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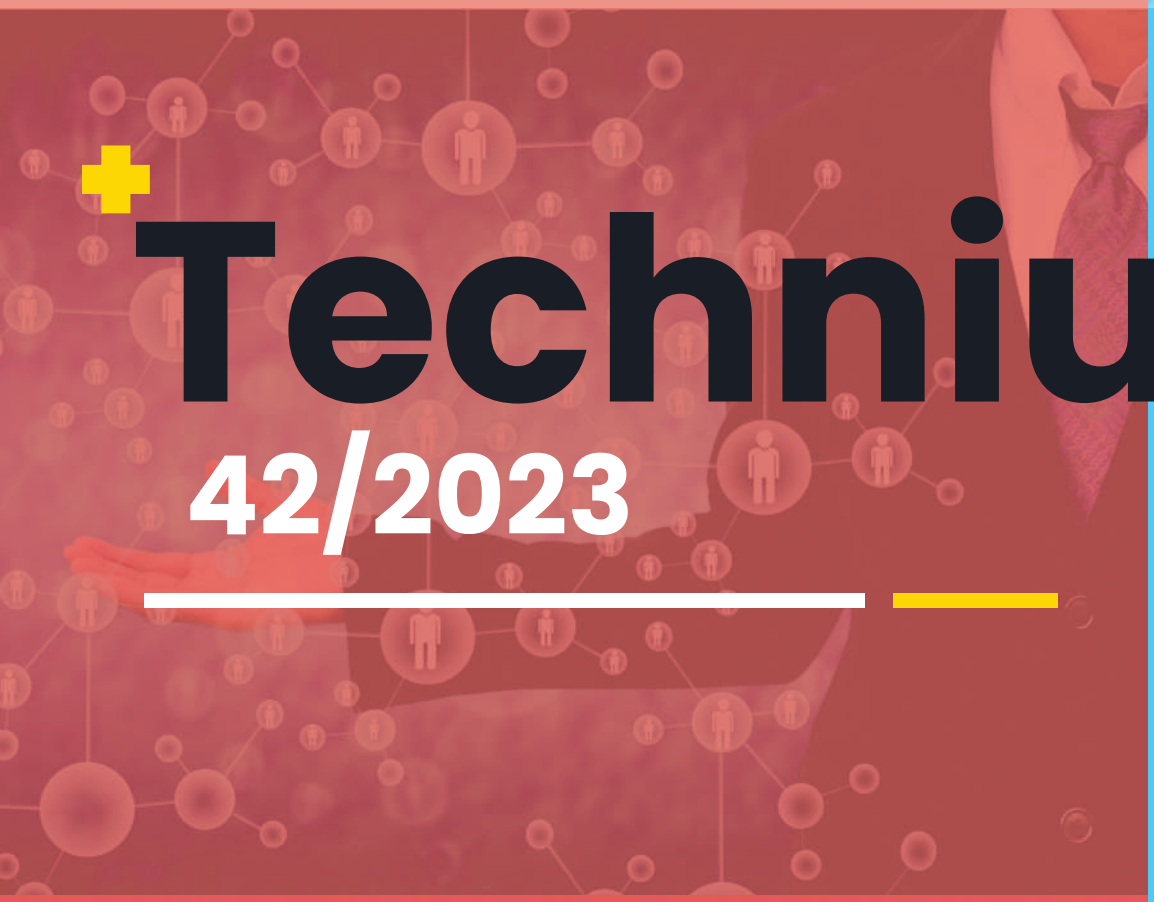

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# Governance of territorial human capital: An attempt to develop a composite index in the SEMCs and the EACs

**Abdeljalil Mazzaourou, Kamal Chakir**

Doctor in Economics, IBN ZOHR University, Morocco

mazzaourou@gmail.com, ka.chakir@gmail.com

**Abstract**. In neo-classical studies, we often speak of the concept of human capital. It is considered as a full-fledged component in the economic growth equation and is a barometer of the governance of countries vis-à-vis this component. As such, it has been the subject of much theoretical and empirical research. However, several approaches have been used to measure the territorial human capital stock in a country at a given time, which often biases the results obtained. Typically, we see measures that neglect the health dimension. In this essay, we have established a composite and synthetic indicator of macro-economic measures of territorial human capital integrating not only the educational dimension but also the health dimension in two groups of countries, in this case the Southern and Eastern Mediterranean Countries and the Emerging Asian Countries.

**Keywords**. Measurement, territorial human capital governance, macroeconomic composite indicator, CPA

## Introduction

In general, many operations and tasks in life require human intervention, often in a collective manner. This means that multiple individuals may work together simultaneously to accomplish a shared goal, such as in a specific geographical area. However, this can make it challenging to identify the individual contributions of each participant. This challenge highlights the difficulty in measuring the marginal impact of each actor on the production chain, and ultimately, evaluating the effectiveness of territorial human capital governance.

Human capital is the sum of the skills, knowledge and experience of the individuals who makeup a society. In the context of a territory's development, human capital plays an essential role. Indeed, individuals with specialized skills and knowledge can contribute to the economic growth, innovation and competitiveness of the territory. They can also contribute to the development of sectors such as research and development, education and health, which are important drivers of economic growth.

In addition, human capital is also a key factor in a region's attractiveness to businesses and investors. Investors often look for regions with a skilled and competent workforce, capable of supporting their business and contributing to their development. Thus, the development of human capital is crucial for the economic and social development of a territory.

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Micro-economically, managers proceed to measure downstream missions actually performed, as it is feasible in this framework. On the other hand, at the macro-economic level, researchersjudge the upstream contributions. That is, they measure the stock of human capital that exists in a country and in a period of time and relate it to a number of economic and social phenomena.

It is in this sense that this essay is inscribed, where we try to establish a composite indicator that measures the territorial human capital at the macro level that integrates all the dimensionsembodied in an individual. Indeed, the indicators mobilized to give a value to a person reflectingthe human capital embodied in him are indicators that are always based on educational components. In this way, they appeal to the level of education of individuals taken in isolation. That is, they adopt a single indicator of the educational sphere (e.g. average number of years of schooling).

In this article, we will address the following question: **Does the development of a composite and synthetic indicator of territorial human capital within SEMCs and EACs respect their profiles in terms of this capital like its traditional indicators?**

To establish this indicator, we will base ourselves on the two important dimensions that explainthe quantity of human capital in a territory, namely, education and health. In fact, each dimension is also composed of sub-dimensions. In this sense, we will use the PCA (Principal Component Analysis) method to synthesize these variables into a single component.

## 1. Theoretical basis of territorial human capital and its measurement at the macroeconomic level

The concept of territorial human capital has undergone several reflections since its emergencein terms of its definition and measurement. In this first section, we will present the definitions, theories and measures of human capital that will frame our methodology for preparing a synthetic and composite indicator in two groups of countries.

### 1.1. Territorial human capital: conceptual and theoretical genesis

The concept of human capital can be traced back to the 18th century economist, Adam Smith. Smith believed it was crucial to recognize the value of the practical skills possessed by every member of society, regardless of the costs required to acquire them. He saw these skills as a permanent and valuable asset, akin to "a fixed and realized capital, as it were, in his person" (Smith, 1776).

In the 1960s, economists started integrating the concept of human capital into their research, resulting in a greater comprehension of the tangible implications of considering personal skills as a type of capital or asset. One driving factor behind this shift was the notion that investing in human capital could account for the substantial discrepancy between a nation’s economic growth and that of conventional factors like land, labor, and capital. In fact, some economists, like Schultz in 1961, proposed that investing in human capital was the primary factor responsible for this difference.

While there are numerous interpretations of human capital in the literature, most emphasize the economic advantages of investing in it. For example, Schultz (1961) defines human capital as the acquired skills and knowledge that distinguish unskilled labor from skilled labor.

Similarly, the Penguin Dictionary of Economics (1984) characterizes human capital as an individual’s skills, abilities, and knowledge, which allow them to generate income, underscoring how investment in human capital can enhance an individual’s economic

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circumstances. The World Bank (2006) also defines human capital as the productive ability embodied in individuals, with specific attention to its contribution to economic output.

The examination of territorial human capital has grown in significance, now more than ever, due to its impact on the competitive edge of individuals and the economic prosperity of regions (Chakir and Mazzaourou, 2023). Though investing in human capital offers economic advantages such as elevated income and economic growth, it is essential to recognize the numerous non-economic benefits that come with such investment, including better health, enhanced personal well-being, and greater social unity. Many scholars regard these broader benefits as equally or even more important than the economic advantages.

The Organization for Economic Cooperation and Development (OECD) has expanded its definition of human capital to include its broader benefits. In a 1998 report, the organization defined human capital as "the knowledge, skills, abilities and other attributes embodied in individuals that are relevant to economic activity" (OECD, 1998). However, in a subsequent report, human capital was redefined as "the knowledge, skills, abilities, and attributes embodied in individuals that facilitate the creation of personal, social, and economic well-being" (OECD, 2001).

The definition presented by the OECD is highly comprehensive, encompassing a range of learned and experiential skills and abilities, including innate capabilities. Furthermore, this more expansive definition of human capital includes factors such as motivation and behavior, as well as the physical, emotional, and mental well-being of individuals (OECD, 2011).

The intricate nature of human capital is reflected in the diverse components identified by the OECD. This definition encompasses both general and job-specific skills, explicit and tacit knowledge. In addition to the traditional cognitive skills recognized by research, the definition also includes non-cognitive skills, such as interpersonal and intrapersonal abilities, which are increasingly significant in modern societies.

The theory of human capital proposes that resources are allocated to individuals to enhance their productivity and, as a result, increase their income. However, as with any investment, the question of its economic efficiency arises: do the benefits of human capital investment exceed its costs? The answer to this question necessitates a comparative analysis of the benefits and costs associated with this form of investment.

According to the human capital theory, investments in the training and development of human resources lead to an increase in their productivity and future income. This concept is similar to the idea of a firm purchasing equipment to increase production and future income. This theory has its roots in an old idea, which was notably discussed by Marx, that the compensation of skilled workers reflects the cost, especially in terms of working time, of their training. The human capital theory is based on five main hypotheses, which are as follows:

- H1: The duration of education is a good indicator of acquired knowledge;
- H2: Seniority accurately reflects aptitude;
- H3: The knowledge and skills of workers increase their productivity;
- H4: Individual productivity can be observed;
- H5: Companies remunerate workers based on their marginal productivity.

The key question, as with any investment, is whether human capital investments are economically viable. The answer to this question depends on a comparative assessment of the benefits and costs of human capital investments.

### 1.2. Measures of human capital: literature review

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Over the past few years, numerous researchers and organizations have devoted their attention to measuring human capital at the macro level. They have developed indicators for various analytical purposes and employed various measurement techniques. Moreover, a significant body of literature underscores the significance of education as a factor in explaining the quantification of human capital that individuals possess.

### 1.2.1. Cost-based measures

Engel (1883) proposed an approach to assess human capital by considering the expenses incurred during an individual's education and training. According to Engel, the cumulative cost of an individual's education until the age of 25 represents the investment made in their human capital. This is the age at which an individual is deemed professionally mature and prepared to join the workforce. Kicker (1967) cited Engel's formula used to calculate this cost, which is as follows.

$$C_{xi} = C_{0i}\left\{1 + x + \frac{k_i x(x+1)}{2}\right\}$$

Where $C_{0i}$ is cost at birth and $c_{oi} + k_i c_{oi}$ are the annual costs, similarly, $k_i = k = 0.1$.

Kendrick and Eisner are prominent researchers who have made significant contributions to measuring human capital stock through the cost approach. Kendrick's approach involved classifying human capital investment into tangible and intangible investments, enabling a more comprehensive estimation of resources invested in education and other human capital-related areas. Kendrick discovered that, when human capital was included in the national accounts, the stock of human capital in the United States was often greater than that of physical capital, which considerably increased national wealth.

Eisner further enhanced this approach by acknowledging the contribution of non-market households to investment in children's education and incorporating investment in research and development in his estimates. Unlike Kendrick, Eisner treated all human capital as intangible and applied a 50-year depreciation rule.

### 1.2.2. Income-based measures

Petty's income-based approach was an early method used to estimate a country's human capital stock. This approach, which he introduced in 1690, was based on capitalizing the wage bill, which is the difference between the estimated national income and the property income, at a 5 percent interest rate (Ullmer, 2004). Although Petty's method was pioneering, it did not account for the heterogeneity of the population, which is an important factor in assessing the value of human capital. Moreover, it raised the fundamental question of how to estimate the monetary value of workers in a country. Petty suggested an answer that has significant economic and social implications.

In 1853, Farr introduced the initial scientific model to determine the monetary worth of an individual. The model proposes that a person's earning potential can be evaluated by computing the present value of their future income generated in the labor market throughout their lifetime, after accounting for survival costs. The fundamental concept of this model is to assign a value to the human capital encompassed within each individual by evaluating the total income that they are likely to generate in the labor market.

Dublin and Lotka (1930) followed Farr in his logic of calculating the stock of human capital by defining a formula for estimating the value of an individual at birth, $V_0$ :

$$v_0 = \sum_{x=0}^{\infty} \frac{s_{0,x}\left(w_x y_x - c_x\right)}{(1+i)^x}$$

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Where, i is the discount rate, $s_{0,x}$ is the probability at birth of an individual surviving to age *x*, $w_x$ is the employment rate at age *x*, $y_x$ is the individual's annual income from age x to age *x+1*, and $C_x$ represents the annual cost of living.

Les Dublin and Lotka challenged the assumption of full employment and incorporated unemployment into their analysis. They also formulated a new equation to estimate the monetary worth of an individual at a particular age *a*, as following:

$$v_a = \sum_{x=a}^{\infty} \frac{s_{a,x}\left(w_x y_x - c_x\right)}{(1+i)^{x-a}}$$

De Foville (1905) voiced criticism of the forward-looking method utilized for estimating human capital, as it disregarded future consumption expenditures associated with potential earnings. To address this issue, he adopted Petty's approach of computing the net maintenance profit, which is the income generated by human capital after deducting subsistence costs. By employing this methodology, De Foville estimated the human capital stock in France.

Weisbrod (1961) gathered cross-sectional data on earnings, employment rates, and survival probabilities. He then made adjustments to the Dublin and Lotka (1930) formula to estimate human capital.

$$V_a \sum_{x=a}^{74} \frac{S_{a,x} W_x Y_x}{(1+i)^{x-a}}$$

Such that $v_a$ is the present value of a person's expected future earnings at age *a*, $s_{a,x}$ is the probability that a person will survive from age *a* to age *x*, $w_x$ et $y_x$ are the employment rate and average urgings at age *x*, respectively, and *i* is the discount rate. The retirement age is set at 75 years, for which earning are zero.

Some authors opt to use the income-based approach to evaluate human capital, with the goal of obtaining an index rather than a monetary measure. For instance, Mulligan and Sala-i-Martin (1997) employed this method to gauge the human capital of a state in a specific year. Their approach involves computing human capital by dividing total labor income per capita by the wages earned by uneducated workers.

However, Wachtel (1997) has raised doubts about the Mulligan and Sala-i-Martin approach. According to him, their formula fails to consider that wage fluctuations could result from factors other than changes in the marginal value of human capital. Additionally, their model assumes that uneducated workers are indistinguishable and interchangeable with the rest of the workforce.

Koman and Marin (2005) explored income-based methods of measuring human capital in Austria and Germany. They constructed an aggregate measure of human capital stock by weighting workers according to their educational attainment and wage income. In contrast to Mulligan and Sala-i-Martin's (1997) approach, Koman and Marin used wage income to estimate worker productivity and the impact of physical capital on wages and human capital.

They discovered that their human capital measure grew at a faster rate than the average length of schooling. Furthermore, the time series data they collected showed that a Solow model augmented by human capital did not fit their observations. Intriguingly, the inclusion of human capital in the model decreased the explanatory power of factor accumulation in the growth performance of Austria and Germany.

Laroche and Merette (2000) followed Koman and Marin's methodology, but they included work experience as an additional factor in addition to formal education, thereby differing from

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their predecessors. On the other hand, Macklem (1997) approached the measurement of human capital from a macroeconomic standpoint, using income as the basis. His calculation of human wealth involved estimating the expected present value of total labor income, minus government expenditures, using a vector bivariate autoregressive model.

#### 1.2.3. Education-based measures

Education is often viewed as a means of improving the lives of individuals by expanding their economic opportunities and providing them with intangible benefits such as better health, improved diets, increased fertility, quality education for their offspring, higher levels of self-realization, and more developed skills. At the macro level, education also plays a central role in economic, institutional, and social development by promoting technological progress, as noted by Haveman and Wolfe (1984).

The education-based approach for estimating human capital involves measuring indicators of educational performance such as literacy rates, enrollment rates, dropout rates, repetition rates, average years of schooling in the population, and national and international test scores. By doing so, this approach provides a comprehensive understanding of the human capital stock available within a given population

##### 1.2.3.1.The adult literacy rate

The impact of adult literacy rates on economic and social development cannot be overstated. Literacy has a significant impact on employability and earnings, which in turn can contribute to the reduction of poverty and inequality. Moreover, literate individuals are more likely to engage in democratic and civic activities and promote social justice. Additionally, high levels of literacy can foster innovation and technological development, as people are better able to acquire and apply new knowledge. Consequently, the adult literacy rate serves as a crucial indicator of a country or region's human capital, with positive implications for both individual and collective well-being, as emphasized by Nussbaum (2012).

##### 1.2.3.2. School enrolment rate

Enrollment rates serve as a measure of the number of students registered in a specific grade in relation to the corresponding population. There are two categories of enrollment rates: gross rates, which comprise all students irrespective of age, and net rates, which account for only students in the targeted age group for the grade. Barro (1991), Mankiw et al. (1992), Levine and Renelt (1992), and Gemmell (1996) have explored schooling rates as substitutes for human capital in enhanced growth models.

##### 1.2.3.3. Average years of schooling

An alternative measure to adult literacy and schooling rates has been developed by researchers, which is the average years of schooling of the labor force. This measure reflects the accumulated educational investment in the current workforce, assuming that the human capital of workers is a function of the number of years of schooling completed.

While adult literacy rates and enrollment rates provide information about the education level of a population, years of schooling is a valid stock measure and directly captures the human capital available. However, primary schooling data are not readily available at the aggregate country level, which has led researchers to rely on estimation techniques such as the census and survey-based estimation method, the projection method, and the perpetual inventory method, as noted by Wachtel (1997).

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**1.2.3.4. The estimation method based on the census and the survey**

Psacharopoulos and Arriagada (1992) were the pioneers in collecting data on the average years of education. They calculated the average years of schooling $\bar{s}$ for the labor force in 99 countries using the following method :

$$\bar{s} = \sum L_i D_i$$

Where $L_i$ is the proportion of the labor force at level *i* of schooling, $D_i$ is duration of years of schooling and includes illiteracy, incomplete primary education, completed primary education, incomplete secondary education, completed secondary education, and university education.

There are limitations to this method. One of them is that it does not consider the number of years of schooling completed by those who did not finish their education level. As a result, researchers must assume that they attended half of the corresponding duration, which may cause measurement errors. Additionally, this method does not consider the technical differences among the 99 countries analyzed, which restricts comparability across countries.

**1.2.3.5. The projection method**

Kyriacou (1991) attempted to address the data limitations of Psacharopoulos and Arriagada (1986) by utilizing a projection method. He analyzed data on years of schooling for 42 countries in the mid-1970s, gathered from 1974 to 1977, using gross enrollment rates sourced from the UNESCO Statistical Yearbook. Nonetheless, the restricted coverage of countries and time periods in Psacharopoulos and Arriagada's initial data poses difficulties in applying these methods.

$$S_{1975} = \beta_1 + \beta_2 prim_{1960} + \beta_3 \sec_{1970} + \beta_4 High_{1970}$$

Where *S* is the average years of schooling in the labor force, *Prim*, *Sec* and *High* represent the enrollment rates for primary, secondary, and higher education, respectively.

Kyriacou devised a projection method to address the data gaps in Psacharopoulos and Arriagada's (1986) research on years of schooling across different countries and timeframes. However, this method is predicated on certain assumptions, such as the consistency of the relationship between delayed enrollment rates and years of schooling, which may not hold true in reality. Additionally, Kyriacou had to rely on assumptions regarding the uniformity of the duration of each level of schooling, as well as dropout and repetition rates.

**1.2.3.6. The perpetual inventory method**

The perpetual inventory method calculates the total education stock *S* at year *T* by summing the enrollments E at all levels g for all age cohorts. Researchers Lau, Jameson and Louat (1991) used this method by constructing time series of education stocks in 58 developing countries from 1965 to 1985, using the following formula:

$$S_T = \sum_{T-a_{\max}+6}^{T-a_{\min}+6} \sum_{g=1}^{g_{\max}} E_{g,t} \theta_{g,t}$$

$\theta_{g,t}$ is the probability that an individual in grade *g* at time *t* survives to year *T*, $a_{\min}$ = 15 and $a_{\max}$ = 64 are the youngest and oldest respectively. Setting the age of entry at six years, we have *T-64 + 6* as the year the oldest cohort entered school, while the youngest cohort began the school year *T-15 +6*.

This method requires a large volume of data. To estimate the number of years of schooling of the population aged 15-64 between 1965 and 1985, it is necessary to have data series on schooling and mortality probabilities back to 1907.

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Barro and Lee (1996) revised their earlier estimates and addressed various criticisms they had received. To overcome the issue of over-enrollment, they extended their coverage to 15-24 year olds and employed net enrollment rates. In their latest update (Barro and Lee, 2018), they used gross enrollment rates that were adjusted for repetition to consider students who start school earlier or later. They also adjusted the data for ten countries to account for variations in the duration of schooling over time. These measures improved the accuracy and comparability of their estimates of educational attainment across countries.

**1.2.3.7. Barro and Lee's measurements**

Barro and Lee conducted a follow-up study in 1996 to improve their previous estimates and address criticisms. They broadened their analysis to include 15-24 year olds and used net enrollment rates to avoid overestimating enrollment, which was a concern raised by Nehru et al. However, De la Fuente and Domenech (2000) disputed the findings of Barro and Lee, citing discrepancies in country rankings and unrealistic breaks in the time series due to noisy data. Barro and Lee employed interpolation and extrapolation techniques to fill in gaps in the data, but De la Fuente and Domenech's results proved more reliable in certain growth models. Despite their method lacking a solid scientific foundation, their research suggests that data quality is the primary factor contributing to uncertainty in the relationship between economic growth and the development of human capital.

Cohen and Soto (2007) present an alternative approach to Barro and Lee's estimates, aimed at minimizing potential errors. They employ a perpetual inventory method to fill in missing data, resulting in estimates similar to Barro and Lee's, although with a lower correlation in the first differences. Cohen and Soto contend that Barro and Lee's estimates are impacted by measurement biases, while those of De la Fuente and Domenech are biased in the opposite direction. Nevertheless, despite the differences, the estimates of all three studies remain highly correlated.

**1.2.3.8. Measures based on quality of education**

Efforts to measure human capital at the macro level have focused on assessing the quality of schooling. However, growth models have tended to prioritize quantity over quality, as noted by Hanushek and Kimko (2000). To address this issue, Barro and Lee (1996, 2001) considered input and output measures such as public expenditure on education per student, student-teacher ratios, teacher salaries, repetition and dropout rates, and international test scores for high school students and adults. While international adult literacy tests provide a good measure of human capital, there is still considerable variation in human capital across OECD countries, even when the average years of schooling of their workforce is similar. Hanushek and Kimko's composite measure of educational quality, which combines various quality indicators, can be misleading as test scores may not fully reflect the quality of education.

Furthermore, it should be noted that the quality of education received by previous and current students may not necessarily be reflective of the skills and knowledge possessed by the current workforce. Furthermore, due to the limited availability of internationally comparable test score data, Hanushek and Kimko have had to rely on imputing missing values through regression analysis, which leaves them susceptible to the second type of measurement error, namely low data quality.

## 2. Development of a territorial human capital index: methodology and results

The indicator used to quantify territorial human capital has been the subject of much debate, as it has led to inconsistent results on the same issue. This divergence can be attributed to the measures of human capital employed.

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### 2.1. Materials and methods

Our approach to constructing a territorial human capital indicator involves a composite methodology that integrates individual indicators related to education and health. We have carefully specified the components of human capital within these two dimensions, and also taken into account the qualitative aspects of human capital. While many studies have focused solely on education as a proxy for human capital, we recognize the importance of the health component as a critical factor. Nevertheless, few studies have given it the attention it deserves. The following table summarizes the selected components according to their groups, theoretical foundations, abbreviations and data sources:

Table 1. The components of the human capital index

| Variables | | Abbreviations | Data Sources | Theoretical foundations |
|---|---|---|---|---|
| **Education** | The share of education expenditure in GDP | **Edu. dans PIB** | World Bank Open Data and UNESCO | Pscharopoulos and Patrinos (2002) |
| | The share of education spending in total public spending | **Edu. dans Dep. p** | World Bank Open Data and UNESCO | |
| | The ratio of students to teachers | **Elèv/Enseig** | Barro-Lee.com | |
| | Average years of schooling | **N.m.scol** | Barro-Lee.com | H. Goumghar (2017) |
| **Santé** | The share of health expenditure in GDP | **Sant. dans PIB** | The World Health Organization (WHO) | Robert Barro and Xavier Sala-i-Martin (1992) Nonnemen et Vanhoudt (1996) |
| | The share of health expenditures in totalgovernment expenditures | **Sant dans Dep. p** | WHO and World Bank | |
| | The ratio of inhabitants per doctor | **Habit/Méd** | WHO | |
| | Life expectancy | **Esp vie** | WHO | Philippe Aghion, Peter Howitt et Fabrice Murtin (2010) |

**Source : Authors**

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Our aim in developing this composite indicator is to incorporate the qualitative and health dimensions of territorial human capital. By doing so, we seek to examine the impact of qualitative aspects on economic and social phenomena, in addition to the quantitative factors. To create a single human capital indicator from the various components outlined in the table, we employed the principal component analysis (PCA) method. This approach enables us to condense a range of variables into a single measure while retaining as much relevant information as possible.

We selected two sets of countries, namely the Emerging Asian Countries (EAC) and the Southern and Eastern Mediterranean Countries (SEMC), each consisting of four countries. The EAC group includes South Korea, Hong Kong, Singapore, and Taiwan, while the SEMC group comprises Morocco, Tunisia, Jordan, and Lebanon.

To avoid any potential bias caused by the Covid-19 pandemic, data for each subvariable were collected between 1990 and 2019. However, we recognize the need to examine the impact of the pandemic on human capital and plan to create a post-Covid-19 human capital indicator in the future for comparison. We have chosen to conduct the PCA analysis using the SPSS version 22 software, which offers electronic data processing capabilities.

### 2.2. Territorial human capital index : Results

The focus of our paper is the creation of a composite indicator that assesses territorial human capital in two distinct groups of countries: The Emerging Asian Countries (EACs) and the Southern and Eastern Mediterranean Countries (SEMCs), as suggested by our paper's title.

#### 2.2.1. Case of Emerging Asia Countries (EACs)

In order to establish the proxy measuring human capital, using PCA, we must first check whether this method is feasible or not?

Table 2. KMO index and Bartlett test for EACs (SPSS V.22.0)

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin index for measuring sampling quality. | | ,887 |
| Bartlett's sphericity test | Chi-square approx. | 1084,514 |
| | dof | 28 |
| | Meaning | ,000 |

**Source : Authors**

By reading the table, it can be observed that the conditions required for utilizing the PCA method have been satisfied. This is evident from the fact that the Kaiser-Meyer-Olkin measure of sampling adequacy value is above 0.50. Additionally, the Bartlett's test of sphericity indicates a statistically significant p-value of 0.000, which is less than 5%.

Table 3. Representation qualities for EACs (SPSS V.22.0)

| | Initials | Extraction |
|---|---|---|
| EdudansPIB | 1,000 | ,612 |
| Edu.dansDep.p | 1,000 | ,771 |
| ElèvEnseig | 1,000 | ,619 |
| N.mscol | 1,000 | ,863 |
| Sant.dansPIB | 1,000 | ,954 |
| SantdansDep.p | 1,000 | ,888 |

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| | | |
|---|---|---|
| HabitMéd | 1,000 | ,939 |
| Esp.Vie | 1,000 | ,838 |

**Source : Authors**

This table provides insight into the quality of the representation of human capital variables in Emerging Asia. We can observe that all extraction values exceed 0.50, indicating that these variables are well-captured in the design.

Table 4. Total Variance explicated for EACs (SPSS V.22.0)

| Component | Initial eigenvalues | | | Sums extracted from the load square | | |
|---|---|---|---|---|---|---|
| | Total | % of variance | % cumulative | Total | % of variance | % cumulative |
| 1 | 2,900 | 36,251 | 36,251 | 2,900 | 36,251 | 36,251 |
| 2 | 1,870 | 23,380 | 59,631 | 1,870 | 23,380 | 59,631 |
| 3 | 1,713 | 21,409 | 81,039 | 1,713 | 21,409 | 81,039 |
| 4 | ,636 | 7,948 | 88,987 | | | |
| 5 | ,571 | 7,143 | 96,130 | | | |
| 6 | ,226 | 2,820 | 98,950 | | | |
| 7 | ,069 | ,866 | 99,816 | | | |
| 8 | ,015 | ,184 | 100,000 | | | |

**Source : Authors**

In order to simplify the interpretation of the human capital composite indicator, we have chosen to focus on the first three components, as they account for more than 80% of the variability. The first component explains 36.25% of the total variance, the second component explains 23.38%, and the third component explains 21.40%. Together, these three components capture 82% of the information. To create a single composite indicator based on these three components, we used the following equation in the SPSS software:

$$proxy.C.H\,(Asie) = {2.9 \times FAC_1}/{6.483} + {1.87 \times FAC_2}/{6.483} + {1.713 \times FAC_3}/{6.483}$$

With:

*Proxy.C.H(Asie):* The indicator measuring human capital for the sample from Emerging Asia;
$FAC_1$ : The first component ;
$FAC_2$: The second component;
$FAC_3$: The third component.

Table 5. Components matrix for EACs (SPSS V.22.0)

| | Components | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| EdudansPIB | ,058 | ,738 | -,254 |
| Edu.dansDep.p | ,346 | ,802 | -,091 |
| ElèvEnseig | -,601 | -,408 | ,302 |
| N.mscol | ,680 | -,412 | ,480 |
| Sant.dansPIB | ,858 | -,384 | -,265 |
| SantdansDep.p | ,401 | ,376 | ,765 |
| HabitMéd | ,541 | -,240 | -,767 |
| Esp.Vie | ,874 | ,027 | ,271 |

**Source : Authors**

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This last table shows the location of each variable in one of the three components. In this sense, the variable *EdudansPIB* and the variable *Edu.dansDep.p* are located in component 2. As for the variables *ElèvEnseig*, *N.mscol*, *Sant.dansPIB* and *Esp.Vie* are located in component 1. Whereas thecomponent 2 containing *SantdansDep.p* and *HabitMéd*.

### 2.2.2. Case of Southern and Eastern Mediterranean Countries (SEMCs)

In a similar manner to the process used to create the Human Capital Composite Index for Emerging Asia, we also applied the PCA method to our second group of sampled countries, the SEMCs. This approach confirms the suitability of utilizing the PCA technique in the context of SEMCs.

Table 6. KMO index and Bartlett test for SEMCs (SPSS V.22.0)

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin index for measuring sampling quality. | | ,713 |
| Bartlett's sphericity test | Chi-square approx. | 395,296 |
| | dof | 28 |
| | Meaning | ,000 |

**Source : Authors**

The table shows that the conditions for using PCA in SEMC are met. This is evidenced by the Kaiser-Meyer-Olkin Index value of 0.713, which is greater than 0.50. Additionally, Bartlett's test of sphericity gives a p-value of 0.000, further confirming the suitability of PCA.

Table 7. Representation qualities for SEMCs (SPSS V.22.0)

| | Initials | Extraction |
|---|---|---|
| EdudansPIB | 1,000 | ,849 |
| Edu.dansDep.p | 1,000 | ,894 |
| ElèvEnseig | 1,000 | ,890 |
| N.mscol | 1,000 | ,962 |
| Sant.dansPIB | 1,000 | ,949 |
| SantdansDep.p | 1,000 | ,936 |
| HabitMéd | 1,000 | ,841 |
| Esp.Vie | 1,000 | ,886 |

**Source : Authors**

This table presents the representation quality of the variables that measure human capital in SEMCs. We can observe that all the extraction values exceed 0.50, indicating that the variables are accurately represented in the design and should be retained.

Table 8. Total Variance explicated for SEMCs (SPSS V.22.0)

| Component | Initial eigenvalues | | | Sums extracted from the load square | | |
|---|---|---|---|---|---|---|
| | Total | % of variance | % cumulative | Total | % of variance | % cumulative |
| 1 | 4,051 | 50,643 | 50,643 | 4,051 | 50,643 | 50,643 |
| 2 | 2,130 | 26,621 | 77,264 | 2,130 | 26,621 | 77,264 |
| 3 | 1,026 | 12,819 | 90,083 | 1,026 | 12,819 | 90,083 |
| 4 | ,404 | 5,055 | 95,139 | | | |
| 5 | ,215 | 2,691 | 97,830 | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | ,097 | 1,218 | 99,048 | | | |
| 7 | ,049 | ,611 | 99,659 | | | |
| 8 | ,027 | ,341 | 100,000 | | | |

**Source : Authors**

We can use the table above to select three out of the eight components that explain 90% of the overall information for the SEMCs. The first component accounts for 50.65% of the total variance, the second component explains 26.63% of the total variance, and the third component explains 12.82% of the total variance. Since we have obtained three factors, we will combine them to obtain a single composite indicator by weighting them according to the following equation:

$$proxy.C.H\,(PSEM) = 4.051\times FAC_1 \big/ 7.207 + 2.13\times FAC_2 \big/ 7.207 + 1.026\times FAC_3 \big/ 7.207$$

With:

*Proxy.C.H(PSEM)*: The indicator measuring human capital for the sample from SEMCs;

$FAC_1$: The first component;

$FAC_2$: The second component;

$FAC_3$: The third component.

Tableau 9. Components matrix for for SEMCs (SPSS V.22.0)

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| EdudansPIB | -,066 | ,911 | ,120 |
| Edu.dansDep.p | -,645 | ,627 | -,293 |
| ElèvEnseig | -,551 | ,199 | ,739 |
| N.mscol | ,973 | ,058 | ,109 |
| Sant.dansPIB | ,844 | ,426 | ,237 |
| SantdansDep.p | ,725 | ,639 | ,046 |
| HabitMéd | ,661 | -,522 | ,364 |
| Esp.Vie | ,841 | ,047 | -,420 |

**Source : Authors**

The component matrix shows the location of each variable according to the three axes selected. Indeed, the variables *Edu.dansDep.p*, *N.mscol*, *Sant.dansPIB*, *SantdansDep.p*, *HabitMéd* and *Esp.Vie* are all located on axis 1. As for axis 2, it contains the variable *EdudansPIB*, while the variable *ElèvEnseig* is represented in component 3.

## 3. Discussion

The aim of this article is to create a comprehensive and condensed human capital indicator by merging multiple aspects such as education and health, taking into account both quantitative and qualitative elements within each dimension's subcategories.

By utilizing the PCA method, we have produced two sets of statistics that track the accumulation of human capital in the EACs and SEMCs from 1980 to 2019. The findings are outlined in the table below.

Table 10. Composite Human Capital Stock Index in SEMCs and EACs

| **Human capital Stock in SEMCs** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |

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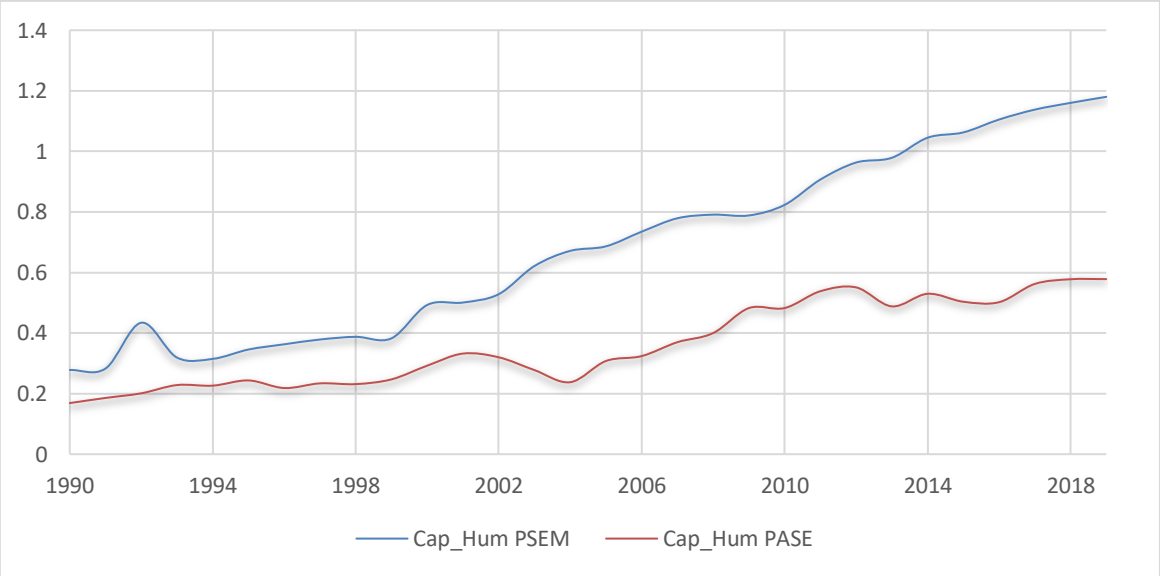
| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0,16** | **0,18** | **0,20** | **0,22** | **0,22** | **0,24** | **0,21** | **0,23** | **0,23** | **0,24** | **0,29** | **0,33** | **0,31** | **0,27** | **0,23** |
| 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| **0,30** | **0,32** | **0,36** | **0,39** | **0,48** | **0,48** | **0,53** | **0,55** | **0,48** | **0,52** | **0,50** | **0,50** | **0,56** | **0,57** | **0,57** |
| **Human capital Stock in EACs** | | | | | | | | | | | | | | |
| 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| **0,27** | **0,28** | **0,43** | **0,31** | **0,31** | **0,34** | **0,36** | **0,37** | **0,38** | **0,38** | **0,49** | **0,50** | **0,52** | **0,62** | **0,67** |
| 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| **0,68** | **0,73** | **0,77** | **0,79** | **0,78** | **0,82** | **0,90** | **0,96** | **0,97** | **1,04** | **1,06** | **1,10** | **1,13** | **1,16** | **1,18** |

**Source : Authors**

In order to visualize this table and to draw conclusions with regard to our problem, we transfer it to the following graph:

Graph 1. Composite Human Capital Stock Index in SEMCs and EACs




**Source: Authors**

The presented chart displays the combined trend of territorial human capital stock in the two focal groups of this study, the Southern and Eastern Mediterranean Countries (SEMCs) and the Emerging Asia Countries (EACs).

It is evident that the human capital stock of the EAC group considerably surpasses that of the SEMC group, despite the fact that these two groups share some similarities, thereby justifying a valid comparison.

To begin with, both the Southern and Eastern Mediterranean Countries (SEMCs) and the Emerging Asia Countries (EACs) were colonized and gained independence in the 1960s. Therefore, these two groups of countries had similar starting points in terms of economic and social policies. Additionally, both groups underwent various foreign reforms, including the structural adjustment plan.

However, after thirty years, various indicators, including the state of territorial human capital, reveal a significant disparity between the two groups of countries studied, indicating different profiles of human capital across territories. This disparity can be attributed to the governance of state actions on territorial human capital as a whole.

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The composite index obtained in this study integrates two dimensions, namely education and health. This index highlights the effectiveness and efficiency of the policies implemented by emerging Asian countries in the fields of education and health, compared to the countries of the South and East of the Mediterranean.

The progress of public policies in education and health in the EACs has been significant, yet challenging. While some countries have managed to increase literacy rates, improve the quality of education, and enhance access to tertiary education, there remain disparities between urban and rural areas and difficulties in providing equitable access to quality education for the most vulnerable populations (Mazzaourou and El Moutaoukil 2021).

Similarly, health policies have resulted in better access to basic healthcare and more effective prevention of communicable diseases. However, improving the quality of care and access for the most vulnerable populations remains a challenge. Governments have implemented innovative approaches to achieve their goals, utilizing technology and implementing prevention and health promotion programs.

To maintain the success of these policies, strong commitment from governments, international partners, and civil society is essential. It is also crucial to find sustainable solutions to finance these policies over the long term. Despite persistent challenges, emerging Asian countries have demonstrated their ability to make significant progress in education and health through effective and innovative public policies.

Despite recent progress in the SEMCs, there are still several challenges that need to be addressed. Education remains a major issue with unequal access to quality education being a significant problem, particularly for girls and children from disadvantaged areas. Additionally, poor quality education limits vocational training and employment opportunities for young graduates (Goumghar, 2017).

Regarding health, the SEMCs face significant challenges, including the prevalence of chronic diseases, high infant mortality rates, and unequal access to healthcare. Limited resources, weak health systems, and armed conflicts have a negative impact on the quality of health services. Mental health is often overlooked as a critical issue for individuals' quality of life and the social and economic stability of countries. Concerted efforts are required to strengthen health systems and improve access to care for all, especially vulnerable populations.

**Conclusion**

Throughout this article, our aim was to create a comparative indicator for territorial human capital in two distinct groups of countries : The Southern and Eastern Mediterranean Countries (SEMCs) and the Emerging Asian Countries (EACs). The objective was to evaluate the governance of territorial human capital in these two groups and measure their progress in education and health.

We chose these two groups based on their historical and procedural similarities in economic and social policies. To create the composite indicator, we considered two dimensions: education and health. While many human capital indicators only focus on education, we recognized that health is just as crucial in shaping an individual's human capital. Even if an individual is well-educated and trained, their contribution to wealth creation is limited if they are not physically, mentally, and psychologically healthy.

We have included four elements for the education dimension and four for the health dimension, which comprise both "input" indicators, such as government expenditure on education and health, as well as "output" indicators, such as average years of schooling and life expectancy.

The resulting composite indicator revealed significant disparities between the SEMCs and the EACs in terms of human capital. Specifically, the EACs demonstrate higher levels of human capital than the SEMCs, indicating the effectiveness of the policies implemented in the area of health and education in the EACs. The divergence in territorial human capital between these two groups of countries accounts for the differences in other domains where human capital is a crucial factor of production.

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