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Human Capital And Inclusive Growth: Reading In Macroeconomic Work

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Abstract: Economists have long been concerned with the determinants of long-term economic growth. It is now widely accepted that technological advances, high levels of human capital and a significant degree of openness to international trade, knowledge flows and financial flows play a major role in growth, especially in a global economy. increasingly knowledge-based and so that countries can meet the challenge of global competition.

Moreover, recent theoretical and empirical literature on economic growth has emphasized the relevance of intangible factors, mainly the diffusion of human capital and trade openness, taking into account productivity growth.

The purpose of this paper is to shed light on the determinants of growth and provide a preliminary picture of human capital models, it is intended to provide information on the impact of human capital and their interaction with economic growth.

Keywords: Human capital, economic growth, expenditures in education and training.

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I. INTRODUCTION

There is a large body of literature, that has revealed that one of the most important factors of economic growth is human capital (Riley, 2012 Lucas, 1988, Mankiw et al., 1992, De la Fuente and Doménech, 2000, 2006) with regard to both the effect of level (so called level effect) by its decisive influence on production through labor productivity (Romer, 1990; Mankiw, Romer and Weil, 1992) and the rate effect by contributing to increased competitive advantage through innovation and diffusion technology (Pistorius, 2004 Siggel, 2000, 2001, Horwitz, 2005). In classical economics, the concept of capital consisted simply of physical capital, and an approach emphasizing the quantitative aspect of growth was followed. In the classical theory of economic growth, labor productivity is regarded as an exogenous factor which depends on the ratio between workforce and physical capital, plus other factors (technical progress), but the beneficial effect of education on potential growth of productivity is not taken into calculation. The new theory of economic growth developed in the early 80s comes to correct this shortcoming of the classical theory emphasizing the importance of education and innovation, (elements of human capital) in long-term economic growth. There have been previous studies on the link between human capital development and economic growth (for example, Mba, Mba, Ogbuabor & Ikpegbu, 2013; Eigbiremolen et al., 2014; Jaiyeoba, 2015; Omotayo, 2015); however, a sparse literature exists on how the development of human capital through education can help government achieve a more inclusive growth.

However, the inability to explain the ever-changing dynamics of physical capital and the increasing importance of technology and knowledge in the production process have shown that the human aspect of production is not negligible. . Evaluating the influence of the human aspect on production processes, in other words, the concept of human capital has brought a qualitative approach to growth and allowed the incorporation of intangible elements into the concept of capital. The fact that the efficiency of human capital significantly influences the productivity of other factors of production has involved the analysis of the social structure in which individuals are formed, and studies have drawn attention to the concept of social capital. This new definition of capital, which puts more emphasis on social aspects, allows researchers to give more weight to the qualitative approach of the economy. As a result, this paper presents a theoretical framework of the link between human capital and economic growth. It will be carried out by a hypothetico-deductive analysis. We will try to revisit the econometric modeling game realized by the authors of the macroeconomics, from the works of authors, finally we will present some empirical results and discuss them.

II. CONTEXT OF THE STUDY

Morocco is in the middle of a debate about growth and its determining factors. Researchers and economists are trying to understand the sources of wealth creation that will make this country an emerging country in the era of globalization and globalization of trade and competition of sectors and companies, an era of African integration and in MENA countries. At this level, Morocco is aware of the need to invest in human capital and to question its educational system and training alone capable of gathering the reasons for a capital in human resources able to join a physical capital and infrastructure in a productive and competitive vision.

Indeed, countries that have a human capital formed, ie, spending on education and training consequent allow a creation of wealth in the absence of oil resources and natural gas. Like these countries, Morocco is now seeking to build a development model based on the diversification of sectors achieving a productive added value. It is time to reposition the education system at the heart of a conscientious policy of the place of human capital in the system of growth and production.

Morocco aims to promote human inclusivity in its production and investment process. Human resources are the factor that this country has today to cope with openness and its induced effects and externalities.

III. PROBLEMS AND HYPOTHESES OF THE STUDY

Macro-economists have tried to answer the question we are asking again: to what extent can human capital or investment in human capital (through education and training) provide a major leverage for the creation of wealth of a nation? In the same vein, is the effect positive or negative? Can we speak of a significant effect or reject any possible link between human capital and growth (measured as macro-economists have done with robust models of regression)? In order to answer this question, we formulate our two presuppositions of the study which are the following:

The general assumption of this paper is that human capital is at the heart of inclusive growth. This hypothesis is based on studies that have examined the effects of human capital on economic growth. We will try to provide a summary but also critical reading of the work done at this stage by the authors who have studied the macroeconomic effects of education, education on the GDP of a state. We will also try to understand the phenomenon of schooling (determinant of the measurement of levels of development and human capital on economic growth).

IV. A LITERATURE REVIEW: HUMAN CAPITAL THROUGH ECONOMIC THEORY

Since Smith, human capital as a lever for wealth creation has been debated, and still is today. Mankiw, Romer since the years 1992

1. The human capital seen by Smith, Marshall and Schumpeter (from the 18th century to the 50s of the 20th century:

Since Smith (1776), Marshall (1920) and Schumpeter (1950), most economists have recognized that the skills of a country's workforce are one of its most important competitive strengths. Investments in human capital are long-term and do not only depend on monetary variables, since the role played by the family in educational choices remains decisive. If these economists have the intuition that the quality of work exerts an influence on the growth, the economic theory considers for a long time the work like a simple factor of production, apprehended exclusively in its quantitative dimension. It will then be necessary to wait until the end of the 1950s to develop the concept of human capital. The origins of the modern microeconomic theory of human capital, however, can be traced back to Mincer (1958), Schultz (1961), and Becker (1962; 1964) by offering theoretical and empirical analyzes of the links between human capital investment and remuneration. The human capital theory has thus helped to explain economic growth and the formation of individual earnings

2. Link between education (human capital) and renewed economic growth with the work of Mankiw, Romer in 1992:

It is pointed out that the data problems have brought many limitations, the mismatch of indicators of measurement of human capital relating to education, these are the educational variables, such as enrollment rates or the average number of school years (Benhabib and Spiegel, 1994); and the question of the place of expenditure on education, notably by Gurgand (2000) and Pritchett (2001). The authors questioned the effect of spending on education.

Note in passing that some international comparison studies have explained that many educational variables are a determinant of per capita GDP growth in countries (Barro 1991, Mankiw et al. More recently, two streams of macroeconomic research have revived interest in the concept of human capital in relation to economic growth.

It can not be recalled that the new theories of economic growth, to which economists such as Romer (1986), Lucas (1988) and Barro (1996) have all associated, have all shown that human capital is a determining factor in economic growth. economic growth. Nevertheless, Marc Gurgand in 2000, showed the existence of paradoxes concerning the relationship education-growth. Despite a number of empirical studies on the subject, based on

internationally compared data, the hypothesis of a clear and positive relationship between investment in human capital and economic growth is largely rejected.

3. The educational approach through the work of macroeconomics

The paper Altinok N. 2007. under the title "Human capital and growth: the contribution of international surveys on student achievement", published in Public Economy is edifying and learning in this sense. We use faithfully its perfect synthesis of the work of macroeconomists on education and its link with growth.

The idea that education contributes to growth is both the origin and the end of the theory of human capital. Based mainly on the qualitative analyzes of this relationship, a literature review on the education-growth relationship can be synthesized. Theodore W. Schultz (1961) found that education accounts for most of the total factor productivity, that dimension of growth that neither physical capital nor the volume of work can justify. Nelson and Phelps (1966) show that the stock of human capital is the main driver of growth and not the difference in rates: differences in growth between countries. Lucas (1988) showed that there are two sources of human capital accumulation: education and learning by doing. He takes up the analysis of Becker (1964) for whom growth is essentially determined by the accumulation of human capital (in terms of flows). This analysis joins those of Mankiw, Romer and Weil (1992) and Barro (1991). Finally, the macroeconomic models estimated by accounting or econometric methods have the upstream introduction of human capital in an aggregate production function, in the same way as the physical capital or the amount of work.

IV. Initial modeling of the human capital-growth link:

The main practical difficulty concerns the measurement of human capital. Indeed, in order to introduce human capital as a factor of production, it is necessary to have data in terms of stocks.

a) Mankiw, Weil and Lucas (1992): an initial approach as a flow

However, as Mankiw, Romer and Weil (1992) do, investment flows can be used, provided that a structural model of growth is introduced and that these economies are close to stationary equilibrium. These authors consider the following production function:

log y = a log k + blog h + log A (1)

Where is the GDP per capita, k the physical capital per capita, h the human capital per capita, A constant, and a and b the unknown parameters. The increase in the stock of human capital per capita is described by:

h + 1 = ht + Ib - (d-n) ht

where b I is gross investment, a depreciation rate of capital and n the rate of population growth. The results of the two great classics of this literature, Barro (1991) and Mankiw, Romer and Weil (1992) are summarized in the table below. The estimates are made cross-sectionally over a hundred countries and the variable explained is the growth of per capita GDP between 1960 and 1985. In order to test the international convergence of growth rates, the authors introduce the level of GDP in 1960 and the investment rate. The authors measure education s by gross enrollment rates. Here is a summary table taken from the work of Barro and Mankiw. Note that the gross enrollment rate for a defined grade level is equal to the ratio between the number of students actually present in class and the number of students who should theoretically be present.

Table 1: Measures in terms of human capital flows

Barro distinguishes between primary and secondary education and retains the value of 1960, while Mankiw, Romer and Weil use an average over the period of the gross secondary school enrollment ratio relative to the labor force. The effects are significantly positive (however, they are only at the 10% threshold for the OECD countries studied). At this point, observe that:

• Investment in primary education, based on mass education, can enable the country to grow. Educational investment leads to increasing the factor of production, namely human capital, as well as investment in education. physical capital,

• Lucas's (1988) view of human capital is seen as an assimilation between physical and human capital.

• This accumulation of capital allows the creation of direct returns for those who are best endowed and its distribution and concentration must be analyzed because, as for physical investment, phenomena of thresholds or externalities exist and can modify level and forms of ownership of performance.

• Therefore, this investment would help the country out of the trap of underdevelopment in which it was trapped. Nevertheless, these evidences nevertheless present limits of analysis.

b) Current difficulties in proving the education-growth nexus

The main limitation of Lucas (1988), Barro (1991) and Mankiw, Romer and Weil (1992) is based on the implicit assumption that education has the same effect on all individuals, as is the capital factor .

• The specifications of Lucas (1988), Barro (1991) and Mankiw, Romer and Weil (1992) would then attribute to human capital the effect on income of these intrinsic characteristics.

• The introduction of regional indicators (for Africa and Latin America) has led to a significant drop in some of the coefficients of education (Barro, 1991).

• Some authors have attempted to directly estimate aggregate production functions, in order to produce robust results on economic assumptions about the nature of equilibria.
• The marginal product of education can remain indefinitely positive for the entire population. This assimilation of human capital to a "classical" capital seems contradictory to the facts. Another limitation is the endogeneity of education.
• There are structural differences between countries (institutional, political, etc.) that can explain differences in growth and even in the accumulation of human capital (Gurgand, 2000).
• Many authors such as Kyriacou, 1991, Lau, Jamison and Louat, 1991, Lau, Bhalla and Louat 1991, Barro and Lee, 1993 and Nehru, Swanson and Dubey, 1995, attempted to construct capital stock data. allowing long-term international comparisons.

V. CONCEPTUAL APPROACH AND DETERMINANTS OF INCLUSIVE GROWTH :

It is the intention of this paragraph to provide a general overview of inclusive growth, by examining its definitions/meaning, determinants as well as measurement. More than ever before, institutions, governments and organizations have been actively talking about inclusive growth. This is a fall out of the fact that it has been observed that increase in income (GDP) of countries does not necessarily mean growth in the first instance, not to talk of sustainable growth. This notion is justified because in most developing countries, there is high unemployment rate, wide income disparity as well as increasing rate of poverty. Although, there is no absolute acceptable definition of inclusive growth, a situation that cut across all branches of economics in agreeing to common definition(s) of any term, there is however, near unison in terms of what inclusive growth generally meant. However , As the term ‘‘inclusive’’, which means all; entire; total and whole, inclusive growth could then be defined as the one that aims to ensure that all income, social and economic groups/agents contribute their quota in the growth process of an economy. Based on this concept, it could be inferred that inclusive growth tends to mainly solve socio-economic/developmental problems such as poverty, inequality and unemployment. In order to have a sound understanding of the concept of inclusive growth, we limit our review to the two leading advocates of inclusive growth-the OECD and UNDP. Starting with the OECD, special attention was devoted to the socioeconomic adversities (unemployment, inequality and poverty) confronting the global economy. They defined inclusive growth as the one that reduces poverty and inequality and benefits the most marginalized section of the population.

Irrespective of the fact that inclusive growth has varying definitions across organizations, there are however, some common positions as regard its determinants. Using the concept of OECD and UNDP, it could be simply summarized that Human Capital Development indicators as well as other socioeconomic variables serve as valid and strong determinants of inclusive growth, To this end, variables such as investment in human capital, job creation, structural transformation and broad-based growth, good institutions and social protection have been found to aid the desired growth

VI . NTERNATIONAL SURVEYS ON THE LINK OR EFFECT OF EDUCATION-GROWTH

Qualitative human capital indicators (HQI) are parameters that allow the economist to gauge the effects of education-training expenditures on the development of the country's wealth (as measured by its level of growth). At this stage, it is proceeded by regressions starting from explanatory variables of the growth (GDP of the country). In this perspective, cognitive levels of schooling can be measured through the results of the international surveys on learning.

a) International surveys: qualitative indicators

De facto, these international surveys have put in place specific procedures to measure levels of proficiency (especially in mathematics, science and reading), by administering to questionnaires both adapted to domestic contexts to several thousand pupils per country. local and allowing an international comparison (international standardization of the tests carried out). These surveys, insofar as their sampling is representative, have made it possible to measure international variations in the cognitive knowledge of school-goers and thus to distinguish the differences in the quality of the future workforce needed by the economy of a school. country. Six groups of international surveys can be mobilized: IEA, PISA, SACMEQ, PASEC, LABORATORIO and MLA. The following table presents the various parameters used by macro economists such as Barro and Hanushek and Kimko to explain the growth by the quality of education.These tests have been deployed to affirm the positive or negative relationship. of schooling on the value added created by human capital in an economy.
(b) Highly criticized international investigations

The choice of these surveys requires explanation.
Previous analyzes have used surveys from 1961 to 1995, without questioning the quality of these. Barro took the test results for all available tests between these two dates for all areas of expertise. Hanushek and Kimko have taken some account of the quality of the data by weighting the raw results by the standard errors. Nevertheless, they recalibrated the data only based on the National Assessment of Evaluational Progress (NAEP). They then assumed that the results from this survey were sufficient to perform an overall anchoring of the data.
Some surveys have been conducted in developing countries and attempt to measure the quality of education in countries that are generally outside the assessments made by large initial international surveys. Although the level of requirement for these surveys is questionable, they represent an indispensable source of data in order to include very poor countries in international comparisons. Moreover, the quality of the IEA surveys has been widely criticized by the OECD, as the questionnaires given to school-goers were too based on the US results. The launch of the Program for International Student Assessment (PISA), by this institution shows that, despite the progress of recent years in sampling methods, surveys are imprecise in their measurement of human capital.

(c) Highly criticized international investigations
These international exploratory surveys show empirical observations:
They alone can not explain the quality of human capital.
They are a unique source for a comparison of education systems, beyond simple quantitative indicators such as the completion rate of a school cycle.
All the surveys used and the main information relating to them are summarized We find the following:

a) Attempt to overcome the problem by Barro & Al. (1993), Nehru (1995)

Barro and Lee (1993) attempt to estimate the schooling of the 25-year-old population. using census data or employment surveys, to obtain a panel of observations for the period 1960-1985, for a large number of countries, and when data are missing, crude rates are used schooling. Also, Nehru et al. (1995) attempted to record gross completion rates and combine them with labor force education stocks, thereby creating annual observations for the period 1960-1987. In the same line of previous work, Pritchett released a measure of school capital using, among other things, the microeconomic wage specification developed by Mincer (1974). In addition to these education data, he uses two series on investment accumulation and estimates of the initial level of capital stock (King and Levine, 1994, Nehru and Dhareshwar, 1993).

b) Studies by Benhabib & Spiegel (1994) and Islam (1995) and Pritchett (2001): lack of link between education and economic growth

Several authors' works have critically read the link between education and economic growth. Some rejected the existence of a positive relationship between these two model variables. Benhabib and Spiegel (1994) used a standard growth accounting model that includes per capita income and estimates of years of schooling expectancy derived from Kyriacou (1991) and obtained a negative coefficient for the growth rate. growth in the number of years of study. Lau, Jamison and Louat (1991) also provide interesting findings, particularly in sub-Saharan Africa.
a) The combination of the quantitative indicator of education S and the IQCH (SIQCH);
b) The test if readjustment of the average number of school years by the quality of education can improve the measurement of education is also an empirical objective;
c) A school year in a given country is not identical to the same year in another country.
d) The value obtained by calculating IQCH / 100 × S can be considered as an average number of school years adjusted to the quality of education.
e) The result is that the coefficient associated with this variable is positive and significant.
f) An increase of one standard deviation of this indicator (approximately 0.83 school year corrected by the IQCH) allows for a 1.5 point increase in the annual growth rate.
g) This effect is more important than the effect of the education quantity indicator alone: the adjustment of a quantitative indicator of education by the IQCH can help to improve the impact of education on growth .

VII. EMPIRICAL STUDIES IN A MACROECONOMIC PERSPECTIVE

The theme is that of measuring the human capital effect on growth. This approximation, which has been achieved through the use of education as the main variable, has made it possible to discuss the challenge of implementing a productive human capital capable of participating in the creation of wealth and economic growth. Nevertheless, international studies and empirical observations by authors in the field of macroeconomics have shown limitations on the contribution of education-training expenditures to GDP in developing countries. Also, attempts to reconsider this link have sought to bring more conclusive perspectives, without being able to bring a convincing analysis, or even a quasi-absence of this link in cases of further econometric studies.

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In the same vein, Islam (1995) implements more complex panel methods. An intermediate form in which human capital is measured directly in stock while physical capital is introduced through the investment rate. Pritchett also supported the idea that one is led to assume a negative relationship of education on growth and significantly. Gurgand (2000) has shown that by using the most robust econometric methods, it becomes impossible to show a positive relationship between human capital and aggregate output growth or level, regardless of the economic specification. In sum, the analyzes of Pritchett (2001) and Benhabib and Spiegel (1994) have contributed to emphasize the lack of relationship between growth and education.

VIII. THE SITUATION OF EDUCATION IN MOROCCO IN AN INCLUSIVE DEVELOPMENT PERSPECTIVE ACCORDING TO THE BM IN 2017

The 2017 World Bank report on Morocco is an opportunity to check the data on the country and its achievements. Indeed, this new report explains how to accelerate and sustain economic growth and make human and social development more inclusive. Indeed, in the coming years, Morocco will be able to accelerate economic growth and create jobs, especially for young people, and catch up with developed countries by investing in its human capital, modernizing its economy and improving economic opportunities. performance of its public institutions. This is the conclusion of the World Bank's latest economic memorandum on Morocco entitled Morocco in 2040: Investing in Intangible Capital to Accelerate Economic Emergence.

This report analyzed and proposed reforms that could improve Morocco's economic and social indicators. "The report released today is the culmination of two years of research and analysis conducted in close collaboration with the Moroccan authorities and key stakeholders in the country. It is timely, as Morocco enters a new phase of its development. We look forward to contributing to the country's efforts towards sustainable development goals, "said Marie-Françoise Marie-Nelly, Director of World Bank Operations for the Maghreb and Malta. We are also very pleased to present the main recommendations of the report to a wide range of actors: public authorities, civil society, academia, the private sector and young people. We hope that this publication will spark a fruitful debate among all sectors of society and pave the way for greater support and understanding of the reforms needed to build a future of shared prosperity. "

The report also highlighted the important economic and social progress made by Morocco over the past fifteen years. The country has initiated reforms aimed at increasing productivity, improving living standards, creating jobs and strengthening institutions. He will have to take care to deepen necessary actions to know:

• Revisit the business model to become more competitive, increase productivity and create a level playing field for investors of all sizes. This will allow the private sector to prosper and create jobs, especially for young people and women.

• Create jobs and carry out the necessary reforms to improve the productivity of its economy and the living conditions of its population, the authors stress.

• Deepen and integrate its sectoral and governance reforms if the country wants to stimulate its development and allow its economy to converge with the countries of Southern Europe.

• Consolidate the rights of Moroccan citizens, expand their opportunities and improve the Kingdom's governance framework.

• Invest more in its human capital, especially in two crucial sectors in the long term: education and health.

"This roadmap attempts to describe the policy and economic conditions that can boost Morocco's growth potential. But the most important thing is that every citizen feels that he can and must contribute to the development of his country, make institutions inclusive and promote equal economic opportunities, as well as

equality between men. and women and interpersonal trust, and to build Morocco's future with confidence, "explains Jean-Pierre Chauffour, senior economist at the World Bank and lead author of the report. There needs to be a consultative and inclusive process that allows all stakeholders to discuss and agree on what they want for their country by 2040. We hope that the analyzes and projections presented in this report will have at least contributed to launch this debate. "

In order for an "educational miracle" to take place and Moroccan students to acquire the skills that will enable them to integrate into a more competitive labor market, the memorandum advocates modernizing the entire education system, focusing on improved performance, governance and results. The memorandum emphasizes that Morocco's ability to strengthen women's position and broaden economic prospects is a major contributor to significantly improving economic growth.

Finally, the report considers that, to ensure that the rule of law is better applied and to place citizens at the heart of the development model, we must start by strengthening the institutions and governance model of the country. Public services must become more efficient and accountable, citizens must be involved in decision-making, and mutual respect, interpersonal trust and civic responsibility must be strengthened.

IX. SOME THOUGHTS ON MOROCCO

A series of ideas for reflection emerge after having questioned the link between education (human capital and growth). This link deserves all interest in a perspective of endogenous growth.

a) Human Resources versus Natural Resources: In particular, resource-poor countries in East Asia deserve to be revisited to build on their success, and some adjustments are needed. These countries built their success on their abundant and productive labor endowment, supplemented by a rapid accumulation of capital. To succeed, resource-based economies will have to do what successful developers in East and Central Europe have done: integrate with the rest of the world through foreign trade and foreign investment. This is the sine qua non for economic development. Thus, in the absence of natural resources, the development of a country will essentially pass through the human capital which will have to be amplified. The creation of wealth through innovation and development and productivity through state-of-the-art technology and expertise in areas of competitive advantage would be sought in more than one way. Morocco has an interest in developing inclusive growth to succeed in the challenge of sustainable development and emergence.

b) WB's successful and successful human potential: Morocco is one of the Middle East and North Africa (MENA) 's promising countries in terms of human capital with an ambitious youth determined to achieve the development goals from the country. The Kingdom has a human potential that enjoys creative energy and a great capacity for innovation, particularly in the field of new technologies. Also, the issue of youth occupies a central place in the development strategy of the world institution and the international financial institutions. Thus, the strategy of the World Bank (WB) in particular, will be articulated in the "most productive way" in Morocco, in order to place it on an inclusive growth strategy and prepare Moroccans for the world of tomorrow. The public authorities are invited to offer more space for the private sector, so that it can contribute largely in the realization of large-scale projects engaged in the Kingdom.

c) Role of the private versus the public sector: The pursuit of growth and shared prosperity is most effective when driven by the private sector and facilitated by complementary government actions. The role of government includes maintaining macroeconomic stability and other elements that provide an enabling environment for private sector activities, such as an adequate regulatory framework and order. It also has a role in providing public goods with varying degrees of collaboration with the private sector and external partners; for example, reliable access to electricity, physical and virtual connectivity, collection and dissemination of essential information for decision-making and basic social services such as education and health. Again, we recommend that the authorities aim to prioritize interventions that benefit a large part of the population, especially those who need them most.

X. CONCLUSION:

The work of Hanushek and Barro again supporting the positive link between education and growth is illuminating at this level of analysis. Indeed, most studies use strictly quantitative indicators of human capital. Only a few studies take into account, in a still partial way, the quality of the education notably of Hanuschek and Kimko then Barro:

• Hanushek and Kimko (2000), in order to better understand the quality of human capital, measure it by the results of students in the various international tests on the achievements in mathematics and science. They then build a standardized measure of the quality of the workforce for 31 countries covering the period 1960-1990. The authors used the surveys of the International Association of Evaluation of Educational Achievement (IEA) and the International Assessment of Educational Progress (EIPA). In total, twenty-six educational performance series were considered (distinguishing ages, area of competence [ie only mathematics and science], and years). The authors then performed a regression of the average annual growth rate with the initial growth rate (1960), a

quantitative indicator of education, the average annual growth rate of the population, and their quality of life indicator. 'education.

o The results show a negative and significant relationship of the initial income level; a positive but not significant coefficient for the quantitative indicator of education; a positive and very significant coefficient on the qualitative indicator of education; finally, a negative but not significant coefficient for the average annual growth rate of the population. After an analysis of causality, they show that there is indeed a positive and significant effect of the quality of education on the rate of growth of the economy.

• Another contribution that directly shifts the measure of the quality of education to a growth model is Barro (2001). The data come from the same sources as those of Hanushek and Kimko. However, Barro builds different indicators according to the area of competence (mathematics, science and reading). These indicators are only available for one period and are entered in a panel regression. Barro uses as a specification the one he used in a previous article (Barro, 1997). Due to the limited number of countries with qualitative indicators of education, the sample is smaller and only concerns 43 countries. His estimation method includes three equations in which the dependent variable is the real annual growth rate of per capita GDP in purchasing power parity for the periods 1965-75, 1975-85 and 1985-90. Barro uses many control variables such as a rule-of-law index, an indicator of international trade, an indicator of inflation, fertility ... In order to avoid possible problems of endogeneity , the author uses the triple-least-squares method to solve a model with three simultaneous equations.

o The results show that the quality of education is more important than the quantity measured by the average levels of completion of secondary and higher education. Confirming the ideas of Hanushek and Kimko, Barro finds a positive but not significant coefficient for the quantity indicator of education, while that of the quality of education has a positive and highly significant coefficient.

In Morocco, macroeconomists will be able to use this work to shed light on the link between human capital and economic growth. While making sure that growth is accounted for by the quality of education offered to school-goers, the country must therefore invest in quality in addition to quantity. As we have clearly understood, developed countries have a significant quantitative coefficient, Barro et al. other renowned economists have demonstrated, growth is indeed correlated with the level of investment in education but especially the qualitative aspects related to the latter. Morocco is in the process of revisiting its education system by reformat, an announcement of several reforms is an opportunity to reposition the issue of production of human capital (through a quantitative education and quality) is therefore hot news. The choice to conduct extensive exploratory research in this direction is a choice and a duty for us economists. Also, the production of growth-related education data should allow statistical and trend comparisons, but also methods and levels, based on standardized qualitative indicators recognized by scientists and politicians. Education is thus one parameter among others that would have an effect or externalities on growth as would health and employment.

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