct investment and economic growth: the importance of institutions and urbanization”, Econ. Growth. Cultural Change 51: 883–896.
Hellman JS, Geraint J, Daniel KMS (2003). "Measuring Governance, Corruption and State Capture: How Firms and Bureaucrats Shape the Business Environment in Transition Economies," Development and Comp Systems 0308004, EconWPA.
Johnston J, Dinardo JE (1997). Econometric Methods, 4th Edition, McGraw-Hill: New York.
Khanam B (1999). "Contributions of Highway Capital to Output, Cost, and Productivity Growth: Evidence from the Canadian Goods-producing Sector" thèse de doctorat, Université York, Ontario, Canada.
Khandker SR, Koolwal GB (2011). "Estimating the long-term impacts of rural roads : a dynamic panel approach," Policy Research Working Paper Series 5867, The World Bank.
Lamarche T (2003). Territoire: développement exogène, développement endogène et hétéronomie. Forum de la régulation 2003, Université Pierre Mendes France de Grenoble, pp.1-13.
Lee C, Chang C (2009). “FDI, Financial Development, and Economic Growth: International Evidence”, J. Appl. Econ. 12: 249-271.
Lee WJ (2013). “The contribution of foreign direct investment to clean energy use, carbon emissions and economic growth”, Energy Policy 55, 483–489.
Lucas R (1993). “On the determinants of direct foreign investment: Evidence from East and Southeast Asia” World Develop. 21: 391–409.
Maguire DJ, Batty M, Goodchild MF (eds) (2005). “GIS, Spatial Analysis and Modelling”. Redlands: ESRI Press.
Mankiw NG, Romer D, Weil DN (1992). “A Contribution to the Empirics of Economic Growth,” Quarterly J. Econ. 107(2): 407–37.
Morrison C, Schwartz A (1996). “State infrastructure and productive performance”. American Econ. Rev. 86(5): 1095-1112.
Nguyen AN, Nguyen T (2007). “Foreign direct investment in Vietnam: an overview and analysis of the determination of spatial distribution”, Development and polices research center, Working Paper, Hanoi, Vietnam.
SAIDI S, Hammami S (2011). « the role of transport and logistics to attract foreign direct investment in the developping countries », published by IEEE, 12094769, pp 484-489.
Sjoerd B, Roger S, Remco Z (2008). “The impact of horizontal and vertical FDI on host’s country economic growth”, Intl. Bus. Rev. 17: 452–472.
Soltani H, Ochi A (2012). “Foreign Direct Investment and Economic Growth: an approach in terms of cointegration for the case of Tunisia”, J. Appl. Financ. Banking. 2(4): 193- 207.
Stilwell J, Birkin M (2008). “Editorial: The case for ASAP’,Applied Spatial Analysis and Policy” , 1: 1-4
Toumi S (2009). « Facteurs d’attractivité des investissements directs étrangers en Tunisie » L'Actualité économique, vol. 85(2): 209-237.
Wei SJ (2000). “How taxing is corruption on international investors?” Rev. Econ. Stat. 82(1): 1-11.
Wheeler D, Mody A (1992). “International Investment Location Decisions: The Case of US Firms”, J. Intl. Econ. 33(1-2): 57-76
Wilson JP, Fotheringham AS (2008). “The Handbook of Geographical InformationScience” , Oxford: Blackwell.
World Bank (2002) ″World Development Report: Building Institutions for Markets″ Washington, DC.
Yeaple SR, Golub SS (2007). “International Productivity Differences, Infrastructure, and Comparative Advantage” Review of International Economics, 15(2), 223–242, 2007.
Zhang KH (2001). “Does Foreign Direct Investment Promote Economic Growth? Evidence from East Asia and Latin America”, Contemp. Econ. Pol. 19(2): 175 -185.
Zhou C, Delios A, Yang JY (2002). Locational Determinants of Japanese Foreign Direct Investment in China, Asia Pacific J. Manage. 19: 63–86, 2002.
Zouhour K, Sofiane T (2007). « Investissement Direct Étranger et Attractivité Appréciation et enjeux pour la Tunisie », Revue d’Économie Régionale and Urbaine 2007/3 (Octobre): 479-501. DOI 10.3917/reru.073.0479.