The Contribution of the Education Sector to Economic Growth: Empirical Analysis from Tunisia

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Abstract

This article estimates the performance of the educational sector using the test of the university massification for the Tunisian case. By adopting the VAR methodology, and based on data of the higher education for the 1971-2015 period, we try to econometrically analyze the impact of the shocks of the various variables of education on GDP per head.

In light of the obtained results, we notice that it is difficult to determine the effective contribution of the educational sector to economic growth. In fact, in a context of higher education massification and the employment crisis, some doubt has arisen about the value of diplomas, and hence about the skills they certify. This uncertainty makes graduates' employability very difficult. For this reason, we believe it is important to develop various forms of university-industry collaboration in order to reduce this uncertainty and promote an effective transfer of economically useful knowledge to the productive sectors of the economy, which stimulates economic growth.

Keywords: Educational policy, Human Capital, University massification, Economic Growth, VAR model.

JEL. Classification : H52 ; I20 ; I21 ; I28

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Introduction

Tunisia, which is a small country by its surface area and natural resources, relied shortly after its independence in 1956 on education as a vector of development, which should, on the one hand, facilitate access to culture and professional competence and, on the other hand, homogenize the society both by spreading knowledge and reducing economic inequalities linked to knowledge. In fact, education during the First Republic was a mass education that met the requirements of the time, such as the country's economic and social development.

The generalization of the education in Tunisia was implemented thanks to the resources devoted to it. In 1960, the part of the gross domestic product dedicated to education was estimated at between 2 and 3 %, then, it significantly increased to reach more than 6 % in 1975, 7 % in 1990 and 4.7 % in 2015. The school attendance rate at the age of 18 (including apprentices) which was 42 % in 1962, rose to 61 % in 1975, then to 75 % in 2005, and ultimately to 81 % in 2015. Finally, this policy of education generalization led to a positive result: the literacy rate of the 15-24-year-old people today is more than 96 %, according to the UNICEF. All these results are the fruit of an adaptation voluntary policy of the Tunisian educational system since its independence, which placed Tunisia at the top of the countries of the Maghreb.

However, Tunisia remains confronted today with important challenges such as the efforts to improve basic education, fight against school dropout, combat illiteracy mainly in the country side, promote women's education, improve the level of qualification of the young graduates who intend to join the labor market and develop the sectors that are vital for the country (ICT in particular). All this consists in adapting school training to the needs of companies, which helps reduce unemployment by creating more jobs for all the young people who join the labor market every year. In a context of integration in the global economy, the reforms of the Tunisian educational system have triggered a set of global reforms which helped the country to improve its competitiveness.

The paper is organized into six sections. The first section introduces the framework of the study. Then, prior studies are summarized in section 2. After that, the data and the methodology are dealt with in section 3. Section 4 presents the empirical analysis and the main achieved results. Finally, section 5 concludes the paper.

In fact, underemployment and the ill-use of the available human potential are the real problems that several emerging countries, such as Tunisia, are facing to accelerate their economic growth. On the theoretical level, since the studies of Schultz T. (1961) and Becker G. (1964), the human resources have always been considered as a factor of production. Even recently, in a context of perfect

mobility of financial capital, Barro R. J., Mankiw N. G**.** and Sala-I-Martin X. (1995) have considered the human resources as the central variable explaining the macroeconomic evolution. They put forward the human capital as a panacea capable of reducing unemployment and the disparities of income in addition to the improvement of productivity and economic growth.

Related work

For his part, Pritchett (2001) and Idenyi, O. S. & Ogbanna, O. S. (2016) examined whether there is a relationship between human capital and economic growth, however, he concluded that this relationship is negative if not non-existent. Based on this observation, educational economists, such as (Barro (2001), Brosworth & Collins (2003), Ciccone & Papaioannou (2005), Altinok N. (2014)), have oriented their research in their analyses towards the importance of the quality of educational systems. In fact, the indicators of the education quality confirmed the positive role of human capital in the process of economic growth.

In this work, the focus is on the quality of the educational system and its effect on the education-economic growth relationship. In fact, all government efforts to promote investment in education should enable graduates to enter the labour market and thus work for the individual and the collective interest, which can be beneficial for labour productivity (Becker (1964)) and for the optimization of the technical efficiency within the enterprises. However, it can be seen that the integration of young graduates into the labour market is not automatic in Tunisia. Actually, it is a tough obstacle or a real problem that deserves to be underlined, as it has long been obvious that diplomas in themselves are supposed to protect them against unemployment and make them a valuable asset, which helps them become senior managers.

The graduates' access to employment has become one of the criteria of university evaluation. In fact the university role is no longer restricted to the production and the diffusion of knowledge and learning, but it currently extends to the vocational training. Although this mission is traditionally a part of the vocation of some courses, such as medicine and law, it is still recent for the non-specialized courses.

However, the difficulties that young people face in having access to the labor market raises questions about the capacity of the educational system to prepare them for the active life. The problem of the university degrees is then the uncertainty about their quality linked to the heterogeneity of the conditions of obtaining them rather than to their number and diffusion in a given generation. This quality can be improved by strengthening students' tutoring, significantly increasing the number of the studying hours, clarifying the educational and intellectual expectations,

rationalizing the modes of evaluation … In fact, there are so many measures that can be taken to reduce the gap between the university education and the other economic sectors in Tunisia.

The public sector remains the main supplier of education, notably the basic level. However, the financing of education in Tunisia is as limited as the public resources. Yet, several research studies which have been published since the 1960s (Denson (1962), Schultz (1961) and Becker (1962)), in the eighties, (Landau (1986; 1983)) or even of the two-thousands (Altinok N. (2014), Hanushek E. A. & Woessmann L. (2007, 2008), Baldacci, E., Clements, B., Gupta, S., & Cui, Q. (2008), Mekdad, Y., Dahmani, A., & Louaj, M. (2014), Mercan, M., & Sezer, S. (2014) and Owusu-Nantwi, V. (2015)) showed that the educational public spending is an indicator of the quality of the educational systems, which can improve the economic growth of a country.

Methodology

The VAR (Vector Auto Regressive) model enables to capture the interdependences between several temporal series. In fact the variables are symmetrically treated in a way that each of them is explained by its own past values as well as by those of the other variables. We suppose that all these variables are stationary and *a priori* endogenous. Besides, the model has no theoretical foundation, therefore**,** it is required to determine the number of delays to be considered.

By using the VAR model particularly, we seek to verify the following hypotheses:

Hypothesis 1 (H_1): The Tunisian educational sector is successful and affects economic growth.

Hypothesis 2 (H_2): There is no positive effect of the educational sector on economic growth in Tunisia.

In fact, the VAR methodology offers the possibility of analyzing the short-term dynamic relations between the variables of the model through the study of the function of impulsive answer of the auto-regressive vector further to a sudden unitarian shock by the series and, the decomposition of the variance of the error of forecast of every variable.

Empirical Analysis

The empirical analysis was carried out on the basis of data covering the 1971-2015 period, which were obtained by matching many sources (according to the statistics of the Ministry of Higher Education and Scientific Research of Tunisia (2016) and the World Bank database (2017)). The temporal depth is sufficient for the study of the impact of shocks affecting the different education variables on GDP per capita growth as well as on the efficiency scores already calculated.

The various used variables, which are expressed in logarithm, are the following:

❖ **Table n° 1:** The variables

GDP	GDP per capita	Barro, R. J. (1997)
DEP	Public expenditure on education divided by the number of students enrolled in higher education	Afonso et al. (2005), Baldacci, E., Clements, B., Gupta, S., & Cui, Q. (2008) Gupta & Verhoeven (2001) Mekdad, Y., Dahmani, A., & Louaj, M. (2014). Mercan, M., & Sezer, S. (2014). Owusu-Nantwi, V. (2015) Tanzi et Schuknecht (2000)
SUP	students enrolled in higher education compared to all students at all levels	Zaneta and al. (2015);
DIP	Rate of graduates of higher education divided by the number of students enrolled in higher education	Gamel C. (2000)
SEFF	Score of technical efficiency of public education sector at the university level	Smaoui F.& Kammoun N. (2019)

In order to examine whether these series follow a stationary process, various tests are designed. In this context, we chose the Dickey-Fuller test (ADF) the application of which requires the use of a number of delays (p) to be introduced in each variable. In our procedure, we used the model that minimizes the information criteria (Schwartz Information Criterion (SC), Akaike Information Criterion (AIC)).

❖ **Table n° 2:** The number of retained delays for each variable

Variables	**PIB**	**DEP**	**PRI**	**SEC**	**SUP**	**DIP**	**SEFF**
Number of lags	1	2	2	2	2	1	1

To verify the stationary variables, it is necessary to refer to the ADF test which helps estimate the following models:

Model (1): $\Delta X_t = \phi X_{t-1} + \lambda + \delta_t + \sum_{j=1}^{p} y_j \Delta X_{t-j} + \epsilon_t$ (1)

Model (2): $\Delta X_t = \phi X_{t-1} + \mu + \sum_{j=1}^{p} y_j \Delta X_{t-j} + \epsilon_t$ (2)

Model (3): $\Delta X_t = \phi X_{t-1} + \sum_{j=1}^{p} y_j \Delta X_{t-j} + \epsilon_t$ (3)

On the other hand, the stationarity test consists in rejecting the null hypothesis (according to which X_t is non-stationary but contains at least one unit root) if the ADF statistical test is lower than the critical value tabulated by Dickey Fuller. In this case, the X_t series is stationary (i. e. it is integrated of order zero).

The following table shows the ADF test level:

❖ **Table n° 3:** The ADF test level

		GDP	DEP	PRI	SEC	SUP	DIP	SEFF
(1)		**-1.46173**	**-0.678048**	**-1.938840**	**-1.707846**	**-2.24453**	**-1.904475**	**-1.83686**
	***	(-4.2092)	(-4.2165)	(-4.2165)	(-4.2165)	(-4.2165)	(-4.2092)	(-4.2092)
	**	(-3.5279)	(-3.5312)	(-3.5312)	(-3.5312)	(-3.5312)	(-3.5279)	(-3.5279)
	*	(-3.1949)	(-3.1968)	(-3.1968)	(-3.1968)	(-3.1968)	(-3.1949)	(-3.1949)
(2)		**-0.40682**	**-1.927635**	**-2.031538**	**-0.973901**	**-1.00630**	**0.043940**	**-2.06617**
	***	(-3.6067)	(-3.6117)	(-3.6117)	(-3.6117)	(-3.6117)	(-3.6067)	(-3.6067)
	**	(-2.9378)	(-2.9399)	(-2.9399)	(-2.9399)	(-2.9399)	(-2.9378)	(-2.9378)
	*	(-2.6069)	(-2.6080)	(-2.6080)	(-2.6080)	(-2.6080)	(-2.6069)	(-2.6069)
(3)		**4.657979**	**1.719110**	**1.183815**	**2.432820**	**2.093904**	**1.922268**	**-1.54800**
	***	(-2.6227)	(-2.6243)	(-2.6243)	(-2.6243)	(-2.6243)	(-2.6227)	(-2.6227)
	**	(-1.9495)	(-1.9498)	(-1.9498)	(-1.9498)	(-1.9498)	(-1.9495)	(-1.9495)
	*	(-1.6202)	(-1.6204)	(-1.6204)	(-1.6204)	(-1.6204)	(-1.6202)	(-1.6202)
		Non stationary	Non Stationary	Non Stationary	Non stationary	Non stationary	Non stationary	Non Stationary

*** Significance at 1% ** Significance at 5% * Significance at 10%

By applying the Dickey-Fuller test, we notice that the variables are non-stationary. Therefore, they must be stationarized.

The studied stationary variables for the Tunisian case are summarized in the following table.

❖ **Table n° 4:** The stationnarization response variables

	ADF value	**Critical Value**	**ADF Test result**
∆GDP	-3.845459	-3.6117 (***)	I (1)
∆DEP	-4.704334	-4.2242 (***)	I (1)
∆PRI	-2.003410	-1.9501 (**)	I (1)
∆SEC	-2.984731	-2.9422 (**)	I (1)
∆SUP	-3.772950	-3.6171 (***)	I (1)
∆DIP	-5.507866	-3.6117 (***)	I (1)
∆SEFF	-3.742661	-2.6243 (***)	I (1)

(1) with trend and with constant
(2) without trend and with constant
(3) without trend and without constant

*** significance at the threshold of 1%.
** significance at the threshold of 5%.
* significance at the threshold of 10%.

This table indicates that all the variables are integrated at "1" in their first difference.

The implementation of Philips-Perron test is then identical to the ADF test. Besides, the critical values and the decision rule are the same as those in the ADF test. The results of the application of the PP test are presented in the following table:

❖ **Table n° 5:** The Philips-Perron test

Variables in the first difference	**t-stat**	**Critical Value**		
∆GDP	-6.501136	-3.6067	***	(2)
∆DEP	-9.742001	-2.6227	***	(3)
∆PRI	-2.117007	-1.9495	**	(3)
∆SEC	-3.398324	-2.9378	**	(2)
∆SUP	-4.543919	-3.6067	***	(2)
∆DIP	-6.604790	-2.6227	***	(3)
∆SEFF	-7.595624	-2.6227	***	(3)

(2) without trend and with constant
(3) without trend and without constant

*** Significance at the threshold of 1%.
** Significance at the threshold of 5%.
* Significance at the threshold of 10%.

The Philips-Perron's test enabled us, on the one hand, to confirm the non-stationary variables: GDP, DEP, PRI, SEC, SUP, DIP and SEFF and, on the other hand, to demonstrate that these variables are stationary in their first difference.

After having demonstrated the presence of a unit root in the studied series, it is possible to test whether these variables are co-integrated. This consists in studying the interdependencies between these variables and testing the existence of a long-term stable relationship, which is called "co-integration" or "long-term relationship".

To test the number of relationships of co-integration, we referred to the work of Johanson S. and Jeseluis K. (1992), who suggested two types of tests: the trace test and the maximum eigenvalue test. Before the implementation of these tests, it is fundamental to test the presence or absence of a deterministic component and / or a constant in the co-integration vector. According to the trace test, there are three relationships of co-integration between the variables. On the other hand, according to the test of the maximal eigenvalue, there are two relationships of co-integration between the considered variables. Consequently, there are long-term relationships between the variables of the education and those of GDP growth per capita in Tunisia.

With the VAR model that we have proposed, the reserved variables are classified in the following order: (GDP, DEP, PRI, SEC, SUP, DIP and SEFF). Because of the existence of a relationship of co-integration, the VAR has been considered as a form of error correction (VECM). This last model represents a VAR with estimated co-integration.

In what follows, we will present the results of the variance decomposition of the forecasting error of each variable as well as the interactions between them by their response functions following a single shock undergone by the series.

In fact, the VAR model is an econometric tool applied to measure all the dynamic connections inside a group of given variables. It enables, on the one hand, to analyze the effects of a variable on another through random shock simulations and, on the other hand, to conduct an analysis in terms of causality

The VAR model with "k" variables and "p" time lag, denoted VAR (p) is written as:

$$Y_t = A_0 + A_1 . Y_{t-1} + A_2 . Y_{t-2} + \ldots + A_p . Y_{t-p} + \gamma_t \quad \Leftrightarrow \quad A(D) . Y_t = A_0 + \gamma_t,,$$

where Y_t is a vector of dimension (k ; 1) and γ_t is the residue vector.

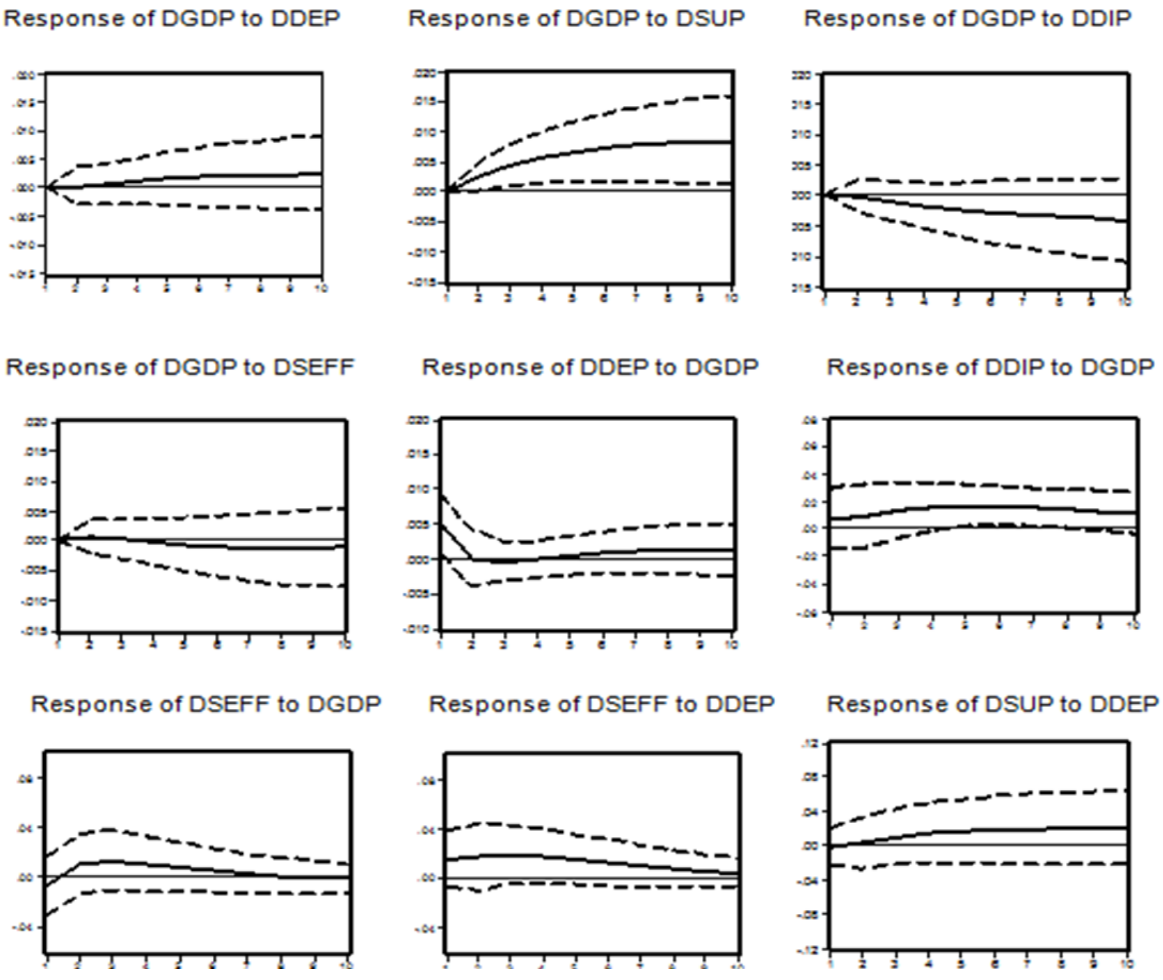
The used VAR model is written in the form of $Y_t = A_0 + A_1 . Y_{t-1} + \gamma_t$, which gives:

$$\begin{bmatrix} \Delta GDPt \\ \Delta DEPt \\ \Delta SUPt \\ \Delta DIPt \\ \Delta SEFFt \end{bmatrix} = [A_0] + \begin{bmatrix} A_1^1 A_1^2 A_1^3 A_1^4 A_1^5 \\ A_2^1 A_2^2 A_2^3 A_2^4 A_2^5 \\ A_3^1 A_3^2 A_3^3 A_3^4 A_3^5 \\ A_4^1 A_4^2 A_4^3 A_4^4 A_4^5 \\ A_5^1 A_5^2 A_5^3 A_5^4 A_5^5 \end{bmatrix} \times \begin{bmatrix} \Delta GDP\ t-1 \\ \Delta DEP\ t-1 \\ \Delta SUP\ t-1 \\ \Delta DIP\ t-1 \\ \Delta SEFF\ t-1 \end{bmatrix} + [yit]$$

Using this model, we will analyze the effects of the Tunisian educational policy by resorting to the analysis of the impulse response functions as tools to measure the impact of a shock on the variables. Then, we will focus on the effects of shocks over10 periods each of which is four and half years long.

❖ **Graph N°1:** Functions of impulse responses

Response to Cholesky**'s** One S.D. Innovations ± 2 S.E.



The variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR. However, it is important to analyze the effects of the shocks on every variable and their impact on the other variables of the education and the GDP per capita.

Discussion of Results

- *The incidence of the shocks DEP ; SUP ; DIP and SEFF on GDP:*

In our model, the economy is subject to 4 types of shocks related to the sector of education: i) The educational spending (DEP), ii) the number of enrollments in higher education (SUP), iii) the number of graduates (DIP), and iv) the indicator of the efficiency (SEFF). A shock on the spending "DEP" has a slight positive impact on "GDP" of 0.21 %. Besides, a shock to the higher education staff "SUP" has a positive and important impact on the "GDP" of 9.219 %. Similarly, a shock to the staff of graduates "DIP" has a negative impact on the "GDP" of 0.38 %. Finally, a shock to the efficiency of the education at the university level "SEFF" has a slight positive impact of 0.11 % on the "GDP" during the first 3 periods then, it becomes negative.

The positive and persistent effect of a shock of the number of students in the higher education on the GDP per head shows that the increase of the number of students (the university massification) forces some universities to hire teachers and pay more salaries. In fact, salaries have two effects on the productivity growth: in the first place, a direct effect, because the increase of salaries drives universities to achieve productivity investments which enable them to set up more effective teaching methods, then, an indirect effect, which occurs because an increase of salaries often entails, at the macroeconomic level, an increase in the global demand. The growth of salaries can therefore generate a growth of demand and productivity, and create a virtuous circle that makes the economic growth process more inclusive and job-intensive.

Moreover, the public offer of good quality education can contribute to the improvement of the workers' living conditions. Then, the regressions of Nelson and Phelps (1996), and especially those of Barro R. J. and Sala-I-Martin X. (1995), showed that the average number of schooling years is significantly correlated with economic growth.

Also, the impact of a shock affecting the number of graduates (DIP) on economic growth is negative. Similarly, a shock of efficiency scores cannot promote economic growth. As it is presented in chart n^{o} 1, this negative effect persists in the medium term (from the 4th period). These paradoxical results, which explain why the university massification combined with the non-adequacy of the diplomas granted for the needs of the companies in competition, resulted in a difficulty of inserting the young graduates into the labor market, at first, then in deteriorating the economic situation, in a second time.

It seems that university training in Tunisia suggests that curricula is not in conformity with the educational norms since the content and skills of these curricula, which are acquired by the students, depend widely on the local context. Besides, the criteria of evaluation and attribution of

diplomas remain very diverse and scattered too, which explains the difficulties of inserting the graduates of the non-specialized sectors of the university whose employability becomes more intricate. Very often, the interpretations of the complexity and downgrading of the university graduates refer to the idea of an "inflation of diplomas", which would lower their profitability according to the law of supply and demand.

- *The impact of a shock on the GDP:*

In a symmetrical way, it is interesting to analyze the impact of a shock affecting the economic situation not only on the SEC, SUP, DIP ratios but also on the SEFF efficiency scores. In fact, a shock affecting the "GDP" has a positive and significant impact on the expenditure on the "DEP" of 10.86%, on the university staff "SUP" of 4.64%, on the graduates "DIP" of 1.779% and on the efficiency of university education "SEFF" of 1.859%.

It should be noted that the effects are appreciable, positive and persistent for “DIP”. However, chart nº1 shows that the impact of a shock affecting the efficiency indicator of the economy is highly positive, which reaches its maximum at the end of the third period, then decays and cancels out in the long run.

The education is a spending of today that must produce more wealth and well-being tomorrow. This investment depends on the economic situation which allows dedicating immediately more consequent budgets to this sector.

Actually, education is considered as an investment made by the public authorities. It is an expense of today that produces more wealth and well being tomorrow. This investment depends on the economic situation which makes it possible to instantly devote larger budgets to this sector.

Actually, education is considered as an investment made by the public authorities. It is an expense of that produces more wealth today and well being tomorrow. This investment depends on the economic situation, which makes it possible to instantly devote larger budgets to this sector. In fact, a shock to the activity has a favorable and immediate impact on the productivity of the expenditure on education, and thus on the number of graduates and on the indicator of efficiency. Therefore, when the economic situation is good, the frequency of the students’ drop-out and repetition becomes low because these students will be able to finish their studies in good conditions.

- *The impact of a shock to the “DEP”:*

A shock the spending "DEP" has a weak positive impact on the "SUP" of 0.11 % and, a shock on the spending "DEP" has a considerable impact on the efficiency of the education at the university level "SEFF" of 6.62 %.

Furthermore, a shock to public education expenditure "DEP" has a weak positive impact on the "SUP" in the order of 0.11% whereas it has a considerable impact on the efficiency of university education "SEFF" of 6.62%.

On the other hand, improvements in public spending favor the creation of new universities and increase the capacity of the existing ones. According to chart n° 1, a positive effect on the "SUP" can be seen during the first period and it regains its optimal level in the 5th period. The impact of this shock on efficiency is important and positive during the first period, but in the long run, it disappears. These results reflect the response of the efficiency scores to the budget allocated to educational and research sectors that are likely to disappear in the long run through the inefficient use of the provided resources.

As a consequence, although the literature considers education as a strategic factor to ensure the economic development, we empirically found a weak positive effect of its variables on the economic activity in Tunisia, which makes us accept hypothesis (H_1) and reject hypothesis (H_2). In fact, any change in the educational system, particularly at the higher level, has no significant effects on the economic activity. The voluntary policy of the State to generalize education has been translated by a university massification in the sense of the increase of the number of the distributed diplomas. The State's voluntary policy of generalizing education has resulted in a university "massification". The university graduates have become more and more numerous while the economic activity is slowing down. However, it is harder for the graduates to find a job that is adequate for their academic level. Actually, graduation and entry into the labor market in times of economic recession may become more difficult at a time when the employers are reducing hiring, which forces young graduates to compete with more experienced workers. Therefore, in these conditions, it is difficult to count on education to promote the economic and social development of the country.

Conclusion

The obtained results make us question the legitimacy of the educational policies in Tunisia. Is it appropriate to pursue university "inflation"? In other words, do we have to encourage the extension of studies, given that there will be a little chance, in the current context, for the creation of jobs for all the university graduates. The improvement of the economic growth does not have to limit itself to the investment in the human resources through education (Kiersztyn A. (2013)). In fact, additional measures have to be taken so that education will fully play its role in the process of economic development.

First of all, it should be noted that education only contributes to economic growth if it can produce human resources needed by the industry. In fact, increasing investment in education to promote economic growth is not enough.

Is it still necessary to solve the difficulties related to the integration of young graduates into the labor market for some skills (senior technicians, human sciences, exact sciences ...)? It is therefore important for a country to have the capacity to exploit and develop the skills and knowledge of its human resources. In fact, this "Human capital" represents the added value that a person can bring to the national economic system. However, in Tunisia there is an "increasing complexity of the transitions between training and active life" which must be analyzed as the combined result of the evolutions of the university, on the one hand, and of the labor market, on the other hand. Uncertainty about the professional integration of university graduates seems to be the result of uncertainty about the quality of the diplomas awarded on the basis of some criteria, such as excellence, the methods of evaluation and the body of skills, which cannot be easily established with certainty. To improve the legibility of the granted diplomas, it becomes important to set a number of reforms in the syllabus of education at the level of the various academic cycles, in the modes of evaluation of the students in higher education.

Then, it is also important to promote the investment in technologies which produce a high added value for the Tunisian economy. Therefore, it would be necessary to direct the training and the education towards the fields of knowledge and the necessary skills to develop high-technology industries such as computer sciences, electronics and biotechnology. In fact, these industries can contribute to the increase of productivity and therefore accelerate the economic growth.

Finally, beside the respective effects of education and the regulations on the markets of goods and labor, it is also important to explore a possible interaction between these regulations. The latter can be implemented through more integrated economic policies which help strengthen the relationship between the industrial branches and the campus so that sciences and technology will be better developed. In fact, these are the interactions which may improve the performance of companies and economic innovation, which strengthens the technological position of the country at the international level. In this context, using data about 17 countries of the OECD mobilized over the 1985/2003 period, Ph.-Askenazy Ph.-Bourlès R. - Cette G.-Dromel N. (2008) showed that earnings of productivity growth, and thus potential growth can be obtained further to implement policies that can improve the training level of those who are at the employment age and simultaneously reduce the rigidity on the markets of goods and labor.

In this work, we focused on the quality of the educational system and its effect on the relationship between education and growth in Tunisia. Indeed, several researchers questioned this relationship

for both the developed and the emerging countries. Therefore, we have focused on the importance of considering the quality of educational systems. A quality indicator of the education (i.e. the efficiency scores of higher education) was defined in order to find the positive role of the human resources in the process of economic growth.

In fact, in this work, we tried to empirically show, for the case of Tunisia, the existence of a long-term relationship between the variables of education and the growth of the GDP per capita. Therefore, in the literature, education can be perceived as one of the engines of economic growth and social development.

Concerning the short-term effects, the model VAR with error correction (VECM) showed, particularly, that the scores of efficiency of higher education improve further after a positive shock related to the GDP or the expenditure on education. However, these improvements disappear in the long term. In contrast, a shock affecting the university graduates has a negative and persistent impact on the economic activity since the university massification contributes neither to the improvement of the education quality nor to that of the GDP per capita.

In fact, the university massification, which is independent of the quality of teaching at the university, clearly shows the voluntary policy of the State to universalize education as a vector of economic and social development of the country. However, in a context of "school inflation" and a poor economic situation, this policy emphasizes the difficulty of inserting young graduates into the labor market, which explains the absence of effects connected to the scores of efficiency in the short-term GDP, to become then negative in the long term.

Regarding these problems, it seems important to define the modalities of action for a university company partnership to strengthen the links of collaboration between the university and the industry. This is considered as a means to both effectively transfer the economically useful knowledge and ensure the advanced training in the qualifications needed by the industry. It is through this path that we favor the insertion of the young people into the labor market, and therefore promote economic growth.

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