

Trade Liberalization, Human Capital and Economic Growth in countries from MENA region: empirical analysis of panel data

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ABSTRACT

This study is a panel data analysis of the relation between trade openness, human capital and economic growth of seventeen countries in the Middle East and North Africa (MENA) in the period 1990-2014. Our study is based on two econometric models: random and fixed effects models. The random effects model measures the trade openness impact on human capital. The fixed effects model measures the trade openness impact on economic growth. Here, we also introduce the human capital variable in order to gauge its impact on economic growth. The main results of the study are manifold. First, trade openness impacts human capital negatively but insignificantly. Second, trade openness impacts economic growth positively but insignificantly. Third, human capital impacts economic growth negatively and significantly. Finally, the countries of the MENA region must invest in human capital in order to benefit from trade openness.

keywords: Trade Openness, Economic Growth, Human Capital, MENA Region, REM

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1. INTRODUCTION

Nowadays, the literature on the foundations of the relation between trade liberalization and economic growth still requires more clarification. The fundamental question is to *measure the degree of impact of the trade openness on the economic growth*, in other words, to know more about it on the links between these two elements.

If it is known that the trade openness encourages the decision-makers to pursue virtuous macroeconomic policies, it is not less true that, from a theoretical point of view, *the open economies are called to know lower one degree of distortion of the prices*, which risks to affect negatively the accumulation of the factors of production and, consequently, the economic growth.

In the context of trade openness, it was indeed noticed that the main channels of transmission by which the trade liberalization affects the economic growth are *the accumulation of the capital, the factor price equality, and knowledge and technologies transfers*. The last two channels are the ones bound to the human capital of a given country. A more open economy will likely to have better gain in the exchange and will have the capacity to absorb new technologies. Which is noticeable in MENA region today is that countries are strongly investing in the education. While these countries compete more strongly on the world markets, they are interested in the ways to find their great historical asset: the human capital.

Approximately 21.5 % of the inhabitants of the region, that is almost 70 million people, have between 15 and 24 years, and 45 % are less than 15 years old. For some observers, this situation is a "demographic time bomb", in a region where the rarity of employment for graduate the higher

education is more and more smelt. However, seen by another prospect, the MENA region constitutes a potential of talents, skills and innovations, and may become a world important actor.

The present work focuses in particular on *the study of the impact of trade liberalization on human capital and economic growth through the analysis of panel data, within the MENA region*.

It is organized in the following way: at first, we proceed to the definition of the theoretical and empirical frame of our analysis there by presenting the various postulates and the empirical results relative to the trade openness/human capital/growth relation. Then, we will present variables and used data followed by a discussion of the adopted econometric methods. Finally, the results of the proposed econometric tests will allow us to draw conclusions.

2. THEORETICAL AND EMPIRICAL LITERATURE

2.1. Theoretical literature review

2.1.1. Relation trade openness and economic growth

The theory of the comparative advantage of David Ricardo (1817) shows that the opening allows a reallocation of rare resources towards the most efficient sectors and for a better well-being of the population. Heckscher and Ohlin (1933) extend this theory by confirming these earnings and by adding others bound to the remuneration for the factors of production. However, within the various theories relative to the international trade, these gains remain static and find their dynamism only in the growth theory.

Solow (1956) shows that the growth was explained only by exogenous factors¹. Here, the commercial policies of a country would not know how to be considered as an element affecting its growth. For the theory of the endogenous growth, the trade liberalization can affect the economic growth in a permanent way, in particular through the spontaneous strengths of the market which can stimulate the technical progress and, consequently, the economic growth². In the case of growth models with learning (practice), the studies revealed that the initial situation of a country determines the nature of its specialization on the long term as well as its growth rate, further to the opening³...

Also, to protect infant industries, these studies recommend protectionist trade policies, at least for a moment.

However, according to other studies, the innovation is presented as source of growth encouraging a policy of openness⁴. However, the mutual tariffs incite to the activity of imitation and decrease, consequently, the economic growth rate. In the case of countries exchanging only goods, Rivera-Batiz and Romer (1991) shows that the growth rate does not vary appreciably and rather stays at a level of autarky. Feenstra (1990) and Grossman and Helpman (1991), as for them, find the presence of two effects of opening on the growth⁵. On one side, in it allows the firms to invest, to innovate and to increase the size of the market. On the other one, the strong competition entails reduction of the incentive to innovate. To note, besides that, in the case of two countries of the same size, certain authors find that these two

effects nullify, what returns the ineffective opening on the growth⁶.

Aubin (1994), pursuing the works of Rivera-Batiz and Romer, shows that with a coordination of the economic policies between countries, the gains of openness in terms of growth are more important⁷. Nevertheless, it is necessary to remind that, the theoretical works did not manage to cut on a positive or negative effect of the openness on the economic growth. Also, the results of every model depend strongly on the composition and the hypothesis of the model to be considered.

The empirical works, on the other hand, end in homogeneous results and identify a favour effect of the opening on the growth⁸. Most of the studies on the relation growth-openness arrive at the conclusions below (Dessus 1998):

- " A highlighting of a learning effect due to the promotion of the exports (Learning by Exporting);
- An increasing use of technology imported in a context of decreasing efficiency on imitation;
- *An improvement of the efficiency allocative of the economy due to the progressive reduction of the outside barriers and the competitive pressures increase.*"⁹

Dessus shows in his analysis that three above-mentioned effects receive a positive impact on the growth of the international openness. Nevertheless, such effects apply even better in countries developed at the levels of relatively high per capita incomes. This question of the growth-openness

¹ R. Solow, "Technical Change and the Aggregate Production Function", *Review of Economics and Statistics*, vol. 39, n° 3, august, p. 312-320, 1956.

² G.M. Grossman and E. Helpman (1991a), A. Young (1991), J.W. Lee (1993).

³ P.R. Krugman (1987), R.E. Lucas (1988), A. Young (1991).

⁴ R. Feenstra (1990), G.M. Grossman and E. Helpman (1991a), (1991b), L.A. Rivera-Batiz, P.M. Romer (1991a), (1991b)

⁵ G.M. Grossman and E. Helpman (1991c)

⁶ A. Abdouni et S. Hanchane, (2006) « Ouverture, capital humain et croissance économique : Fondements théoriques et identification des liens à l'aide de données de panel », *Critique économique*, N°17.

⁷ C. Aubin (1994), « Croissance endogène et coopération internationale », *Revue d'économie politique*, 104 (1).

⁸ G. Feder (1983), B. Balassa (1985), A. Harrison (1996), S. Edwards (1998).

⁹ S. DESSUS (1998), « Ouverture et productivité à Taiwan », *Economie Internationale*, n° 73, trimestre 1.

relation turns out so essential, in particular in view insertion problem of the developing countries in the international division of the work and the choice of their economic policy.

There are many factors by which the effects of the opening on the growth are passed on, these effects constituting only some of these channels; the advantages of the opening base among others on the optimal allocation of the resources and the access to a more advanced technology.

Harrison (1995) stresses that the relation existing between the opening and the economic growth could be confusing by the fact that it was associated with other factors. Numerous theoretical arguments are directed towards the existence of the positive causal link between trade openness and economic growth. These arguments can be ventilated in two types following the nature of their impacts:

The trade openness considered as an engine of economic growth

According to Ricardian logic, the specialization of the state economies allows a global economy of factors of production and leaving a movement of the border of the possibilities of production. But these earnings are essentially static, the strength of this "classic" argument remains consequently rather relative. The trade openness contributes, incontestably, in the international distribution of the innovation through the flows of services and goods, in particular capital goods which has a leading role. It also allows the exploitation of static, dynamic and internal economies of scale even external through the establishment of big markets and the extension of the produced series. Productivity gains obtained in the sectors export of spread in the whole economy on a national scale in particular through the price reduction relative of the capital goods. The arguments developed by the theory of the endogenous growth are also found in this vein even if foundations are more immaterial. The openness gives access to the world stock of

knowledge, the establishment of big markets allows the diverse research area to exploit increasing yields on scale and to delete repeated activities. After all, every country can dedicate a more important part of human capital to the search. Here, the trade openness is still unmistakably a real engine of the growth.

The trade openness, the catalyst of the growth

Through the intensification of the competition, the trade openness would constitute a factor of all-out rationalization within savings. At the microeconomic level, the business competition accelerates de facto the search for productivity gains, the effort of adaptation to the request, and under certain hypotheses the rhythm of the innovation ... At the macroeconomic level, the opening would constitute a factor disciplining regarding conduct of the cyclical policies and a factor of orientation of the structural policies towards more flexibility and leaving towards a better global allocation of the resources.

We find in this case, the "consensus of Washington" philosophy is argument is fought by Stiglitz (2002) who reminds that the strategies of structural adjustment have social consequences which entail a stronger instability of the economic growth rate. Finally, the trade openness would force societies to focus on a better efficiency of their institutions, in particular their education system to adapt itself to the technological changes (innovations). In this case, the openness would be through this channel, a catalyst of the development.

2.1.2. Human capital and economic growth relation

Generally speaking, based on the first studies¹⁰ and those more recent¹¹, it was noticed that the human capital is a factor exercising an influence on the growth, along with research and development

¹⁰ R. Barro (1991), R.J. Barro and J.W. Lee (1996), R. Barro and X. Sala-i-Martin (1995).

¹¹ J. Temple (1999) and S. Ahn and P. Hemmings (2000).

activities, macroeconomic and structural frames of the action of public authorities, the commercial foreign policy or even the situation of financial markets. However, it should be noted that the exact role of the human capital in the economic growth of the developing countries is to be clearly defined.

Numerous authors (Romer, Grossman and Helpman) assert, on the other hand, that the developing countries can benefit from the technology transfer, largely via the trade openness. Furthermore, there is in these countries a difficulty in pointing the impact of the human capital on the growth, unless technological elements resulting from the outside opening of economies are integrated in explicit way. This seems to justify a consolidation of the role of the human capital in the growth of these countries. Due to its characteristic of component of the human capital, the education exercises a positive influence on the level or the growth rate of the economy. Also, growth researchers recently made the accumulation of the human capital one of the fundamental axes of their models¹², and that is how, from a theoretical point of view, the education-growth relation was built. Perceived through the empirical works, it is on the big sample of country that this relation appears rather clearly and takes widely the shape of a positive correlation, or a causality. Also, it remains very vague in certain regions of the world, knowing that the education is exercising only a much-reduced influence (or without influence) on the growth within the African countries¹³.

As regards the abstract frame of the theory of the human capital, the contribution of Becker (1964) is to have fixed this frame by formalizing it by the educational choices as a choice rational an optimizing agent which compares, on the duration

of their life cycle, the value presents earnings to be expected from the education and the committed costs.

The contributions of Lucas (1988) and Mankiw, Romer, Weil (MRW) (1992) is going to bring a new impulse to the debate on the relation economic growth-human capital. Around the end of the XXth century, some works as those of Caselli, Esquivel and Fernando (1996) and Pritchett (2001) questioned, nevertheless, this relation and ended in an absence of relation, or in a negative relation. The neo-classic model of Solow (1956) planned that the similar economies in terms of technology and rather, would align themselves with an identical level of GDP per head. Mutually, the theory of the endogenous growth introduced by Romer (1986), expresses that the differences between the levels of GDP per capita remain.

For Becker, "*the human capital can be seen as all the productive talents and the skills of the worker, that they are informally acquired (via the experience) or formally (via the education or the formation)*". According to the economic theory, for the development of an economy, neo-classic and endogenous growth models, put, prejudice, the accent on the importance of the human capital: by distinguishing the models which consider the human capital in the function of production as a factor of accumulation just like the physical capital of those who show that a higher stock of human capital affects essentially the economic growth by facilitating the innovation and the adoption of new technologies.

Mankiw and al. (1992) propose an augmented Solow model. For them, they are the disparities on the scale of the education, the savings and the population who demonstrate the differences of per capita incomes. They also rise that the poor countries tend to grow faster than the rich countries or those endowed with technology, with a rate of accumulation of the capital and with a population

¹² R.E. Lucas (1988), P. Romer (1990) P. Aghion and P. Howitt (1992).

¹³ R. Barro (1991), L.J. Lau, D.T. Jamison, F.F. Louat (1991), N.G. Mankiw, D. Romer and D.N. Weil (1992), J. Benhabib and M.M. Spiegel (1994).

growth similar, and are supposed to converge more lately than the second, as predicted by the neo-classic model of Solow (1956). Benhabib and al. (1994) propose, as for them, an approach inspired by the theory of endogenous growth. These authors model the technological progress as a function of the level of the human or educational resources. Their results question the traditional role granted to the human capital, as isolated factor of production, in the process of development. Pursuing their reflection on the impact of the education on the growth, Benhabib and Spiegel (1994) also show that it is the direct effect of the education on the capacity to innovate who is to influence the growth in the richest countries while the catch-up effect, him, intervenes in the poorest countries. They end from it, from then on, that the impact of the education on the growth is to be determined from the level of development of every country.

Resuming this postulate, various empirical studies¹⁴ questioned the contribution of the education to the growth there, by putting forward three reasons: an unfavourable politico-institutional environment is fatal for the accumulation of the human capital and eases, therefore, the economic growth. Then, a low educational quality on the duration is hardly profitable, this one creating no significant improvement in terms of human capital; finally, the yields on the education could fall quickly when the offer of educated working strength increases in front of a stagnant demand.

For its part, and through the initial endowment of available human resources in the economy, Dessus (2000) got down to explain another aspect of the human capital than is the heterogeneity of the quality of education systems. This confirms the results of Azariadis and Drazen (1990) according to which the fast growth cannot be made without a high level of human capital investment compared with the per capita income.

As for Wössman (2000), he proposes a review of the human capital proxies used in the literature. Among them, we can quote the work increased by the education, the literacy rate, the average, primary or secondary percentage of children in full-time education or, even the average number of years of studies.

The author criticizes each of these indicators because, according to him, they only give a certain idea of the human capital incorporated into the workforce. He suggests a new indicator allowing considering a double quantitative and qualitative aspect of the human capital, respectively by taking into consideration of its decreasing yields and the efficiency of the education system.

Barro (2001) and, Creel and Pilon (2006) proposed later a new approach of the human capital consisting both of the measure of the quality of the education in a growth model and through the impact of the human capital (educational ordinary spending and public investment on the growth by using an augmented model of Solow). Their results show that the consideration of the quality of the education is more important than its quantity (completion of high school and university level education).

2.2. Empirical literature review

There are numerous empirical studies on the relation between trade openness and economic growth. After examination, we can conclude that ***most of the studies proved that the first one has a positive effect on the second***¹⁵. Furthermore, the studies which deal with the trade openness they assert that ***the last one affects the economic growth positively***¹⁶.

¹⁵ R. Levine and D. Renelt (1992), D. Greenaway and D. Sapsford (1993), S. Ghatak, C. Milner and U. Utkulu (1995), J.C. Jin (2000), E. Cavallo, and J.A. Frankel (2007).

¹⁶ C. Arteta, B. Eichengreen and C. Wyplosz (2001), S. Edwards (2004), U. Utkulu and D. Özdemir (2004).

¹⁴ L. Pritchett (2001) and A. Krueger and M. Lindahl (2001).

In this regard, *an increased number of studies adopting the data analysis of panel was found. If some of them brought the clear evidence that the trade openness promotes the economic growth, others reached opposite results.* Thus, the results of the selected studies, following a non-exhaustive and chronological review turn out sensitive to indicators and adopted models¹⁷:

Discussing the growth, Dollar and Kraay¹⁸ highlights that *a third of the developing countries had, during the last two decades, good results in terms of income growth and poverty reduction* (Bangladesh, India and Sri Lanka have known a strong improvement of their trade balance and a significant reduction of their tariff barriers (tariff and non-tariff)). However, *the rest of the developing countries, whose trade is largely concentrated in Africa, did not had expansion beyond the continent* which is due to a lack of openness on the rest of the world and which was settled by weak results in terms of growth and poverty reduction.

As for Söderbom and Teal¹⁹, they have re-examined *the hypothesis on the positive impact of a high level of the human capital on the trade openness and the productivity growth.* In the subject topic, which involved some 93 countries over the period 1970-2000, these authors used models with fixed effects. It remains, however, noted that *if their hypothesis proves to show a significant effect of the human capital on income, it does not reveal any effect of it on the productivity growth.*

Utkulu and to Özdemir²⁰ have instead focused their reflection on the human capital through an empirical examination of *the impact of the trade openness on economic growth and the per capita income* in Turkey. To do it, they used data over a wide period, from 1950 to 2000. *The cointegration in Johansen and the Error Correction Model (ECM)* were used to test the relation between trade openness and economic growth. The human capital (measured by the rate of registration in high school) and physical were taken as variables of control with main variable the trade openness. *The results showed a significant impact of the trade openness on economic growth in Turkey* both on the short and the long term. Furthermore, three exogenous variables, trade openness, the human capital and the physical capital, resulted in the country's economic growth which are during this period.

Which have dealt Krebs and al.²¹, with the Mexican case, *were particularly interested to estimate empirically the relation between the trade liberalization and the risk affecting the income of the individuals.* They examine, then, *the degree of incidence of the commercial policy on workers' income from different human capital*, while taking for proxy of the said capital the education. It also had to be noted, that *in the evaluation suggested by these authors for the period 1987-1998, the data for the various industrial sectors and the results are obtained using a simple regression analysis.* They conclude ultimately, that *the trade openness in Mexico has no link with the risk of income.* Furthermore, it was found that *the reforms regarding in trade policy in this country have no impact on the risk of individual income in the case of a low or high human capital, but they cause,*

¹⁷ A.S. Bilman and S. Turkeli, "Interaction between international trade and economic growth: Evidence from qualitative comparative analysis", *International Economics Letters*, Volume: 2, No: 4, pp. 5 – 18 ISSN: 1805-7306, November 2013.

¹⁸ D. Dollar and A. Kraay, "Trade, Growth and Poverty", *World Bank Development Research Group*, Washington D.C., 2001.

¹⁹ M. Söderbom and F. Teal, "Openness and human capital as sources of productivity growth: An empirical investigation", *EconWPA series Development and Comp Systems*, No. 0409031, 2003.

²⁰ U. Utkulu and D. Özdemir, "Does trade liberalization cause a long run economic growth in Turkey?" *Economics of Planning*, Volume 37(3-4), p. 245-266, (2004)

²¹ T. Krebs, P. Krishna and W. Maloney, "Human capital, trade liberalization and income risk", *Defense of Globalization: Prospects and Problems*. University of Florida, Gainesville, January 29-31, 2005.

however, an increase of the risk of income among individuals with intermediate human capital.

Also, discussing *the impact of trade openness on the growth in the developing countries*, Abdouni Abdeljabbar and Said Hanchane²² propose an *endogenous growth model taking into account their low factorial subsidies, factor endowment particular in terms of human capital*. The study concerns a panel of 47 countries (1980-1997). A random individual effect model is specified there and is estimated using generalized method of moments (GMM). *Their results show that the opening of the developing countries has globally a positive effect on their economic growth allowing them, through the imported properties, to reach the foreign "knowledge", essential in the process of production of firms.*

Examining, for their part, *the effect of the trade, labour, education and debt on economic growth* of Pakistan, Hasan and Butt²³ uses a database between 1975 and 2005. The estimations were obtained using the approach ARDL and *the results reveal that the workforce and the education contribute positively to the economic growth* of this country. On the long term, *the increase of one percentage point of workforce of the level entails an increase of 2.85 % of the economic growth.*

Seeking to determine to what extent trade liberalization had affected the Sri Lankan economy, Herath²⁴ proceeded, as for him, to the division of the 1960-2007 period in two: 1960-1976 and 1977-2007 (respectively before and after the trade liberalization), by applying to the periods considered *the Chow test* to allow the study of

structural changes of the said economy. *The results show a positive effect of the trade liberalization on economic growth and reveal an increase in growth after the trade openness.*

Verifying the causal relation between trade openness, human capital and economic growth of Pakistan, Chaudhry and al.²⁵ *resorted to the use of the causality according to Granger*. As for the relation of short and long-term between 3 aforementioned variables, the authors used *the Johansen cointegration and the Vector Error Correction Model (VECM)*. The studied period is between 1972 and 2007. *The authors show a positive and significant relation between trade openness and economic growth* during chosen period, with the same report between human capital and economic growth. Through the significant effect of the trade openness and working strength on economic growth, *exports have resulted in growth assumption and in the existence of a unidirectional causality between trade openness and economic growth.*

Lai²⁶, also, studied *the impact of the trade liberalization on the human capital* for 41 developing countries. The data period is from 1980 to 2002. The author took, as proxy of human capital, the registration to the high school. The income, the year of liberalization and the public spending, were taken as control variables for the model.

By dividing countries studied in 2 groups: high and low rate of literacy, Lai wanted to verify the effects of the trade liberalization on human capital and succeeded in highlighting the difference between the quality and the quantity of human

²² A. Abdouni and S. Hanchane (Winter 2006).

²³ A. Hasan and S. Butt, "Role of trade, external debt, labor force and education in economic growth: Empirical evidence from Pakistan by using ARDL approach", *European Journal of Scientific Research*, Volume 20(4), pp. 852-862, 2008.

²⁴ H.M.S.P. Herath, "Impact of trade liberalization on economic growth of Sri Lanka: An econometric investigation", *Department of Banking and Finance, Faculty of Business Studies and Finance, Wayamba University of Sri Lanka*, 2008.

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²⁵ I.S. Chaudhry, A. Malik and M.Z. Faridi, "Exploring the causality relationship between trade liberalization, human capital and economic growth: Empirical evidence from Pakistan", *Journal of Economics and International Finance*, Volume 2(8), pp. 175-182, 2010.

²⁶ C.W. Lai, "Trade liberalization and human capital formation in developing countries", *Hong Kong Baptist University, Kowloon Tung, Hong Kong*, (2010)

capital. *The results show that the trade openness has increased more the human capital (formation) in the countries where the literacy rate is higher than in those where this rate is low.*

Having had to consider how the trade liberalization affected the Nigerian economy, Effiom and al.²⁷ developed two models to verify the impact of the trade openness on the economic growth and the human capital, by using two proxies separately: the literacy rate and the education spending. The data are the ones concerning the period 1970-2008, the model used the VAR analysis and the cointegration one. *The obtained results show that the trade liberalization of the Nigerian economy had, statistically, no significant effect on the human capital, when the used proxy was the spending in education. But, the results were completely opposite for the literacy rate to conclude that the trade liberalization affects, all the same, positively Nigerian growth.*

As for Maksymenko and Rabbani²⁸ mostly examined the impact of *human capital accumulation and the trade policy reforms* within the time frame that come after their introduction on economic growth in India and in South Korea. For this later, data are relative to the period between 1966 and 1977 while those concerning the Indian case are relative to the time frame going from 1992 to 2003. *The estimations were obtained by using maximum likelihood and the multivariate model: cointegration. If, indeed, the human capital contributes positively and significantly to the economic growth of both countries, the effect of the trade reforms on the capital differentiates*

them because it was significant and positive in the case of South Korea but low and negative in that of India.

On the other hand, the authors Nwosa and al.²⁹ drawn special attention to *the relative contribution of trade liberalization on the revenue from business tax* to Nigeria between 1970 and 2009. *The results of their research revealed that the trade liberalization, the public debt, the gross domestic product and the working population have a positive incidence on tax revenues (business tax) and negative on the exchange rate;* which led them to conclude that *to improve the trade liberalization in Nigeria, there is need to strengthen the macroeconomic policy.*

Testing empirically *the effect of trade liberalization on the economic growth of Bangladesh, the effect which they verified by using the ordinary least squares method* during period 1980-2010, Manni and Afzal³⁰ came to the conclusion there, which *the trade liberalization contributed positively to the economic growth* of Bangladesh. However, it is important to reveal that during this period, *the liberalization not only affected the inflation in the country, but also increased both the imports and the exports.*

As Chaudhry and al., the authors Nirodha De Silva, Benaissa Chidmi, Jeff Johnson³¹ tried to demonstrate *the relation of causality between trade liberalization and economic growth* in Sri Lanka during the period 1960-2010, by using the tests of co-integration and Causality of Granger. *The*

²⁷ L. Effiom, U.P. Samuel, E.O. Okon and E.E. Itam, "Trade liberalization and human capital in Nigeria: A vector autoregressive analysis", *European Journal of Economics, Finance and Administrative Sciences*, Volume 40, pp. 154-168, (2011).

²⁸ S. Maksymenko and M. Rabbani, "Economic reforms, human capital, and economic growth in India and South Korea: A co integration analysis", *Journal of Economic Development*, Volume 36(2), pp. 39-59, 2011.

²⁹ P.I. Nwosa, M.O. Saibu and O.O. Fakunle, "The Effect of Trade Liberalization on Trade Tax Revenue in Nigeria", *African Economic and Business Review*, 10(2): 28-43, 2012.

³⁰ U.H. Manni and M.N. Afzal, "Effect of trade liberalization on economic growth of developing countries: A case of Bangladesh economy", *Journal of Business, Economics and Finance*, Volume 1(2), pp. 37-44, 2012.

³¹ N. De Silva, B. Chidmi, J. Johnson, "Trade Liberalization, Openness, and Economic Growth in Sri Lanka: A Co-Integration Analysis", *GSTF International Journal of Engineering Technology (JET)* Vol.2 No.2, August 2013.

results support a long-term relation between trade openness and economic growth. The study concludes on the fact that *the investments and the agreements of free trade are not only correlated significantly and positively to the economic growth* but support it significantly.

Finally, *the addition brought by the authors Atif Khan Jadoon, Hafiz Abdur Rashid and Aamir Azeem³² to the study of the impact of the trade liberalization on the human capital and the economic growth is their comparative analysis through a panel of Asian countries classified by level of income.* The results show that *the developed countries and in development know an economic growth due to the trade* during studied period (1981-2012). The impact of the trade openness on the human capital is positive for both groups of countries, but significant only for the developed countries, because of the existence of qualified human capital.

3. EMPIRICAL STUDY OF THE RELATIONSHIP BETWEEN TRADE OPENNESS/HUMAN CAPITAL AND ECONOMIC GROWTH FOR A PANEL OF COUNTRIES IN THE MENA REGION

The purpose of this section is to study empirically the impact of trade openness on human capital and economic growth in the MENA region. We will also discuss if whether trade openness is related to economic growth because of its impact on human capital in those countries.

3.1. Specification of the econometric models

Following the methodology adopted by the authors³³, we will consider two models:

³² A.K. Jadoon, H.A. Rashid and A. Azeem, "Trade liberalization, Human capital and Economic growth : EMPIRICAL EVIDENCE FROM SELECTED ASIAN COUNTRIES", Pakistan Economic and Social Review, Volume 53, No. 1, pp. 113-132, Summer 2015.

³³ Cf. A.K. Jadoon, H.A. Rashid and A. Azeem (Summer 2015).

The first is designed to verify the impact of trade liberalization on human capital. In this case, the dependent variable which is taken into account is human capital and the explanatory variable is trade opening, are also integrated in this model, control variables, namely the demographic dependency ratio and the growth of per capita income. The model to estimate, as an equation, is written:

$$HC_{it} = \beta_0 + \beta_1 OP_{it} + \beta_2 DEP_{it} + \beta_3 PCY_{it} + \varepsilon_t \quad [1]$$

Where

HC_{it} = Human capital

OP_{it} = Trade liberalization

DEP_{it} = Dependency ratio

PCY_{it} = Growth of per capita income

ε_t = Random disturbance term

i and t Cross section and time series dimension of the variable

For $i = 1, \dots, 17$ / $t = 1990, \dots, 2014$.

With β_0 , β_1 , β_2 and β_3 are the parameters to be estimated in this model.

The second model is designed to examine the direct impact of trade liberalization on economic growth, human capital is incorporated in the model to check its impact on growth because it is affected by trade liberalization. Similarly, labor and capital are also incorporated into the model, considered as basic components for the explanation of economic growth. Therefore, we consider the following model as equation to estimate:

$$Y_{it} = \beta_0 + \beta_1 K_{it} + \beta_2 Logl_{it} + \beta_3 HC_{it} + \beta_4 OP_{it} + \varepsilon_t \quad [2]$$

Where

Y_{it} = Growth Rates

K_{it} = Gross Capital Formation

$Logl_{it}$ = Labour Force

With β_0 , β_1 , β_2 , β_3 and β_4 are the parameters to be estimated in this model.

3.2. Presentation of variables

The exposed variables are related to a panel of 17 countries³⁴ in the MENA region for the period 1990-2014. In the first model, the dependent variable is human capital (HC) and the explanatory variables are trade liberalization (OP), the dependency ratio (DEP) and the growth of per capita income (PCY). For the second model, the dependent variable is the GDP growth rate (Y) and the independent variables are the gross capital formation (K), labor force (log L), human capital (HC) and trade openness (OP).

3.2.1. The variables of the first model

3.2.1.1. The dependent variable: Human Capital

In our first model, we use as dependent variable human capital measured by enrolment in high school. This is the total enrolment in secondary education, regardless of age, expressed as a percentage of the population in age to follow a formal secondary education. This rate can exceed 100 % due to inclusions of students under or over-aged, respectively as a result of early or late enrolment, and repetition. The data for all variables studied in this model are available in the database of the World Bank.

3.2.1.2. Independent variables: Trade liberalization, the dependency ratio and growth of per capita income

Since the trade liberalization, economies have become increasingly interdependent. In terms of trade liberalization, it is measured by the trade opening rate that is the sum of trade (exports and imports) of goods and services calculated as a percentage of GDP. In this sense, the evolution of trade dependence ratio, maybe analysed compared to GDP: $(M + X) / GDP$. The proportioned load of inactive people (population aged under 15 and over 64 years) relative to the working age population

(population aged 15 to 64) is measured by the demographic dependency ratio. The data are represented as the proportion of inactive people per 100 people of working age. The standard of living of the population is the quality and quantity of goods and services that an individual or a population is able to acquire. Its evolution is measured by GDP per capita (US \$ constant 2005).

3.2.2. The variables of the second model

3.2.3. The dependent variable: GDP growth rate

For the empirical analysis of the second model, we use the GDP growth rate as the dependent variable. The data for this variable as well as the explanatory variables are taken from the database of the World Bank.

3.2.3.1. Independent variables: Gross capital formation, labor force, human capital and trade openness

Since the early work of Solow, the theory of economic growth is explained by an increase in primary capital resources (gross capital formation) and work (labor force) employed in the production and growth of the global productivity of factors (GPF). The capital factor measured by the gross capital formation (formerly gross domestic investment) is all expenses consisting of tangible capital additions of the economy plus net inventory changes. The labor factor meanwhile is measured by the total labor force corresponding to persons aged 15 and over. According to the International Labour Organization (ILO), the labor force includes all persons supplying labor for the production of goods and services during a given period. This definition includes both workers and job seekers. In continuation of the work of MRW, the second model is Solow's augmented model of human capital and trade openness. Authors like Pissarides (1997) believe that the most appropriate economic framework for a reallocation of human capital to more productive activities is that of economic openness. The latter allows economies to access

³⁴ List of sample countries: Algeria, Saudi Arabia, Bahrain, Djibouti, Egypt, UAE, Iran, Israel, Jordan, Lebanon, Libya, Morocco, Malta, Oman, Qatar, Syria and Tunisia.

new foreign technology, this giving them the opportunity to exercise their human capital and improve growth.

3.3. Estimation results and findings

3.3.1. Model 1: Impact of trade liberalization on the human capital

For our first model, the method used allows us to take into account unobserved heterogeneity of the sample countries. These individual characteristics can be either deterministic or of random nature.

Hausman test

To recap, the test specification of Hausman (1978) is a specification test of individual effects. It is used to discriminate the fixed and random effects. The hypothesis tested concerns the correlation between the individual effects and the explanatory variables. Thus, under H_0 , the model can be specified with random individual effects and we must retain the estimator generalized least squares MCG (BLUE estimator). Under the alternative hypothesis H_1 , the model must be specified with fixed individual effects retaining meanwhile the within estimator (unbiased estimator). Under H_0 , the statistic H is asymptotically a chi-square (χ^2) with K degrees of freedom. According to the estimation results, specifically, Hausman test statistics, we find that the estimates used will be those of models with random individual effects. The Hausman test accepts the hypothesis of no correlation between the random term and the explanatory variables of the model. (P-value = 0.2590 > 0.05).

The estimation results

Table 1. Effect of trade liberalization on human capital

Dependent variable: Gross enrolment ratio, secondary (%)	REM
	(1)
OP	-0.0025 (0.942)
DEP	-0.7280 (0.000) ***
PCY	-0.1823 (0.154)
Constant	121.6034 (0.000) ***
Observations	282
Number of countries	16
R ² (within)	0.5375
R ² (between)	0.4307
Hausman test	(0.2590)

*** Significance at 1%, 5% ** Significance * significance at 10%. The 1990-2014 study period. The dependent variable is enrolment in high school. The Hausman test statistic is the Hausman test, with p-value in parentheses.

Table 2. Heteroscedasticity test and autocorrelation

Test	P-value
Heteroscedasticity intra-individual	0.0000
Heteroscedasticity inter-individual	0.0000
Autocorrelation	0.0000

The heteroscedasticity Breush-Pagan test, shows that the probability is less than 5 %, we reject H_0 ; There is, therefore, intra-individual heteroscedasticity (error variance changing over time). The modified Wald test, which is essentially a Fisher test reveals a probability of less than 5%, pushing (forcing us) to accept H_0 and consider that the error variance is the same for all individuals in our model. The probability being less than 5 %, it is found that the presence of autocorrelation. Against by, in the case of random effects models, the above tests have little practical interest. Our regression model in Table 1 shows that trade openness has a negative and insignificant coefficient. This could be related to the weakness of human capital, even with the modest range of educational levels in our sample of countries. This weakness reduces the average effect derived from the import of capital goods.

In order to make profits gains of the opening, it is necessary that countries be staffed (endowed) by a skilled workforce that would allow the assimilation and transmission technology of foreign firms to local firms. However, in the study area, countries generally have a low level in terms of human capital compared globally and indicator of human development in general. In addition, as GDP growth per capita has a positive and significant coefficient not unlike the work of Baldacci et al. (2004) and Al-Samarrai (2006), improving the standard of living of the population leading to improved quality of education and encouraging the enrolment in secondary school is no longer in doubt. The insignificance of this variable may be due to a lack of relationship between per capita income and enrolment in high school, probably because of free of the latter. In terms of the dependency ratio coefficient, the latter negatively and significantly affects the human capital in the countries of the MENA region. An increase of 1% of that ratio results in a decrease of 0.728 points in enrolment in high school, which is consistent with the theoretical and empirical literature presented above. In other words, as the burden of the inactive population (especially those aged under 15) compared to the working age increases. The result is a diversion enrolled in high school to a market of precarious and unregulated.

3.3.2. Model 2: Impact of trade liberalization on the economic growth

The estimate of the second model will be using the fixed effects model (FEM), as expected by the Hausman test (0.0050) to examine the impact of trade openness on economic growth, human capital being incorporated in this model. According to the second regression (FEM), we note that the workforce variables (log L) and gross capital formation (k) in the estimation of the growth equation are positive and significant, respectively, of the thresholds 10 to 5%. The coefficient of

human capital (hc) is negative and significant. For the opening variable (op), it is positive and not significant. In view of the above, the MENA region, object of our work appears to be heterogeneous due to the differences that persists in many aspects including economic, social, educational and political. Thus, the coefficients resulting from the estimate fixed effects are globally significant and support the theory. Through the results in Table 3, we affirm that the active population and gross capital formation variables significantly and positively contribute to economic growth. Also, the results for the effect of the gross capital formation are consistent with the work of Fayissa, B. and C. Nsiah (2010).

The estimation results

Table 3. Impact of trade liberalization on economic growth

Dependent variable: Economic growth	FEM
	(2)
K	0.2014 (0.000) **
Logl	2.1030 (0.066) *
HC	-0.0630 (0.009)
OP	0.0109 (0.537) **
Constant	-27.5987 (0.079) *
Observations	282
Number of countries	16
R ² (within)	0.1098
R ² (between)	0.0291
Hausman test	(0.0050)

*** Significance at 1%, 5% ** Significance * significance at 10%. The dependent variable is GDP growth rate. The Hausman test statistic is the Hausman test, with p-value in parentheses.

Table 4. Heteroscedasticity test and autocorrelation

Test	P-value
Heteroscedasticity intra-individual	0.0000
Heteroscedasticity inter-individual	0.0000
Autocorrelation	0.3034

According to the table above, the probability relative to the intra-individual heteroscedasticity test is less than 5% so we reject the null hypothesis,

thus there is an intra-individual heteroscedasticity. In contrast to the first test, the second allows testing inter-individual homoscedasticity, using a modified Wald test, which is essentially a Fisher test. The probability is less than 5% pushing us to accept the null hypothesis and to consider that the error variance is the same for all individuals in our model. The autocorrelation test shows that the probability is greater than 5%, pushing us to accept the null hypothesis of no autocorrelation. It should be noted that trade openness variable is positive and not significant. Several authors point out that the link between openness and growth is not systematic. Grossman and Helpman (1991) points out that the effect of trade can sometimes be ambiguous and even negative. In addition, Fontagné and Guérin (1991) see that the opening would be a catalyst, not an engine of growth. Other recent studies provide clarification on the matter, in particular, the work of Busson and Villa (1997) note that the nature of trade is probably more important than the intensity in explaining growth. This result can be explained by the fact that this variable is not as relevant (0.0109) as it does not impact productivity through technology transfer, knowledge and, therefore, growth. We can add that the non-significance of the trade openness variable could be due to the fact that we have not distinguished between exports and imports, or even introduced the quality of trade policy (Burnside and Dollar, 2000). Regarding the enrolment in secondary school taken as a proxy of human capital, it negatively and significantly contributes to economic growth, in contrast to results obtained by Lai (2010). However, our result supports the work of Lau, Jamison and Louat (1991) that come to interesting conclusions concerning particular sub-Saharan Africa. In estimating the effects of education (by grade) for five regions, the authors found a negative effect of the primary level in Africa and the MENA region. Most studies provide

no satisfactory empirical validation of the relationship between human capital and growth. Thus, the study of Barro (1991), the initial level of human capital in 1960, perceived in terms of rates of primary and secondary school, explains the growth significantly, but gives no definitive results for 1970. As for Romer (1990), he shows that the literacy rate in 1960, adjusted for measurement errors, provides no explanation for growth outside its effects on investment. Benhabib and Spiegel (1994), reported above, get a negative but not significant between human capital and growth, regardless of the employed variable (literacy rates, average years in school ...). Generally, the panel data estimates produce results against-intuitive: human capital variables negatively and significantly contribute to the growth per capita (De Gregorio (1992), Islam (1995)).

4. CONCLUSION

The purpose of this study was to shed light on the relationship between trade openness, human capital and economic growth. In this context, we presented a synthesis of theoretical and empirical literature on the relationship between trade openness, human capital and economic growth. The results of this study are that trade openness, firstly, impact negatively and not significantly human capital and on the other, affects positively and insignificant economic growth way. Human capital, in turn, negatively and significantly impact economic growth. Investment in human capital, both in quantity and especially in quality, is a need for countries in the MENA region to benefit from the effects of trade opening.

The role that education can play in the production of skills is heavily dependent on how articulates the productive and educational system in the countries of the region. Moreover, it should be noted that the status of the variable "gross

enrolment rate in secondary school", as chosen proxy of human capital, may as well refer to a program against illiteracy disconnected needs skilled workforce that a development policy centered on the establishment of an educational system that wants to perform. The effect of education can't, therefore, being varied from one economy to another, hence the livelihood of the interpretation of this variable problem. Research tracks that can be borrowed to improve this work can in principle be broken down as follows:

- Using a better proxy of human capital incorporating the quality of the education system;
- Introduction of other measures open trade (exports, imports, FDI, tariff barriers...);
- Introduction of the sphere relative to the labor market...

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