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Transport Infrastructure Development and Economic Growth: Evidence from Tunisia

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Abstract: ***The investment in the transport infrastructure is a new political orientation for the firming up of economic conjuncture. This article aims at examining in depth the relationship between the investment in transport infrastructure and the economic growth in Tunisia during the period 1990-2015. Based on a model VECM, we allow ourselves to value the relevance of the model and to interpret it economically through the individual coefficients of the model at the 5% threshold. The estimate results show that the added value of the transport sector influences positively and significantly the growth of the GDP per capita in Tunisia. Our results cast a new dimension to the importance of investing in the transport infrastructure as a promising device to generate a higher economic growth.***

Keywords: transport infrastracture, economic conjuncture, relationship, VECM, economic growth

Jel classification: D23, O11, R11, R42

1. Introduction

The improvement of the population living standard as wellas the guarantee of the society well being ultimate objectives of powers are public. Whatever the policy followed, these targets cannot be reached without a supported and lasting economic growth.

Economic growth is synonymous with the production of property and services, the creation of jobs and treasures. It assures, when it is exploited well, on the economic, social and human prosperity. Growth is a necessary but not sufficient condition to assure the good to be social.

According to Adam Smith, (1776), economic growth is a subject which did not cease preoccupying the economists and the public decision-makers, as well as the possibility of transporting property and access to new markets.

To attain a level of satisfactory development, the State must bet on the improvement of the transport system. This improvement can be only advantageous, in the sense that it contributes among others to the increase of the working market size the improvement of the production processes and it gives a reliable accessibility and reinforces links at the city-countryside.

The transport act as an essential role in the economic and commercial development of countries and, participates, in the well being of their population.

Today, Tunisia, as all other developing countries, must put forward the question the transport performances systems to reduce considerably unemployment, poverty and to speed up its economic growth.

The transport sector in Tunisia represents 7% GDP. It accomplished a 3% growth rate between 2012 and 2015 and it employs 140.000 persons, among wfom 40.000 are in the private sector, which suffers from several difficulties, such as the big plans realisation delay and the financing of the necessary equipments for its development and for the improvement of its services quality.

In spite of plans identified for several years, the development of this sector remains handicapped by insufficient and obsolete infrastructure, insufficient capacity to absorb funds and a deficient governance.

The development of the sector infrastrucutre remains however a major social stake of territories readjustment and of the inside regions of opening up .

In addition, the transport system suffers from growing imbalances: Tunisia Is badly linked up with its neighbouring countries, the building of road and rail way links with Algeria and Libya has been delayed, penalising trade between the Maghreb countries.

Some infrastructures, notably in the maritime and rail way sectors, introduce problems of efficiency and capacity and need to be urgently updated because of the equipment dilapidation. Beyond physical infrastructure, other links pose problem especially the insufficiency of adapted services of transport and the existence of strangling necks in the logistical chains.

Facing this situation, it is urgent to find necessary means to improve the transport infrastructures contribution in economic growth.

The main problem in Tunisia which holds the attention of the development economists is investments. The challenges of the transport sector demonstrate that without strong investments to give our countries a system of sure, efficient and reliable transport, we will always have disability to get time savings of course, the goods mobility by encouraging

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export and importation which will allow our country a stable growth.

The investment is therefore the main means, because it is considered to be the fundamental source of the infrastructure improvement.

Thus, it is important to measure the investment impact in transport infrastructures on the economic activity, that is why our study carries on topic « Analysis of the investment impact in the transport infrastructure on the economic growth in Tunisia ».

In the present situation of investments promotion in the key development sectors, and in the reflexion extension relating to the factors of growth within economy in development.

This study aims at answering the following fundamental question: Does investment in transport infrastructure really ensure economic growth?

Before the installation of new plans, it is necessary to think of the correlation of infrastructure about economic growth and to analyse what was made in the country.

The objective of this article is to determine with the aid of empirical step, the contribution of the transport infrastructure in economic growth in Tunisia.

This paper is divided into two parts. The first one is a review of the literature of the oretical link between infrastructure of transport and economic growth. The second is an econometric analysis of relation between the investment in the transport infrastructure and economic growth in Tunisia during the period 1990-2015.

Data are extracted from World Bank (WB) and from the National Institute of Statistics (NIS).

2. A Brief Literature Review

There is an hypothesis that investments in the transport infrastructure have a positive impact on economy and that economic growth also imposes needs for an additional development of infrastucture.

The examination of literature shows that important studies tried to determine the relation between infrastructure and growth, notably between investments in transport infrastructure and economic growth.

The analysis of this relation is ancient and the presentation which made Adam Smith, (1776), lost nothing of its actuality. It is based on relation: Infrastructure → Transport → Exchange → Growth. An improvement of the transport infrastructure is first going to improve the transport service. To improve means to lower costs or to augment speed, or else to reduce delays. This improvement of the transport characteristics is going to favour exchanges in its turn. It is going to reduce distance and quasi monopolies which create the immobility of goods, that is to say to return the possible of exchanges which were not. There is not exchange without transport. More of transport (in the sense of more efficient, quicker, less expensive transport) is more exchange. They find here the well-known problems of the impact of exchanges on growth. Adam Smith had already pointed the essential mechanisms. Exchange allows the specialisation which draws away in its turn the savings of ladders and the comparative advantages, lowering production costs. Exchange intensifies competition, eliminates annuities and stimulates innovation. Exchange procreates growth. An improvement of the transport will procreate an enhancement of exchanges and the growth which goes with. Symmetrically, a deterioration of the transport (increase of costs, reduction of performances) will draw away a reduction of exchanges and of the growth which goes with.

The transport infrastructure remains an inevitable element, at all levels, to give to our States chances to develop. As underlined by Robin Carruthers and R Ranja Krishmani, (2008), to sum up the contribution of infrastructure : « Roads, bridges, lines of rail ways, harbours and airports give economic and social advantages by linking up firms with the international and regional markets and by allowing to the individuals to achieve the water, the fuel, schools, medical services, jobs and parents. Without a reliable goods transport and at competitive costs using robust infrastructure, nations have not enough chances to exchange their goods on the best conditions. If the farmers cannot transport their products of their rural zone isolated in the market, they will be unable to go out of an agriculture of subsistence.

If they cannot transport their children to the school and to the health centre, the following generation will not come better. The transport is necessary to the functioning of markets. »

There are other approaches allowing to model transport as determiners of economic growth.

The first one, and the most controversial, is the theory of the direct investments initiated by Aschauer, (1989). This theory considers simply investments in transport to be a factor of production next to job and too capital.

Aschauer, (1989), using temporal aggregated data relating to the United States of 1949-1985, finds a strong elasticity in 0.39 of the public capital, however an elasticity in comparison with basic infrastructure which includes roads, common transport, airports, is 0.24.

In the second approach, which is an extension of the first one, the model of endogenous growth (Barro, 1990), takes back in its account the basic idea of Aschauer according to which the improvement of road infrastructure is translated by the improvement of the efficiency of firms. This approach by the models of endogenous growth can so serve for measuring the part of the growth of the productiveness attributable to the investments in transport infrastructure.

Eberts, R.W, (1990), chooses as example the investments in transport infrastructure.

In the context of a more classical analysis of a road plan or of common transport means to gether, they would determine

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that, to assess investment, measure in which plan improves accessand augments mobility. This approach would ask that they concentrate on the evolution of the state of infrastructure rather than on the way its improvement could influence the production of economy. The use of a more general method of calculation of the investment value would consist in determining if the improvement of access and most high efficiency would have an influence on jobs which would be preserved where created, how the improvement of mobility would increase the access of the employers to the workforce and if the investment would lead to sites likely to be exploited.

Jean-Marc Offner, (1993), thinks that the structural effects of infrastructure do not exist, but would be recovering from a political myth, which reinforces the vision of the political decision-makers and of a scientific mystification on behalf of the economists founded on a mixture of néo-keynésianisme benevolent, what confers on the transport infrastructure (roads or rail way net works) a role of engine of growth.

Following Offner, Burmeister and Colletis Wahl, (1997), think that the analyses of economy of transport would in by determinism, and the idea according to which infrastructure could be an engine of development, would be invalidated by observation of facts and scientific demonstrations.

Veganzones, (2000), on a panel of 87 countries of which 25 developing countries of sub-Saharan Africa, find a positive impact of the public investment in road infrastructure and economic growth.

According to Eberts, (2000), the key issue is that to know if, in the margin, an additional investment in infrastructure contributes to economic growth. In the opinion of the decision-makers, this growth has several possible exits, among which the growth of job and of income, improvement of the quality of life, protection of the environment, even, sustainable development. This multidimensional conception of economic development makes an analysis of the investment in infrastructure by taking in to account many factors.

Limao and Venable, (2001), showed that if the infrastructure of a country improves, it can result from an increase of its volume of exchanges, that is 2005 km equivalence in comparison with all business partners. Countries enclosed as those who are not from sub-Saharan Africa would win together, if they develop their transport and communication infrastructure.

The investment in transport infrastructure can have effects on growth. These effects can materialise under various forms, the infrastructure can notably make easier exchanges and division of labour, stimulate competition on markets, favour a more efficient sharing out of economic activities between regions and country, contribute to the broad casting of technologies and to the adoption of new organizational practices, or else give the access to new resources.

The increase of the inner product coming from the strengthening of productiveness constitutes the principal of advantages generated by transport.

The transport infrastructure includes various elements necessary for the functioning of economy, it allows among others the circulation of the individuals and the goods.

François Plassard, (2003), underlines in his work Transport and territory : « This thirst for mobility, this need to goal ways towards one else where undoubtedly better, which is found in all societies, pushed the men to imagine continuously new means of transport which allow them to go more quickly and therefore faster ».

Go more quickly and faster, it is precisely what allows the infrastructure of transport by making the mobility of the men and the goods easier.

- The increase of the mobility of the persons goes hand in hand with an increase of the job productiveness.
- The increase of the volume of goods transport goes also hand in hand with an increase of the job productiveness.

There are other authors, across their studies, who tried to determine the contribution of the investment in infrastructure of transport on economic growth.

Esfahani, H, S., and Ramirez, M, T., (2003), develop a model with simultaneous equations to analyz the reciprocal effects of infrastructure on growth. Their results show a substantial contribution of infrastructure in the GDP exceeding costs linked to the hired investments.

Another study of Shirley and Winston, (2004), finds empirically that expenses in road infrastructure are negatively linked up with the levels of inventories of the supplies of firms. So, the authors confirm the fact that, better transport infrastructure (the road net work) allow to the firms to reducethe size of their supplies, and there abouts, to reduce their costs of stocking.

Herrerias, M. J, (2010), makes a study on the transport infrastructure in China. It is about a multidimensional approach tested on data of panel between 1946-2004. Results confirm a significant impact of the expenses of infrastructure on the long-term economic growth.

Keho and Echui (2011), find that there is no effect between infrastructure of transport and economic growth in case of the Ivory Coast, but there is a relation of direct causality between expenses in infrastructure of transport and economic growth. According to the authors, the absence of correlation between these two variables can be explained by the bad conditions of the transport infrastructure.

Banerjee, A., Duflo. E., and Qian, N., (2012), lead a regional analysis on China, by using as instrument out distances them in the shortest way between the big Chinese cities. They also find a substantial impact of the transport infrastructure on growth : an increase of 10% of distance in network would cause a reduction of the growth of the per capita in come from 1 to 3%.

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The study of Achour, H., and Belloumi, M., (2015), examines causative relations between the infrastructure of transport (rail and road), the value of transport, the raw training of capital, the power consumption of transport and transport CO2 emissions in Tunisia over period 1971-2012. They used the approach of multivarious cointegration of Johansen, the functions of impulsionnelle generalised answer and the technique of variance decomposition to examine the effect of the transport infrastructure on economic growth and environment. Results show the existence of a long-term unidirectional causality between the value of transport, of transport power consumption, transport CO2 emissions and of raw training of capital with the transportinfrastructure (rail and road). These results are very important in the choice of decisions of the government policy.

Palakiyèm Kpemoua, (2016), makes a study to assess in which measure the transport infrastructure constitutes a factor of economic growth in Togo and to have links of causality between these infrastructures and the economic growth covering the period 1980-2015. Empirical results reveal a long-term positive correlation between the transport infrastructure and economic growth and the existence of causality of infrastructure in economic growth.

Xiushan Jiang, Xiang He, Leus Zhang, Huanhuan Qin, Fengru Shao (2016), offers a model of structural equation (SEM) to consider exhaustively bidirectionnelle relation between investments of multimodal transport and economic development. An empirical analysis based on group of panel data at regional level of China from 1986-2011 is led. Results show that investments in the transport have repercussions on economic growth at regional level, but differ at national level and at provincial level.

Saidi, S., Hammami, S., (2017), makes an article to study causative relations between transport of goods, economic growth and deterioration of environment for 75 countries over period 2000-2014. On the basis of the countries income level, they divided the total panel into three sub-panels; to know groups with high income, with mean income and with weak income. The differentiation between panels allows to use models of data of dynamic panel in simultaneous equations estimated by the method of generalised instants. Main results note the existence of an effect of feedback between incomes and transport. For the panel of high incomes, there is a bidirectionnelle causality between deterioration of environment and economic growth. Results give the same results for panels to weak and mean incomes where they determined a deterioration of environment mainly affected by economic growth and transport of goods while in inverse sense the effect is weak and statistically insignificant.

These empirical data support strongly the relation of coupling between economic growth and transport of goods, but reject retrospective effect between deterioration of environment and economic growth for countries to weak and mean income.

The existent literature as well as empirical studies show the existence of a link between the investment in the transport infrastructure and economic growth.

These studies prove the preponderant role which investments have to play in transport infrastructure for the realisation of objectives fixed by a country.

Not very expensive and sure, quick transport was always the foundation on which countries built their development and their prosperity.

The availability of means allowing to circulate the persons and goods easily and economically needs today another explanation that visits the economic advantage which some States, notably Tunisia enjoy.
An empirical application concerning the case of Tunisia is then offered.

3. Methodology

Econometric step consists in representing with the aid of equations, behaviour of a noticed phenomenon and in estimating the coefficients of equations by using the history of phenomenon and this with the intention of in cluding it, explaining it, producing it and envisaging it.

The theoretical review is in favour of a positive contribution of the investment in the transport infrastructure in economic growth.

However scientific examination requests an econometric modelling. This approach introduces several advantages among which the recognition of the dynamic impact of the added value of the transport sector on the growth of the GDP per capita in Tunisia.

Data are drawn of WB and INS. This relation by an econometric software Eviews8 is going to be estimated. This part is divided into two under titles, first door on the specification of the model, while the second represents method of estimate and ultimate results.

3.1 Specification of the model

In this part we are going to introduce our sample, the sources of data, our variables and our basic model.

Empirical synthesis consists in supporting some variables likely to explain the GDP per capita as approximation of economic growth in Tunisia which gives an idea of the clean characteristics of their economy.

Among these determiners, we choose the Gross Enrolment Ratio Secondary as both sexes, Gross Fixed Capital Formation and the Added Value of the Transport sector as proxy of the investment in the transport infrastructure.

The unavailability of data is an obstacle which delimits generally the number of variables that can explain properly the growth of the GDP per capita in Tunisia.

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Because of problem of data limitation, the sample which we could construct has a size of 26 observations dating from 1990-2015.

These data are then compiled in a file Excel that we will treat for a an econometric software Eviews8. The WB and the NIS constitute our main sources.

The basic model will be written under its following econometric specification:

$$LGDPCt = \beta 0 + \beta 1 LEDUt + \beta 2 GFCFt + \beta 3 LAVTt + \varepsilon t \quad (1)$$

Where LGDOCT, LEDUt, LGFCFT and LAVTt indicate respectively logarithm of the GDP per Capita, of Education, Gross Fixed Capital Formation and the Added Value of the Transport sector, εt : represents the term of error and *t* : represents the horizon temporal of variables.

3.1.1. Definition of variables

- GDP per capita (constant 2010) : is used as indicator of economic growth. GDP per Capita is gross domestic product divided by mid year population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.
- Education: represent the Gross Enrolment Ratio Secondary as both sexes (%), corresponds to total of inscriptions in secondary education, independently of age, expressed in percentage of the population in age to follow an official secondary education.
- Gross Fixed Capital Formation (constant 2010) formerly Gross Domestic Fixed Investment : as proxy of the supply of capital. It includes land improvements (fences, ditches, drains, and so on), plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA (the system of national accounts), net acquisitions of valuables are also considered capital formation.
- Added Value of the Transport sector (at price of the previous year) : the proxy of the investment in the transport infrastructure. It is about a flux and not stocks of infrastructure.

3.2 Method of estimation and interpretation of results

Econometric allows us to test the validity of our analysis and to prove the significance of our model. We will use the recent developments of the econometrics of the temporal series to analyz the relations of causality between the GDP per Capita, the Gross Enrolment Ratio Secondary as both sexes, Gross Fixed Capital Formation and the Added Value of the Transport sector in Tunisia. This approach will be made in four stages : test of stationarity of variables (ADF), determination among delays p of the model VAR (p), test of cointegration of Johansen and estimation of the vectorial model with correction of error " VECM ".

3.2.1. Test of stationarity of variables (Test of Augmented Dickey Fuller)

The tests of unit root allow to identify the presence of unit root in a series. A chronological series is stationary if it includes neither tendency nor saisonnalité.

The used test of stationarity is that of Augmented Dickey Fuller (ADF) with following hypotheses:

$$\begin{cases} H0: \text{presence of unit root (not stationary series)} \\ H1: \text{absence of unit root (stationary series)} \end{cases}$$

- Rule of decision

One test hypothesis H0 : $\phi = 0$ agains thypothesis H1: $\phi = 1$. We reject the null hypothesis when calculated statistical value is less than the tabulée value of Mackinnon, 1991, (series is stationary) or when likelihood are less than 5 %. We use the technology of unit root (Unit Root Test) of ADF (1981) to examine this stationarity by performing regression on stationarity in level and in first difference. This test allows to determine order of différentiation of a series, it is based on estimation by the slightest squares of the three following models :

1) Without tendency but with constant

$$\Delta xt = (p-1)xt\_1 + j = 2\ \varphi j \Delta xt\_\ j + 1 + \gamma\ + \varepsilon t \quad (2)$$

2) With tendency and with constant

$$\Delta xt = (p-1)xt\_1 + j = 2\ \varphi j \Delta xt\_\ j + 1 + \gamma + \beta t + \varepsilon t \quad (3)$$

3) Without tendency and without constant

$$\Delta xt = (p-1)xt_1 + j = 2\ \varphi j \Delta xt\_ j + 1\ + \varepsilon t \quad (4)$$

By referring to tabulated values performed by the test of ADF, we led to the following results (at the beginning of 5 %) which are represented in the table below.

Table 1: Results of Test of ADF

Variables	Order of Integration	Level of confidence	Type of model	Prob	T- statistic ADF	Critical Values	Observations
LGDPC	I(0)	5%	(1)	0.6215	-1.281967	-2.986225	Not stationary
LGDPC	I(1)	5%	(1)	0.0044	-4.095710	-2.991878	Stationary
LEDU	I(0)	5%	(2)	0.9984	0.457181	-3.603202	Not stationary
LEDU	I(1)	5%	(2)	0.0100	-4.392354	-3.612199	Stationary
LGFCF	I(0)	5%	(1)	0.7705	-0.902333	-2.986225	Not stationary
LGFCF	I(1)	5%	(1)	0.0078	-3.847296	-2.991878	Stationary
LAVT	I(0)	5%	(1)	0.8260	0.711870	-2.986225	Not stationary
LAVT	I(1)	5%	(1)	0.0018	-4.468270	-2.991878	Stationary

Source : Using Eviews8
I(0) : Integrated in Level
I(1) : Integrated in first difference

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The results of the test of unit root ADF show that variables GDPC, EDU, GFCF and AVT are stationary in first difference.

GDPC, EDU, GFCF and AVT ~ I (1) (1)

The results of our stationarity test, show us that the variables of our model are integrated of the same order. Therefore a risk of cointegration exists. It is possible to envisage the estimate of a model VECM. In order to do that, they begin by determining the number of delay p of the model VAR (p).

3.2.2 Determination the numberof delay p of the model VAR (p)

To perform our estimate, we need to cause the number of delay to introduce it. There are several criteria of information to know Akaike Information Criterion (AIC) and Schwarz Criterion (SC). It aims at minimizing the logarithm of the variance of residues by taking into account an additional penalty based on the model size. To choose well the most pertinent criterion which optimises the model, we are going to perform tests in order 1 VAR (1), in order 2 VAR (2), in order 3 VAR (3) and in order 4 VAR (4).

Table 2: The following table summarizes the main results

The order of the VAR	1	2	3	4
AIC	-16.85011	-16.61858	-17.25764	-18.83641
SC	-15.27501	-14.85150	-14.69044	-15.46409

Source : Using Eviews8

With a value of-18. 83641 for criterion AIC and value of-15. 46409 for criterion SC, estimate of our model by including four delays. We will sum up while both criteria lead us to keep a process VAR (4). To prove the existence of cointegration between variables, it is necessary to carry out the test of cointegration of Johansen.

3.2.3. Test of cointegration of Johansen

As writings it Bourbonnais (2003), the analysis of cointegration allows to identify true relation apparently between two (or several) variables by searching the existence of a vector of cointegration and by eliminating its effect if necessary. The test of cointegration is made either by the approach of Engel and Granger (1987), or by the approach of Johansen (1988). The approach of Johansen consists of a test of cointegration based on the analysis of five models to which refere abulated values by Johansen.

The approach of Johansen allows by the method of maximum of likelihood to test the existence of a relation of long term in the temporal series and to get all vectors of cointegration in a multivarious frame.

The principle of the test of Johannsen is based on the comparison of the ration of likelihood LR with critical value CV.

- If LR = CV H0 is accepted and they consider cointegrated variables.
- If LR ≠ CV H1 is accepted That is variables are not cointegrated

The rule of decision is the following : If the value of statistics TR there am less than its critical value, then null hypothesis is accepted and is a relation of cointegration between variables.

$$\begin{cases} H0: \text{A relation of cointegration exists} \\ H1: \text{A relation of cointegration does notexist} \end{cases}$$

The test of cointegration of Johansen uses two statistics : the statistics of the trace and that the maximum eigenvalue. Distribution asymptotiques this statistics is not standard. Eviews8 software will give directly the results of the test number relations of cointegration of Johansen.

Table 3: Results of the test of the trace on variables

Null Hypothesis	Eigenvalue	Statistical Traces	Critical Value (5%)
No *	0.731641	62.77115	54.07904
At most 1	0.432888	31.20080	35.19275
At most 2	0.356084	17.58804	20.26184
At most 3	0.253716	7.023569	9.164546

Source : Using Eviews8

Table 4: Results of the test of the maximum eigenvalue

Null Hyphotesis	Eigenvalue	Statistical of the maximum Eigenvalue	Critical Value (5%)
No*	0.731641	31.57035	28.58808
At most 1	0.432888	13.61276	22.29962
At most 2	0.356084	10.56447	15.89210
At most 3	0.0253716	7.023569	9.164546

Source: Using Eviews8
* Mean rejection hypothesis in 5 %.

Table 5 : Normalised coefficients of cointegration

LGDPC	LEDU	LGFCF	LAVT	C
1.000000	-0.615265 (0.08169)	0.918367 (0.17651)	-0.022668 (0.05581)	-8.328890 (0.71016)

Source : Using Eviews8
The observation of the results of the test of trace on variables shows that to (No), the calculated statistical trace is superior to critical value : the null hypothesis Ho of cointegration to 5 % is rejected. On the contrary, they accept the null hypothesis according to which the statistics of the trace are less than critical value at the threshold of 5% (31.20080 < 35.19275).

There are therefore three relations of cointegration meanime of confidence of 5 % of the likelihood test. The test of maximum eigenvalue onfirms well this choice.

Normalised relation is:
LGDPC=0.6 LEDU-0.9 LGFCF+0.02 LAVT+8.32 (5)

In other words, an increase in 1 % GDP per capita would procreate in the long term in Tunisia an increase of 0. 6 % of education and of 0. 02 % added values of the transport sector and a reduction of 0. 9 % of GFCF.

An increase of the growth of the GDP in Tunisia contributes to the investments increase in the transport infrastructure and to the education improvement.

From this point of view, the more there is it infrastructure of transport, the more there is growth.

What is therefore advantageous for Tunisia is to invest in useful infrastructure of transport in growth, pertinent with

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needs, and pre-schedule in comparison with integration in worldwide economy. This triad must be a priority for the public decision-makers all the more, as Tunisia is a country which has a very good geographical position : heart of the Arab world, heart of the Mediterranean, close to big European cities and at the head of Africa, what reinforces the opening of its economy. It is therefore opened on the whole world culturally and economically.

Theoretical point of view, this result is in the descendants of jobs of Adam Smith, (1776), of François Plassard, (2003), and of Robin Carruthers and R Ranja Krishmani, (2008), which advocate the positive role of the contribution of investments in the transport infrastructure in economic growth.

3.2.4. Estimation of the Vectorial Model with Correction of Error (VECM)

The use of a model with correction of error in the case of cointegration allows to get more reliable predictions. The objective of the model with correction of error is on one hand to eliminate the effects of the cointegration vectors and on the other part to search real link between variables (Bourbonnais, R., Terraza, M, on 2016).

The model with correction of error is a particular form of the autoregressive models with delay spread out (ARDL).

It can be interpreted in this respect as a model of adjustment. Following the example of the model of adjustment, the coefficient of the term of error is pertinent only when it is significant and including between -1 and 0.

The estimation of the error correction model is given in the following Table 6:

Table 6: Result of the estimate of the vectorial model with correction

Correction of errors	D(LGDPC)
CointEq1	-0.069455
D(LGDPC(-1))	-0.293803
D(LEDU(-1))	-0.116647
D(GFCF(-1))	0.128963
D(LAVT(-1))	-0.000787

Source : Using Eviews8

Empirical point of view, model with correction of error is validated, that if these coefficients must be significantly negative and different from zero.

Coefficients with correction of error are statistically significant and sense signs waited except the gross fixed capital formation.

What interests us in fact in this estimate is to express the growth of the GDP per capita according to other model variables. Results point out that the GDP per capita depends positively on its passed rate, what is explained by the upward trend of Tunisian growth. On the other hand, they note that the GDP per capita notably depends on education and on added value of the transport sector because the values associated with the variables are significant.

Besides, they point out that the dynamics of the growth of the GDP per capita in Tunisia cannot be explained by GFCF (do not speed the GDP up) because it is not significant, even though GFCF is an indicator allowing to measure the investment, at least nearly, of course very often used by the economists to assess the good health of an economy. Also GFCF who increases first let's think that growth is going to be quick. This indicator would have therefore to be good quality and to measure correctly the effort of investment of a country.

Economic point of view, estimates point out that the transport infrastructure has a long term positive and significant impact on the GDP per capita. The added value of the transport sector has a long term allowable elasticity.
The politics of investment in infrastructure of transport was not neutral with regard to economic growth just as it envisages economic theory.

This result is explained due to the fact that the Tunisian State allocates an important financial allocation in investment for the sector of transport.

This allows the acquisition of fixed and mobile infrastructure which reinforce the consistency and the status of infrastructure and mobility of the persons and goods.

What confirms at the same time the hypothesis according to which the added value of the transport sector influences the growth of the GDP per capita.

The development of plans of infrastructure of transport competes to the widening of markets, allowing so the creation of economies of scale. In a primordial way, investments in infrastructure of transport allow the broadcasting of economic growth and make trade easier by reinforcing export and importation.

4. Conclusion

The investment in the transport infrastructure is important for the economy as that undamaged infrastructure of functioning is obviously a necessary condition for economic activity.

Transport and infrastructure of transport play a key role. The objective of this study is to show the impact of the sector transport on economic growth by appeal in two types of analyses : theoretical analysis and econometric analysis.

The theoretical analysis shows that the contribution of the investment in transport infrastructure on the economic growth is very remarkable.

The econometric analysis of the impact of the sector transport in term of added value in the economic growth of Tunisia is also based by an estimate of a model VECM where the GDP per capita (dependent variable) was in touch with education, gross fixed capital formation and added value of the transport sector during period 1990-2015.

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Estimate produced results which allowed to judge the adequacy of the whole model and the statistical and economic significance of individual coefficients in 5 %.

The estimate of the equation of the GDP per capita showed that the added value of the transport sector influences the GDP per capita positively and significantly. Indeed, Prob < 0.05 what allows to reject no hypothesis and confirms at the same time the hypothesis according to which the added value of the transport sector contributes to economic growth.

So, taken into account results between GDP per capita, education, gross fixed capital formation and added value of the transport sector, infrastructure should be in the centre of the development policy of the Government.

To improve the competitiveness of the Tunisian economy, infrastructure, inevitable factor of economic and social development, should be available in quantity, in quality and at an optimum cost.

Main recommendations which appear therefore at the end of this study are:

- The improvement of fixed and mobile infrastructure across the service of a budget mattering for these infrastructure. In addition the government has to make sure that the financial allocation could be used in a judicious way according to request to avoid wasting.
- The promotion of the liberalisation of the transport sector. It will allow the institution of the private sector. Any thing which will allow to reinforce this sector and by domino effect improve the growth of the GDP.
- The installation of an economy of modal adjournment. That is to say to use the resources of the sector which contribute mostly to the growth of the GDP to develop others under branches of the sector.
- Conceive and update regularly statistical databases on infrastructure both at physical level and in monetary level.
- Resolutions of identified problems and entrance of Tunisia in the green and clever transport.

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