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Education and Economic Growth in the MENA Region: Some New Evidence

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Abstract
The purpose of this paper is mainly to analyze the long-run relationship between education and the economic growth in MENA region. To ensure this, we have analyzed the evolution of some quantitative and qualitative indicators of the human capital within MENA countries including comparisons with other developing regions during the fifties by using the latest version of Barro and Lee (2010) dataset. Then, by using the most appropriate panel data techniques, we have empirically tested the impact of education upon the economic growth for the period 1975-2010 using several indicators for the human capital. The sample includes 15 countries divided into two groups (middle-income countries and high-income countries). The findings have indicated that although some progress is noted, much is remained to be done to ensure education as a large scale project of investment. Empirically, the results have shown that the effect of education depend on the measure used and on the relevant sub-group.
Key words: education, economic growth, MENA

1. Introduction

Since the second half of the 20th century, several studies have focused on how human capital accumulation may be beneficial to individuals, businesses and society. The benefits of education takes many forms: education increases individual earnings (Mincer, 1958, 1974; Arrow,1973; Spence, 1973; Acemoglu & Angrist, 2001) improves productivity (Moretti, 2002; Aghion & Cohen, 1998; Dearden et al. 2000; Martins, 2004) and stimulates economic growth (Mankin, Romer and Weil (MRW), 1992; Benhabib & Spiegel, 1994; Temple, 1999; Cohen & Soto, 2007; De la Fuente & Domenech, 2006). Besides these measurable effects, investment in human capital is a source of positive externality. In fact, investment in education improves health (Taubman & Rosen, 1982; Desai 1987, Christenson & Johnson, 1995. Deaton & Paxson, 2001; Elo & Preston, 1996; Rogers, Hummer & Nam, 2000; Lleras-Muney, 2002) reduces crime (De la Fuente, 2003; Behrmann & Stacey, 1997), promotes freedoms (Campbelle et al, 1976; Rizzo & Zeckhauser, 1992). On the economic point of view, there is a theoretical consensus among scholars that education increases economic growth. However, the empirical results are fragile, mixed and sometimes contradictory.

Kruegeret and Lindahl (2001) have attempted to reconcile the empirical literature of the effect of education on economic growth. They argue that these contradictory results are due to measurement errors. Taking into account the criticisms of Cohen and Soto (2007) and De la Fuente and Domenech (2006) Barro and Lee (2010) establish a new database with several indicators for human capital for 140 countries during 1950-2010. In addition to the issue of measurement errors. They argue also that the used methodology or the estimation methods are not suitable. Such is exactly the case of the endogeneity of variables. They remark that several studies are based on OLS methods which lead to biased estimators.

In the MENA region, while the low productivity of education is not a recent phenomenon, there is a disagreement about its origins. Studies carried out by Prichett (2001,2006) and Makkdisi et al. (2000, 2007) have stressed that the human capital measured by the educational level detained by the population does not explain the economic growth of the countries of MENA region.

This work differs from others in the sense that it uses recent data and the most appropriate panel data techniques. This is the first study that investigates the impact of several educational indicators (qualitative, quantitative, stock and flow) on economic growth in MENA region. While the MENA countries does not constitute an homogenous group, and in order to study the different growth trajectories, we divided our sample into two groups, the group of high-income countries and the group of middle income countries.

This paper is organized as fellow: section two present a theoretical and empirical framework about the relationship between education and economic growth in MENA region. Section tree traces the evolution of some human capital indicators within the countries of MENA region through comparisons with other developing regions during the fifties. Section four present the models and explains the methodology. The results are

discussed in section five. Section six concludes.

2. Theoretical framework and review of empirical literature about the relationship education and economic growth in MENA

2.1 The theoretical framework

Identifying the mechanisms whereby education may affect economic growth allows us to distinguish between three theoretical models. The first model is based on that of Solow (1956). The latter identifies two factors of production: the capital and the labor along with technical progress that is considered as exogenous. This neoclassical model which was subsequently developed by MRW (1992) has considered education as an isolated factor of production. Within this context, the accumulation of education increases the level of the human capital of the workforce and conducts the economy towards its stationary equilibrium level.

The second model is theoretically based on the endogenous growth which has been developed during the 1980's. Therefore, authors such as Lucas (1988), Romer (1986, 1990a, 1990b) and Aghion & Howitt(1998) have emphasized the role played by education for the development of innovative capacity of an economy via the generation of new ideas and new technologies. They are called endogenous growth models in the sense that the technical progress is determined within the model. The proponents of this theory have argued that higher level of education may lead to a steady stream of new ideas enabling education to affect the economic growth.

The third theoretical model highlights the role of education in the dissemination of technology. This theory has been developed by Nelson and Phelps (1966). An update of this theory has proposed by Benhabib and Spiegle (2005). It suggests that education can facilitate the transmission of knowledge which helps to generate new technologies.

2.2 Empirical results

During the last twenty years, several studies have attempted to analyze the impact of education on economic growth in the MENA region. El-Erian et al. (1998) have found, by using the panel data for six countries of MENA region, that there is a weak link between education and economic growth. They have explained that the weak link between education and economic growth is attributed to low quality of educational services and to labor market distortion in these countries. At the same time, they have also noted that this weak link goes hand in hand with a rapid expansion of schooling. Furthermore, they have observed that the education systems focus on the rote learning of definitions, knowledge of facts and concepts. They do not really deal with the development of critical thought and problem-solving.

Prtichett (2006,2001), relying on cross-sectional data, has shown that there is no relationship between the increase of human capital and the growth rate of GDP per capita in MENA region. As far as Prtichett's research is concerned, this weak link can be explained by three major factors: First, education does not increase the human capital but increases the personal salary. Second, the rates of marginal return to education is radically declining. Finally, the prevailing institutional environment in many countries is not conductive to the accumulation of human capital already concentrated in rent-seeking activities that hinders the economic growth.

Dasgupta, Keller and Srinivasan (2002) have shown that the economic performances of MENA region, particularly in the 90's, are far from being satisfactory in comparison to other countries or regions of the world.

Sala-i-Martin and Artadi (2003) have analyzed the economic growth performance in the Arab countries during the last forty years. They have concluded that the poor quality of investments is the major determinant factor of growth. In this sense, they have emphasized the complementarity between the human capital and the investments in physical capital. Meanwhile, They have recognized that the poor quality of the human capital in the Arab countries does not encourage the potential investments since they require a skilled workforce.

Abed (2003) have analyzed the low economic growth of MENA region during the 1980's and 1990's. He argue that this weak performance is largely due to five main factors: the low quality of institutions, the dominance of public sector, the underdevelopment of the financial markets, highly restricted trade policies and the inappropriateness of exchange rate regimes.

Hakura (2004) have analyzed the weak performance of economic growth in MENA region during 1980-1990 on the basis of an empirical model of economic growth in long term. The results have shown that the factors affecting the economic growth vary within MENA countries. Also, the Gulf countries, where the oil revenues are important, the size of the public sector stifles the growth of the private sectors and prevents the economic diversification. In the other countries, the quality of institutions (including educative system) as well as the political instability have slowed down the economic growth.

Makdisi et al. (2000，2007) has analyzed the economic growth of MENA region during the period 1960-1998 and then 1960-2000 on the basis of cross-sectional data. The out-findings have revealed that the growth trajectories diverse across countries and that the growth is marked with high degree of volatility compared with other regions of the world. According to these authors, the low performance is due, in addition to the unfavorable

economic liberalization and the negative impact of severe external shocks, to the inefficiency of physical and human capital.

Nabli and Varoudakis (2007) have shown that there is a positive impact of human capital on the economic growth in 44 developing countries (including some countries of MENA region). The education variable is approached by the rate of enrollment in primary schools by using the Principal Component Analysis.

Al-Yousif (2008) has examined the type and the sense of relation between education expenditure, as a proxy for human capital, and the economic growth within the six countries of GCC during 1977-2004. The obtained empirical results are mixed and vary from one country to another and according to the used measurement of the human capital.

3. The educational sector in MENA : a low performance[2]

3.1 The completion rates at the different school levels are very low

In this section, we analyzed the evolution of completion rates in the three cycles. In the primary cycle, the completion rate in the MENA region has almost doubled between 1970 and 2010. This performance, however, hides disparities between countries. For some countries, the primary completion rate has more than doubled between 1970 and 2010. This is essentially the case of Morocco, Iraq and Libya where the primary completion rate has increased by 3.8% to 23.6%, from 4.1% to 21.6% and 5.6% to 18.7% respectively. Other countries have seen their completion rates stagnated or rose slightly. For example, in Kuwait, the rate rose from 9% in 1970 to 9.5% in 2010. That of Qatar increased from 4% to 6% during the same period. This improvement is mainly due to the commitment of MENA countries in the achievement of Education For All goals.

With regard to secondary education, the Maghreb countries recorded the lowest rate of completion. Indeed, in 1970 only 2.4% of the population aged 15 and over have completed secondary school in Morocco, while only 1.3% did so in Libya, 4.1% in Tunisia and 4 % in Algeria. In 2010, the completion rate in the secondary is highest in Bahrain with more than 40%, followed by Jordan and Iran with, respectively, 38.6% and 38.9 %. In Morocco, the rate of school completion does not exceed 15% of the population aged 15 years and over: it is among the last countries in the MENA region. This shows that, for 40 years, the Moroccan education system remains one of the weakest educational systems throughout the region. Algeria, a country in the Maghreb, is better placed than Morocco, since 36.1% of the population aged 15 and over have completed secondary school.

When analyzing the rate of completion of higher education, we see that Qatar is the only country whose completion rate exceeds 5%. This shows that higher education was virtually absent in almost countries in the region in 1970. In 2010, the situation has greatly improved. All countries exceeded 5% except Bahrain, Kuwait and Syria. However, this improvement is still insufficient.

3.2 The average number of years of schooling : a remarkable convergence

We have seen above that the completion rates at the different educational levels are in progression between 1970 and 2010. It is therefore expected that this improvement affects naturally the average number of schooling of the population. This last measure is extensively used in the literature in order to approximate the level of investments in the human capital.

Tha data points out that difference persist across the countries of MENA. In fact, in 1970, Maghreb countries are those where the very weak average number of years of schooling is observed. For example, The average number of years of schooling in Morocco does not exceed one year, 1.5 in Algeria, 1.7 in Tunisia and 1.5 in Libya. Unlike the Maghreb countries, it is within Golf countries where we notice the largest average number of years of schooling themselves already low compared to other regions of the world.

In 2010, the majority of countries have exceeded the rate of 6 years of schooling except Morocco (5 years), Syria (5.27 years) and Iraq (5.84 years). If the low performance of Iraq can be explained by the political instability prevailing this country since 2003, that of Morocco reflects the failure of educative policies. Countries such as Tunisia, Algeria and Libya (Maghreb countries) have achieved the highest growth rates of the average number of schooling years rising respectively from 1.76 years to 7.32 years, from 1.51 years to 7.70 years and from 1.5 years to 7,85 years during the period 1970 and 2010. Contrary to these three Maghreb countries, countries like Qatar and Kuwait are experiencing the weakest growth rates of the average number of the years of schooling.

The average number of the years of schooling is increasing faster in MENA region than in EAP and LAC. In other words, the average number of the years of schooling gap between MENA region and other regions is largely reduced. Indeed, in 1960, the average number of the years of schooling in MENA region has been 1.25. In 2010, this number reaches 7.77 in MENA region, 8.29 within EAP (East Asia and Pacific) and 8.41 in LAC (Latin America and Caribbean).

[2] In this section, all data are from Barro and The (2010) unless otherwise noted.

3.3 The illiteracy rates: insufficient efforts

From an economic perspective, illiteracy rate is considered as an aspect of the human capital quality that a country owns at a given time.

The graph 6 illustrates the evolution of illiteracy rates within some countries of MENA region from 1970 to 2010.

In 1970, the countries of MENA region have recorded very high rates of illiteracy. In a typical way, Morocco registered the highest rate of illiteracy, this rate exceeds 83% of adults; followed by Egypt and Iraq with respectively 82.2% and 81.7%.

In 2010, the situation has largely improved. In fact, the illiteracy rates in MENA region reach 20% of adult population. Once again, Morocco have registered the highest rate with 43,8% of out-of-school adults. The lowest rates are registered in Kuwait, Bahrain and Turkey with respectively 5.5%, 5.8% and 10.8%.

The principal cause behind these higher rates when compared with other regions of the world is the discrimination that girls suffer from in their school enrollment[3]. MENA region is extensively mentioned as a reference for the predominance of gender inequality in school enrollments.

Illiteracy rates among adult population, particularly women, is distinguishing clearly MENA countries from those of EAP and LAC regions. According to World Development Indicators Database (2006), the total number of illiteracy in MENA region countries is approximately equal to 54 million people, which represents about 1,5% of world's adult illiterates. At the same time, the 36 million illiterate women in MENA represents 2.2% of illiterate females of the globe.

The analysis has shown that rates of illiteracy among adults are largely reduced between the period 1980 and 2003 over all the three regions.

The very highest rate of illiteracy has been registered amongst women and it reaches its peak within MENA region. From 1980 to 2003, the illiteracy rate of women has been reduced in the countries of MENA region and the rate of variation is rapid, however, the persistent gap that distinguishes MENA region from the two other regions makes the convergence even further. Indeed, illiteracy rate of women in MENA region is 30%, otherwise in LAC and EAP regions where it represents respectively just 9,3% and 11,6%.

3.4 A reliable measure of the quality: pupil-teacher ratios

Also called the supervision rate, Hanushek(1995) has defined the number of pupils per teacher as the ratio between the number of students in a school or educational institution and the number of courses meant to supervise. In some countries, all stakeholders are embodied in the educative system including administrative staff (Mc Robbie et al.1998). Hanushek (2002) has distinguished between pupil-teacher ratios and the class size. For him, "pupil-teacher ratios are not the same as class sizes...data on pupil-teacher ratios reflect the total number of teachers and the total number of students at anytime, not the utilization of these." (Hanushek, 1998, p. 12). In crowded classes, pupils find it difficult to attend their audiences. At the same time, for teachers, the allowed time to address each student's needs is reduced.

The data have pointed out that the crowded classes occur commonly in Sub-Saharan Africa and South Asia Than in any other region of the world. Worse still, pupil-teacher ratios for primary education are increased in these regions between 1970 and 2010.

It is rather in Europe and Central Asia where we observe the lowest rates of pupil-teacher ratios in 2000. Within the same context, MENA region is ranked second in the world in terms of pupil-teacher ratios in 2000.

The good performance of MENA region, however, hides the disparities between regions. In high income countries, pupil-teacher ratios are much lower than that of low income countries. Meanwhile, the gap between the two groups is slightly narrowed from 13 students per teacher in 1970 to 9 students per teacher in 2010. According to the World Bank (2007), one of the possible explanations is that the region devotes a significant portion of their budgets to education compared to other regions of the world. To better analyze the performance of education systems in MENA, we estimate the impact of some educational indicators on growth economic.

4. Models and methodology

In this article, we will rely on the specification of Durlauf et al. (2004), which was in turn inspired from the research of MRW (1992), to identify the following economic model:

[3] UNESCO Director-General Irina Bokova have claimed that « numerous social, cultural and political factors still strongly limit access to learning opportunities for girls and women. When gender disparity is combined with other factors such as poverty, ethnic background, area of residence and disability, the risk of not attending schools is still high. Such inequalities impede progress in all areas: improving mother and child health care are linked with other efforts to reduce poverty overall » (UNESCO's Global Education Digest, 2010 p : 3).

$$\dot{y} = \phi \ln y_{i,0} + \psi X_i + \pi Z_i + \varepsilon_i \quad (1)$$

y_i is referring to the growth rates of per capita outputs, y_{i0} output per capita at the initial date. X_i matrix with variables suggested by the base model of Solow. The Z_i matrix with control variables not included within the basic model of Solow. Durlauf et al. (2004) have argued that Solow's variables usually appear in the different empirical studies either in cross-sectional, panel data or time series. The variables contained in Z_i vary widely from one study to another. At this respect, Mc Mahon (2007) has recorded more than forty control variables.
Although some variables are well founded theoretically, the way that they are not included in the regressions is explained either by data absence or the existence of aberrant data.
In our research study, we distinguish between three types of variables:

- The dependent variable : growth rate of GDP per capita.
- Control variables : the sum of growth rates of the population, progress, capital depreciation, physical capital stock depreciation as well as human capital variable.
- Control variables : life expectancy at birth, political instability, trade openness and the level of financial development.

Within the framework of the standard static model, we are specifying the following relationship starting from the equation 1:

$$\Delta \log(Y_{it}) = \beta_0 + \beta_1 \log(n_{it} + g + \delta) + \beta_2 \log(sk_{it}) + \beta_3 \log(H_{it}) + \eta_i + \lambda_t + \varepsilon_{it} \quad (2)$$

Along with $\Delta \log(Y_{it})$ growth rate of GDP per capita and $\log(n_{it} + g + \delta)$ the logarithm of the sum of the growth rate of the workforce, technilogical progress and of capital depreciation. The *Log* (H_{it}) measures the level of human capital detained by the population.
In this study, we will test four types of educative variables. 1) the illiteracy rate among the working population (*Lnnoscho*) 2) the number of the schooling years (*Lnyofscho*) 3) the enrollment rates in the three cycles of education: primary, secondary and higher education (noted respectively by *Lnpritot, Lnsectot* and *Lnsuptot*) 4) the number of pupils per teacher (*Lneleenseig*). η_i is unobservable individual effect (fixed or random effects) measuring the social and cultural factors, λ_t is the temporal effect and ε_{it} is iid error term.
The study covers 15 countries of MENA region : Algeria, Egypt, Libya, Morocco, Tunisia, Jordan, Iran, Kuwait, Bahrain, Iraq, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirate.
The used data covers the period 1971-2010. In order to study the long term relationship between education and economic growth we have developed the five-year averages for each variable. For what concerns the quinquennial data, Islam (1995) has shown that this data avoids disruptions due to economic cycles as well as cross-correlations which one could have in the annual data. So, we retain eight periods : 1975, 1985, 1990, 1995, 2000, 2005, 2010. Therefore, the maximum number of available observations are 120.

5. Results and discussions

The first test to be carried out is checking the existence of specific individual effects. After doing this, we have to choose between a fixed effect model and random effect model. Hausman's test (1978) has prompted us to adopt a random effect model for all the regressions we have done. Consequently the " within" estimator is not BLUE estimator and the best estimator is GLS estimator.
In this paper, too much importance should be given to the different aspects of human capital. We have effectuated regressions for the whole sample and then for the two sub-groups : middle income countries (which consists of 9 countries) and high income countries(consists of 6 countries).
Table 1 shows the results of the base model estimates over all samples. The results have shown that the impact of the sum of growth rate of the workforce, of technological progress and of capital depreciation ($\ln(n_{it}+g+\delta)$) is negative and significant whatever is the human capital variable. This impact is explained by the fact that in MENA region, the growth of the population does not promote economic growth in the sense that any additional population especially when there is no productive employment will be added to millions of already existing unemployed people. Within this context, MENA's unemployment rate is viewed to be the highest in the world (Salehi-Isfahani, 2010).
The physical capital impact ($ln(sk_{it})$) is positive but insignificant. This result has suggested that the physical capital does not fully play its role in the economic development of the region.
With regards to the human capital variables, the findings suggest that illiteracy rate of the workforce has the

expected negative and significant sign. It leaves one to think that illiterate persons do not contribute to the economic growth and therefore remained as a burden on society. The average number of the years of schooling (*Lnyofscho*), enrollment rates in the primary education (*Lnpritot*), secondary schooling rate (*Lnsectot*) and higher education enrollment rate (*Lnsuptot*) are not significant. These results have confirmed the conclusions of Pritchett (1999) and Makdissi (2006) for whom education in MENA region does not contribute to economic growth.

Hanushek (2007) and Wossmann (2003) have argued that the notion of reducing class size does not prove convincingly the increase of pupils' performances. The results found in the micro-economic literature are consistent with our findings, in the macroeconomic level, whereby reducing the number of pupils per teacher (*lneleenseig*) does not promote the economic growth in the sense that the reduction of pupil-teacher ratios calls for additional costs that might be invested, for example, in building new schools.

The mixed results that we have obtained with regard to the impact of education on economic growth allows us to introduce other variables that may influence the economic growth. The list of these variables notably includes: economic openness(*Lnopen*), politic instability (*Lninstab*), financial development (*Lndevfinancier*) and life expectancy at birth (*Lnespdevie*). The full model is written as follows:

$$\Delta \log(Y_{it}) = \beta_0 + \beta_1 \log(n_{it} + g + \delta) + \beta_2 \log(sk_{it}) + \beta_3 \log(H_{it}) + \beta_4 \log(open_{it}) + \beta_5 (\log instab_{it})$$

$$+ \beta_6 \log(devfinancier_{it}) + \beta_7 \log(espdevie_{it}) + \eta_i + \lambda_t + \varepsilon_{it} \qquad (3)$$

Table 2 presents the results for the full model whereby the control variables are introduced. The results suggest that the base model variables have not altered the sign. The negative effect of the sum of the growth rate of the workforce, the technological growth and the capital depreciation is perfectly in accordance with the teachings of endogenous growth theory. This can be explained by the low level of industrialization in MENA region or the obsolescence of the existing units and the low proportion of qualified resources able to assimilate the universal technologies. Regarding the human capital variables, the coefficient associated with higher enrollment rates (*Lnsuptot*) becomes significant. Thus, in the presence of a favorable macroeconomic framework, higher education has a positive impact on economic growth in the MENA region.

Other variables are included in the full model. In fact, the political instability have unexpectedly presented a positive but insignificant impact. This positive sign can is due to the nature of the used variable to approximate the political instability (the level of political and public freedoms). In such communities, probably the repression of the rights of individuals may cause them to be productive and consequently contributes to economic growth.

It is also apparent that the financial development outcome has the expected positive sign though insignificant. This result confirms those of Atje and Jovanovic (1993), Levine (1997) Beck and Levine (2004).

Life expectancy at birth sign depends on the measure used to calculate the human capital. Thus, in the presence of illiteracy rate variable, the impact of life expectancy at birth is negative though insignificant. These findings have confirmed the idea that illiterate people have lower life expectancy than that of educated ones. Also, in the presence of other variables of education (column 2, 3 and 4) life expectancy has a positive impact on economic growth.

Trade openness variable acts in a contradictory manner in the economic growth according to the used human capital variable. In the presence of illiteracy rate and the number of schooling years, the variable of trade openness acts therefore positively on the economic growth. Meanwhile, in the presence of the rate of enrollment at different cycles of education on the one hand and pupil-teacher ratios on the other hand, trade openness acts negatively on the economic growth. By cons, these signs are not significant.

Such mixed impact of human capital and economic openness allows one to believe that there are differences between educational system and import and export structures in MENA countries. This leads us to split our sample into two subgroups in order to identify the growth path differences within the countries of MENA region. Thus, we distinguish between middle-income countries (Morocco, Jordan, Tunisia, Turkey, Algeria, Iran, Iraq, Egypt and Syria) and high income countries (Qatar, Bahrain, Saudi Arabia, United Arab Emirate, Kuwait and Libya).

Tables 3 and 4 show the results of base model for the two subgroups.

The sign of the sum of growth rate of the workforce, technological progress and capital depreciation undergoes no change although it is insignificant for high income countries. This change is due to the physical capital impact which becomes negative for middle income countries. Furthermore, this negative sign suggests that investments

in physical capital are insufficient as they can not provide the countries with infrastructures which can stimulate economic activity.
As regards human capital variables, all the coefficients associated with this variable have opposite signs (column 2, 3, 4; table 3 and 4) except the illiteracy rate which has a negative impact on economic growth in both subgroups.
Enrollment in primary and secondary impacting positively and significantly economic growth in the and middle-income countries but are not significant for the high-income countries. As we can see in column (3) tables (3) and (5). The coefficient associated with higher education is positive and significant only for high-income countries. For the first group, the obtained results are consistent with those of Aghion and Cohen (2004) to whom the developing countries should invest more in primary and secondary education. For the second group, all the countries are economic rent whose primary activity is the extraction and import of natural resources; investing in primary and secondary education is not a catalyst for economic growth. The negative sign of *Lneleenseig* has suggested that the reduction ,which touches pupil-teacher ratios in high income countries, promotes the economic growth in the sense that the costs generated by this reduction will be funded by the excess of revenue at their disposal and consequently enhancing the educational system performance. By contrast, in middle income countries, reducing the pupil-teacher ratios have caused additional costs which represent a heavier burden on public finances from which the positive sign associated to *lneleenseig*.
Having introduced the control variables by estimating the full model for both groups (table 4 and 5), the results have shown that control variables do not change the sign for the two groups of countries except that the negative impact of physical capital became significant in the middle income countries.
For middle income countries, the negative impact of illiteracy is increased in the base model from -0،004 to attain -0،075 in the full model. This explains the scale of the negative effects of illiteracy over the other variables which determine economic growth. In high income countries, the negative effect of illiteracy has decreased from the base model to the full model. The introduction of control variables has changed the sign of enrollment rates in secondary education which is turned to negative in middle income countries. This confirms the notion that education which is measured on the basis of flows does not contribute to economic growth. Afterwards, the pupil-teacher ratios impact is not changed from base model to full model.
Both the trade openness and the political instability have a positive impact upon the economic growth of the two groups of countries. The estimation of the model extended to other variables have suggested that the financial development negatively impacts the economic growth of high income countries as there is a very pronounced restriction on the distribution of credit to the private sector. On the other side, in middle income countries, financial development supports economic growth since the loans granted by the monetary financial institutions enhance the potential of these countries' economy (Anderson, 2003).
These empirical evidences are part of many inconsistencies found in the literature. They are abundant in the empirical literature on human capital and economic growth (Benhabib & Spiegel, 1994; Lacoste, 2005; Islam, 1995; Gurgand, 2000; Pritchett, 1996, 2001; Top, 2000). Thus,the most robust macroeconomic approaches provide contradictions in the relationship between education and growth.

6. Conclusion

With regard to the issue of the development of education in MENA region, although some progress has been noted, the initial observations have revealed that much work is remained to be done for education to be a project of very large investments. On the other side, the impact of education upon the economic growth is a controversial topic. This impact varies from one sub-group to another and depending on the used variable as a proxy for education. The threshold of educational attainment represents a take off point from which we may feel the effectiveness of education (Azariadis and Drazen, 1990; Lau, Jamison and Louat, 1990). Once we reach the critical threshold, education therefore may affect positively the economic growth (World Bank, 1977b). In sum, the countries of MENA region have to invest more in education. The use of the most robust econometric analysis and the most recent data do not suggest the existence of a stable and positive relationship between human capital and economic growth. The results here confirm those generated by the large number of empirical studies, conducted on data from international comparison.
This paper use quantitative and qualitative indicators to approach human capital accumulation, in a recent study, Lopez et al. (1998) point out that if education is not distributed in an egalitarian manner within the population, a large part of the revenues will be held by a minority of well-educated, which has a greater inequality in the distribution of income and therefore remain in the virtuous circle of poverty. In a recent article, Castelló (2010a) empirically examines the channels through which inequality in education may influence growth. In our forthcoming work, we will investigate this issue and we will attempt to measure the impact of inequalities in education upon the economic growth of MENA region countries.

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Annex

Table 1. Regression of GDP growth rate on human capital variables, base model (the sample is 15 countries, the estimator is GLS)

	1	2	3	4
ln(ni,t+g+δ)	- 0,475***	-0,502***	-0,5373***	-0,433***
ln(skit)	0,0361	0,031	0,026	0,017
Lnnoscho	-0,025*	-	-	-
Lnyofscho	-	-0,027	-	-
Lnpritot	-	-	-0,035	-
Lnsectot	-	-	-0,021	-
Lnsupertot	-	-	0,013	-
Lneleenseig	-	-	-	0,081
Const	1,13***	1,26***	1,469***	0,831***
N° observation	120	120	120	116
R-sq Within	0,13	0,09	0,09	0,07
Between	0,42	0,23	0,24	0,36
Overall	0,12	0,1	0,11	0,11

Table 2. Regression of GDP growth rate on human capital variables, full model (15 countries as a sample, the GLS estimator)

	1	2	3	4
ln(ni,t+g+δ)	-0,485***	-0,539***	-0,564***	-0,454***
ln(skit)	0,0295	0,03	0,022	0,011
Lnnoscho	-0,081	-	-	-
Lnyofscho	-	-0,11	-	-
Lnpritot	-	-	-0,055	-
Lnsectot	-	-	-0,068	-
Lnsupertot	-	-	0,035*	-
Lneleenseig	-	-	-	0,111
Lnopen	0,001	0,005	-0,02	-0,008
Lninstab	0,053	0,034*	0,114	0,091
Lnespdevie	-0,357	0,303	0,116	0,147
Lndevfinancier	0,029**	0,016**	0,02**	0,032*
Const	2,79***	0,07***	1,07***	-0,056***
Nbs d'observation	116	116	116	112
R-sq Within	0,24	0,27	0,18	0,26
Between	0,34	0,3	0,28	0,33
Overall	0,3	0,28	0,23	0,28

Note: * significance at 10%, ** significance at 5%, *** significant at 1%

Table 3. Regression of GDP growth rate on human capital variables, base model (the sample consists of 9 of middle income countries and the estimator is GLS)

	1	2	3	4
ln(ni,t+g+δ)	-1,0175***	-1,038***	-1,093***	-1,039***
ln(skit)	-0,045	-0,044	-0,062	-0,061
Lnnoscho	-0,004***	-0,0366	-	-
Lnyofscho	-	-	-	-
Lnpritot	-	-	0,023*	-
Lnsectot	-	-	0,013*	-
Lnsupertot	-	-	-0,045	-
Lneleenseig	-	-	-	0,28**
Const	2,758***	2,849***	2,925***	1,922***
Nbs d'observation	72	72	72	72
R-sq Within	0,11	0,12	0,15	0,14
Between	0,53	0,47	0,49	0,58
Overall	0,17	0,17	0,19	0,2

Note: * significance at 10%, ** significance at 5%, *** significant at 1%

Table 4. Regression of GDP growth rate on human capital variables, base model (the sample consists of 6 of high income countries and the estimator is GLS)

	1	2	3	4
ln(ni,t+g+δ)	-0,207	-0,271	-0,36	-0,2695
ln(skit)	0,116	0,09	0,056	0,117
Lnnoscho	-0,16*	-	-	-
Lnyofscho	-	0,135*	-	-
Lnpritot	-	-	-0,072	-
Lnsectot	-	-	-0,082	-
Lnsupertot	-	-	0,118*	-
Lneleenseig	-	-	-	-0,226
Const	0,796***	0,187***	1,021***	0,959***
Nbs d'observation	42	42	42	38
R-sq Within	0,117	0,07	0,16	0,11
Between	0,313	0,56	0,51	0,04
Overall	0,12	0,097	0,17	0,11

Note: * significance at 10%, ** significance at 5%, *** significant at 1%

Table 5. Regression of GDP growth rate on human capital variables, base model (the sample consists of 9 of middle income countries and the estimator is GLS)

	1	2	3	4
ln(ni,t+g+δ)	-0,969***	-0,953***	-0,936***	-0,932***
ln(skit)	-0,067*	-0,596	-0,072**	-0,068*
Lnnoscho	-0,075*	-	-	-
Lnyofscho	-	-0,054	-	-
Lnpritot	-	-	0,0137*	-
Lnsectot	-	-	-0,05	-
Lnsupertot	-	-	-0,007	-
Lneleenseig	-	-		0,218*
Lnopen	0,017*	0,0147*	0,026*	0,01*
Lninstab	0,119	0,082	0,071*	0,098
Lnespdevie	-0,573	-0,004	0,064	0,073
Lndevfinancier	0,054*	0,040*	0,039*	0,029*
Const	4,89**	2,381	2,081	1,26
Nbs d'observation	68	68	68	64
R-sq Within	0,17	0,12	0,15	0,19
Between	0,33	0,56	0,51	0,44
Overall	0,25	0,27	0,19	0,24

Table 6. regression of GDP growth rate on human capital variables, base model (the sample consists of 6 of high income countries and the estimator is GLS)

	1	2	3	4
ln(ni,t+g+δ)	-0,102	-0,195	-0,284	-0,164
ln(skit)	0,104	0,042	-0,0008	0,111
Lnnoscho	-0,123	-	-	-
Lnyofscho	-	-0,386	-	-
Lnpritot	-	-	-0,119	-
Lnsectot	-	-	-0,287	-
Lnsupertot	-	-	0,138	-
Lneleenseig	-	-	-	-0,424***
Lnopen	0,125	0,305	0,252	0,328*
Lninstab	0,114	0,497	0,442	0,0416
Lnespdevie	0,214	1,721	1,21	-0,156
Lndevfinancier	-0,0869	-0,033	-0,003	-0,037
Const	-0,9***	-0,408***	-5,398***	0,474***
Nbs d'observation	42	42	42	38
R-sq Within	0,15	0,18	0,2	0,19
Between	0,3	0,21	0,88	0,16
Overall	0,15	0,15	0,23	0,18

Note: * significance at 10%, ** significance at 5%, *** significant at 1%