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Human capital investment and economic development: empirical evidence from the Middle East region MENA

M'HAMEDI Amani Zhor *	BOUMEDIENNE Mohammed
amanizhor.m'hamedi@univ-tlemcen.dz	mohammed.boumediene@univ-tlemcen.dz
Larmho laboratory Tlemcen University (Algeria)	Tlemcen University (Algeria)

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Abstract:

This paper explores the role of human capital in economic growth in the MENA region. This research proposes empirical approaches using panel data from 2007 to 2019, and employs appropriate econometric techniques. This work argues that investment in human capital is considered a crucial factor in influencing economic success. It is found that human capital has an influence on economic growth; however, this influence may not be as large which can limit a country's growth potential in the MENA region.

Key words: Human capital; Economic growth; MENA region; Education; Health; Investment.

JEL Classification Codes: O15, I25, J24, O55, O53, O54.

* Corresponding author

1. Introduction :

Human capital, which includes an individual's knowledge, skills, and abilities, has been identified as a fundamental driver of economic progress and success. Human capital is even more important in developed nations, where knowledge-intensive sectors and technology improvements play a vital role. Researchers such as: Becker (1992) Theodore W. Schultz (1961) Jacob Mincer (1974) had investigated the many characteristics of human capital, such as Schultz's work published in 1961. On the other hand Gary Becker is often regarded as one of the pioneers of human capital theory. His work published in 1964, laid the foundation for understanding the economic implications of investments in education and training, experience, health, and creativity in order to determine its significance for economic growth. Therefore, emphasizing the value of human capital in the MENA region is crucial, especially given that many of its countries rely largely on mono-cultural economies. The region's reliance on oil as a key source of revenue needs a critical shift toward diversification. The MENA region is at a turning point, and investing in human capital development has the potential to open up new routes of growth and prosperity. This study aims to provide some insight into the critical importance of human capital in economic growth. Addressing the complex link between human capital and economic growth is critical for determining successful policy decisions and strategic interventions in the Middle East and North Africa (MENA) area. This study intends to contribute to the current body of knowledge by addressing the research questions and goals and providing empirical information on how investments in human capital might promote sustainable development using a panel data approach.

The paper's objectives are: to measure the region's level of human capital by examining important indicators like educational attainment and health outcomes, examining its impact on economic growth, identifying key determinants, and establishing empirically supported approaches and policy recommendations for boosting the development of human capital in the MENA area with the goal of fostering long-term economic growth.

Problematic: How does human capital influence economic growth and development in the MENA region? Partial problematic: 1. how does investment in education impact economic growth in developing countries? 2. What role does healthcare expenditure play in shaping human capital development?

Our general hypothesis: Increased investment in human capital will result in greater economic growth in the MENA area.

Partial hypotheses are: 1. In MENA, there is a positive correlation between government spending on education, health, and economic development. 2. The quality of human capital negatively influences economic growth in the region.

This paper will now be resumed in the following way. The first section discusses relevant literature on human capital, and the second piece provides some basic statistics on the two components of human capital health and education so that the pattern and trend may be identified, and analyses the results. The concluding section provides a summary and suggests recommendations for policy makers.

2. Literature Review

A. Human Capital definition:

Human capital is "the stock of knowledge and skills embodied in the ability to perform labor so as to produce economic value" (Mincer, 1974). Hence we initiate this definition: Human capital is defined as the knowledge, skills, expertise, and capacities embedded within humans that can improve productivity and contribute to economic growth and development.

B. Empirical studies on the impact of Human Capital on Economic Growth:

Numerous theories have explored the concept of human capital and its impact on economic growth, ranging from the neoclassical endogenous growth theory proposed by Romer and Lucas to Becker's. Furthermore, far more study in this area highlights the critical importance of human capital innovation technology in economic growth and

progress (e.g., Solow 1956,Romer1986;Lucas1988). Researchers have introduced significant growth models, such as the human-capital augmented Solow model by Romer and Weil (1992), and endogenous growth models pioneered by Romer (1986) and Lucas (1988). These models, which emphasize advanced technology and human capital, eventually contribute to Unified Growth models like those developed by Galor and Weil (2000), Galor and Moav (2002), and Galor (2005, 2012).

Major conclusions on the relationship between economic growth and human capital concluded that human capital has a beneficial effect on economic growth. Similarly, some authors studied the impact of human capital component education on regional levels in order to quantify this positive correlation (Yamarik, 2011, p. 196) (Martín and Herranz, 2004) while others estimate the amount of influence of human capital accumulation on economic growth at the national level. According to the study (Marquez-Ramos and Mourelle, 2019) a country's economic success is determined by its human capital development, which is impacted by educational attainments. The purpose of this article is to find nonlinearities in the link between education and economic growth in Spain. It discovers a link between education and economic growth at both the national and regional levels.

According to (Tahir, 2020) study, the stock of human capital has a negative influence on growth in emerging nations, and since our study sample consists mostly of developing countries, we found these results relevant to the research, although average working hours have a beneficial impact. Domestic investment and employment levels are also cited as major factors of growth in emerging nations.

In addition, many other scholars included the health variable such as (Bane, 2018). In addition Li and Liang (2010) paper on human capital in East Asia, and their findings demonstrate that both health and education stocks have a positive link with growth. Nonetheless, the stock of health capital is far more important to growth than the stock of education capital.

Other researchers discovered that increased life expectancy had no effect on economic development and even lowered per capita incomes due to faster population growth (Acemoglu and Johnson 2007; McDonald and Roberts 2002).

C. Critique of the existing literature and identification of research gaps:

The impact of human capital on economic growth in different regions has been the subject of extensive research, however there's still to be discovered in the MENA (Middle East and North Africa) regions and the construction of non-oil-based economic pillars. While this existing literature provides valuable insights, there is a lack of information regarding this region. Therefore, this research aims to address the various challenges faced by the MENA region in order to provide valuable insights and recommendations to policymakers.

3. Methodology Empirical study:

A. Research design and approach Sample selection and size: This research has assembled a set of panel data conducted on the mena region that represent the population as a whole while the sample consisted of 12 countries from both developed and developing countries (Algeria Bahrain Egypt, Arab Rep, Iran, Islamic Rep, Jordan Kuwait Morocco Oman Qatar Saudi Arabia Sudan Tunisia.) Because the economies in our sample are at different phases of economic growth, there are considerable disparities in many dimensions (including geographical, social, and economic characteristics). The data is studied from the year 2007 as a starting point to 2019 a 12 years' time series, the number of observations reached 156 in total.

B. Data collection methods and sources: Concerning the motive behind selecting the previous data, it is based on the availability of the secondary data to construct a strongly balanced panel in order to make the appropriate analysis. Regarding the sources of the data half of it was collected from the database of World Development Indicators while the other half from penn world table database. The panel data sets

were analyzed using descriptive and inferential techniques in order to examine the impact of human capital development on growth.

Panel data is constructed from both cross section variables presented as country in this study and time series presented as year, which is also familiar with the term cross-sectional time-series data it observes the behaviors of any units over a period of time; these units differ according to the purpose of the research. Panel data cons can be summarized in the act of gaining control over variables that alternate over time this help maintain the heterogeneity of individuals; it also allows you to introduce multiple level in a hierarchical model at many analytical levels, The error term in a panel data model can be broken down into two parts: the individual-specific effect and the time-specific effect. This decomposition enables the model to incorporate more sources of variance.

Our model's core foundation depends on Knowles and Owen (1995), who built upon the Mankiw et al. (1992) model, which integrates health and education. Here's an illustration of a generic linear panel data model:

$$Y_{it} = \beta_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \ldots + \beta_k X_{k,it} + \alpha_i + \varepsilon_{it}$$

Where:

- Y_{it} is the dependent variable for individual i at time t.
- $X_{1,it}, X_{2,it}, \ldots, X_{k,it}$ are the independent variables for individual i at time t.
- $\beta_0, \beta_1, \beta_2, \ldots, \beta_k$ are the coefficients to be estimated.
- α_i represents the individual-specific fixed effects or random effects.
- ε_{it} is the error term or residual.

Using OLS on panel data will result in a correlated error, which will cause problems, equivalent to applying pooled OLS regression to panel data. It gives weak results because of the error term that is often correlated over time for a certain residual. Likewise for the between and first difference estimations, which are viewed as unfit models for testing panel data, according to much research.

In regards to finding types of models for handling panel data (Tahir and Azid, 2015), there are two models to employ in order to test our data: fixed effect symbolized as fe ANd random effect symbolized as re the analysis is different depending on which one to use. types of models for handling panel data (Tahir and Azid, 2015). These techniques have been used in multiple empirical studies and approved by scholars in their results. Starting with fixed effects or within effect it is a transformation that involves omitting the unobserved effect; it analyses the interrelation of parameters with predictors and outputs and focuses on the correlation of specific heterogeneity inside the independent variables. According to Hill et al. (2008), it is feasible to estimate panel data models using the FE estimation method. On the other hand we have random effect estimation that deduces that each unique effect is independent of the explanatory variables; we refer to this precise individual effect as an error term.

The Hausman test offers a rigorous statistical evaluation to determine if the model's conditioning regressors are correlated with the unobserved individual effect. Statistics support a random effects model when the exogeneity of the unobserved individual effect is not rejected. Whereas a fixed effects specification is supported by the failure of the exogeneity hypothesis. The task of implying the fit model is crucial because it affects the resulting estimation. In other words the right model equals the right estimation therefore significant results to work and analyse with it.

C. Variables selection: To test human capital's direct impact on economic development, this study employs different proxies for human capital independent variables: Following the work of (Li and Liang, 2010) theoretical model, human capital is represented by factors such as government spending on health and education, life expectancy, and enrolment in secondary education. While our dependent variable which is economic development is presented by GDP per capita (current US$), following the steps of previous literature. According to the neoclassical growth theory, economic development is a complex concept that cannot be controlled just by one proxy therefore we have involved four control variables consumer prices index to represent

inflation in the countries, Gross fixed capital formation (% of GDP) to represent investment, trade openness peroxide by the ratio between the sum of exports and imports encoded as trade1 and population growth size. Endogenous growth theory presented by Lucas (1988) and Romer (1986) The three factors of investment (k), human capital (h), and inflation (I) were considered to be the three components that determine economic growth (y). The inclusion of trade openness (o) and population growth (P) in the econometric growth model is motivated by their potential role as growth indicators, especially in the context of developing countries such as those in the MENA region. The following is the formula: y=f (k+h+I+o+p). To specify our research even further, we build our initial formula:

The panel data formula for the specified model can be expressed as follows:

GDP per capita = β0 + β1(Health government expenditure) + β2(Life expectancy) + β3(Government education expenditure) + β4(Secondary education enrollment) + β5(CPIit) + β6(Gross fixed capital formation) + β7(Trade openness) + β8(Population growth size) + αi + εit

The panel data formula allows for examining the direct impact of human capital proxies (health government expenditure, life expectancy, government education expenditure, and secondary education enrolment) on economic development (GDP per capita) while controlling for the effects of consumer prices index (CPI), gross fixed capital formation, trade openness, and population growth size. The inclusion of individual-specific fixed effects accounts for time-invariant heterogeneity across countries, while the error term captures unobserved factors and random variations in GDP per capita.

4. Results and discussion:

A. Descriptive analysis

The total observations for real GDP displayed as gdp1 in table1: are 156 with the value of mean calculated at 78.5 and the standard deviation reaching the value of 45.17743

whereas the proxies of human capital beginning within the initial instance, the variable representing secondary education enrollment, denoted as "secedup1," exhibits a mean value of 46.00641 and a standard deviation of 39.24028. Meanwhile, the variable representing total expenditure on education from total government expenditure, labelled as "gee," comprises 156 observations, with a mean value of 44 and a standard deviation of 38.23442. On the other hand, the second proxy to observe the human capital regressor is life expectancy, displayed as leab1 has mean value of 78.02564 std Div of 44.74486 and the government expenditure on health displayed as che1 has a mean value of 78.5 and std Div of 45.17743.

While the representatives of GDP control variables: inflation rate encoded as inf1; Gross fixed capital formation (% of GDP) encoded as gfcf1; Trade openness encoded as trade1 and population growth size encoded as pz1. They all have a total observation of 156 and a mean value of 78.5, 55.583, 78.5 and 78.5 respectively following with the standard deviation value of 45.177, 42.2, 45.177 and 45.177 correspondingly.

B. Test statistics:

Jarque-Bera normality test: The Jarque-Bera normality test produces a test statistic of 3.094, following a chi-square distribution with two degrees of freedom. The associated p-value for the test statistic is 0.2129. As the p-value (0.2129) is greater than the commonly accepted significance level of 0.05, there is no basis to reject the null hypothesis of normality. This suggests that, based on this test, the residuals of the model may not deviate significantly from a normal distribution.

Test for heteroskedasticity: The Breusch-Pagan/Cook-Weisberg test reports a test statistic of 2.27, following a chi-square distribution with one degree of freedom. The associated p-value for the test statistic is 0.1318. Since the p-value (0.1318) is greater than the commonly accepted significance level of 0.05, there is no sufficient evidence to reject the null hypothesis of constant variance. Therefore, based on this test, it suggests that the assumption of constant variance in the model's residuals is not violated. This suggests that the assumption of constant variance is appropriate because there is no

discernible indication of heteroskedasticity in the residuals. In conclusion, based on the findings of these tests, it cannot be concluded that there is significant heteroskedasticity in the model or that the residuals show strong evidence of deviations from normality.

Variance inflation factor test: According to results the regression model's displays the Variance Inflation Factor (VIF) for each independent variable. based on the VIF values provided, there is no strong evidence of multicollinearity among the variables. This suggests that the variables included in the analysis are not highly correlated with each other, which is desirable for regression or predictive modeling purposes.

C. Random effect model analysis: it reports the random effect model : R-squared (R-sq) values reflect the proportion of variation explained by the independent factors in the dependent variable (ln_gdp).

R-squared inside: 0.4807, indicating that the model explains about 48.07% of the variance in GDP growth within countries.

R-squared between: 0.1101, showing that the model explains about 11.01% of the variance in GDP growth between countries.

The total R-squared value is 0.1770, which represents the proportion of variation in ln_gdp explained by the model across all data.

The Wald chi-square test is used to determine the general importance of the model's independent variables. The test statistic in this example is 113.79, and the probability value (Prob > chi2) is 0.0000, indicating that at least one of the independent variables is statistically significant in explaining variance in GDP growth.

Correlation of Random Effects (corr(u_i, X)): This value is assumed to be 0, suggesting no correlation between the random effects (country-specific error terms) and the independent variables in the model. Selected coefficients are interpreted as follows:

che1: The coefficient of ln_che is -0.1541, and its p-value (0.027) suggests that it is statistically significant at the 0.05 significance level. The negative sign indicates that higher health expenditure is associated with lower GDP growth. This finding may indicate that allocating more resources to healthcare might not necessarily lead to higher economic growth. In the examined context ineffective healthcare systems can restrict the positive effects on economic growth, even though investing in healthcare is crucial for enhancing population health. Developing nations may have issues like poor infrastructure, restricted access to high-quality healthcare services, or ineffective resource management. These elements may lessen the contribution that health spending makes to economic growth.

Leab1: The coefficient of ln_leab is 0.8276, and its p-value (0.000) indicates that it is highly statistically significant. Higher life expectancy at birth is associated with higher GDP growth, suggesting that better health conditions and longer life expectancy contribute positively to economic growth in the MENA region. Life expectancy is frequently used as an indicator of a population's general health and happiness. A population that is generally healthy has a greater rate of labor force participation, higher levels of productivity, and better human capital. This in turn could have a favorable effect on GDP and economic growth. Several researchers reported statistically significant positive impacts of health human capital on GD using life expectancy (Knowles and Owen 1995) and healthcare spending (Heshmati 2001) as proxies for health human capital.

Secedup1: The coefficient of ln_secedup is 0.0196 and its p-value (0.409) indicates that it is not statistically significant. On the contrary (Marquez-Ramos and Mourelle, 2019) study provided evidence of a positive correlation between education and economic growth The investigation focuses on secondary education.

Trade1: The coefficient of ln_trade is -0.2461, and its p-value (0.000) indicates that it is highly statistically significant. Higher trade openness is associated with lower GDP

growth. This result could indicate that there may be some challenges or negative consequences associated with a high level of trade openness in the MENA region.

Since our sample consists of a large sample of developing countries therefore trade openness may not have a large economic impact on developing nations that have an insufficient export market or are strongly dependent on a small variety of products. Lack of diversity can restrict the beneficial effects of trade on economic growth by making their economies susceptible to external shocks and changes in global market demand. As a result, developing nations have a difficult time allocating enough funds to upgrade their educational institutions, which limits access to high-quality education and vocational training. Human capital development is hampered as a result, depriving people of the information and skills required for better work chances and financial opportunities. Numerous studies, using various measures of openness, report that relatively open economies experience substantially higher growth than closed economies. There doesn't seem to be any statistically significant effects of the other variables.:

ln_cpi: The coefficient of ln_cpi is -0.0410, and its p-value (0.151) indicates that it is not statistically significant at the 0.05 significance level. This suggests that inflation, as measured by the consumer price index, has no meaningful influence on GDP growth in the region under consideration.

There are a number of causes. CPI, can diminish peoples' and businesses' purchasing power, which can result in less investment and expenditure and have a detrimental effect on economic growth. High inflation can also make the economy unstable, which makes it challenging for businesses to plan ahead and make long-term investments.

ln _gfcf: The coefficient of ln_gfcf is -0.0923 and its p-value(0.221) indicates that it is not significant. It suggests that gross capital investment does not show a significant relationship with GDP growth in the examined contect. Developing nations frequently struggle to expand their infrastructure and attract investment

ln _pz: The coefficient of ln_pz is 0.0981 and its p-value(0.287) suggests that it is not statistically significant. Here are some possible explanations for these results: growth in population has the ability to increase the labour force and consumer base, but it also cannot be realized if population growth is coupled with insufficient spending on healthcare, education, and skill development. Given the other factors present in the developing nations in the sample, it is possible that the negligible coefficient indicates that population growth alone may not be a substantial driver of economic expansion.

GEE: The coefficient of ln gee is -0.004 and its p value (0.858) show that it is not statistically significant. Pelinescu (2015): demonstrated a negative relationship between educational expenditures and economic growth. The author argued that heterogeneity across countries could be one of the reasons for the existence of a negative relationship between educational expenditures and economic growth.

D. Robustness and sensitivity analysis: This section is devoted to an analysis of robustness testing of some additional variables such as exchange rate and domestic absorption that are incorporated in the model to examine whether the results change or stay robust. It revealed that the additional variables did not impact the earlier results.

5. Conclusion:

In conclusion, the social infrastructure, which included basic amenities like free education and healthcare, was critical in supporting and influencing the observed economic condition. During the study of the findings, we noticed: the influence of social infrastructure on schooling revealed a negative correlation. This shows that certain components of the social infrastructure may have contributed to the lower-than-average educational quality, according to (Murata, 2017) analysis, Increasing investment in public education promotes human capital creation. On the other hand, the positive correlation between social infrastructure and life expectancy was found to be promising. This suggests that, despite the healthcare system's lack of excellence; the availability of free healthcare has led to increased life expectancy among individuals. Human capital has an evident economic influence on the MENA area. It is worth emphasizing, however, that this influence may not be as large as that seen in developed

nations. Because the value of human capital is defined mostly by its quality, and low-quality human capital may slow economic development and limit a country's growth potential in the MENA region. Governments in the MENA area, in particular, must realize the importance of this valuable asset and prioritize the deployment of appropriate expenditures in education and skill development. Increased investment in human capital will result in greater economic growth in the Middle East area.

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