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Educational policies in Morocco: Governance and impact on human development

Politiques éducatives au Maroc : gouvernance et impact sur le développement humain

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Abstract

Today, human development is considered to be the strengthening of basic capabilities that enable individuals to live a decent and dignified life. At the heart of this system is education. Moreover, improving the quality of education is an objective requirement in the face of internationalisation trends, so educational governance is a quality assurance trend that aims to deliver reliable results through standardised control of the conditions and processes of the education system.

Our work will aim to analyse econometric models by introducing several variables to explain human development. We will therefore attempt to enrich our research on the themes and fiscal policy structures of the Moroccan education system in the social sector in order to estimate the influence of governance and public spending on education and other determinants of human development over the period 1990 to 2022 through an empirical study based on three interdependent simple linear regression models.

Keywords: Human development; governance; public spending; education; quality.

Résumé

Aujourd'hui, le développement humain est défini comme le renforcement des capacités fondamentales permettant à chacun de mener une vie digne et intègre. L'éducation est au cœur de ce système. Par ailleurs, l'amélioration de la qualité de l'éducation est une exigence objective face à l'internationalisation. La gouvernance éducative s'inscrit donc dans une démarche d'assurance qualité visant à garantir des résultats fiables grâce à un contrôle standardisé des conditions et des processus du système éducatif.

Nos travaux s'attacheront à analyser des modèles économétriques en introduisant plusieurs variables explicatives du développement humain. Nous chercherons ainsi à enrichir notre recherche sur les thématiques et les structures de politique budgétaire du système éducatif marocain dans le secteur social, afin d'estimer l'influence de la gouvernance et des dépenses publiques sur l'éducation et d'autres déterminants du développement humain sur la période 1990-2022. Cette estimation reposera sur une étude empirique fondée sur trois modèles de régression linéaire simple interdépendants.

Mots clés : Développement humain, gouvernance, dépenses publiques, éducation ; qualité.

Introduction

Since its independence in 1956, Morocco has made significant development efforts, but basic social indicators remain insignificant compared with other countries in the region. The country's ranking on the United Nations Development Programme's (UNDP) Human Development Index (HDI), which puts it in 120th place in 2024, is a clear indication of the low potential for human development in Morocco. We would also add at this point that the low level of education in Morocco clearly indicates both the low level of human development and the insufficient level of economic growth.

Indeed, over the last two decades, education systems have undergone significant changes (Maroy, 2017), with governance and regulation forming an integral part of educational policy updates and reflections on operational and management practices (Pelletier, 2009).

In this respect, governance of the education system has become a concern for all countries, especially those suffering from a failing system. These countries are expected to improve their management and effectively assume the responsibilities entrusted to them.

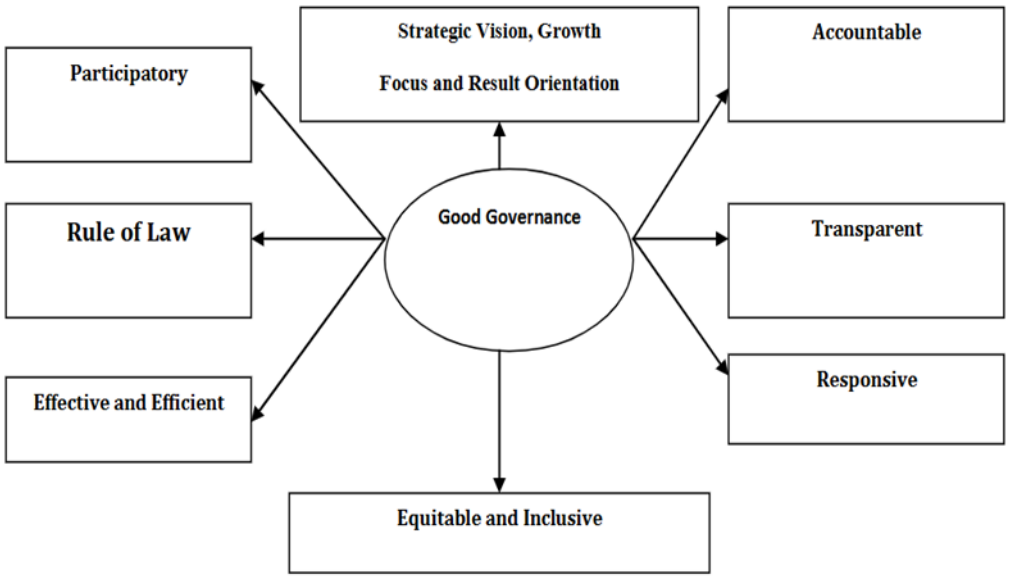
Moreover, the relationship between human development and governance was first put on the agenda in the official report of the United Nations Development Programme (UNDP) in 1997: "Governance has become a hot topic as evidence mounts of the crucial role it plays in determining societal well-being." (Graham, Amos and Plumptre, 2003), so the question is framed as follows: To what extent does educational policy governance affect human development in Morocco?

1. Theoretical framework

1.1. The governance of educational policies

The understanding of the concept of governance lacks clarity and seems uncomplicated, a panoply of writings and a multitude of literatures believe that this term remains complex. According to Lacroix and Pier-Olivier St-Arnaud, "Attempting to define a concept as broad and multifaceted as that of governance presents a definite challenge». In his book, Beitone (2007) inherited the European Commission's definition, considering governance as the set of transactions aimed at organizing, legitimizing and controlling collective rules; governance is then a process. This adds to Defargas's (2003) reflection that governance is similar to the phenomena of globalization. For the World Bank (WB), governance is seen as the set of institutions through which a country's political decision-makers exercise their power for the common good of its citizens, while the UNDP defines governance as the exercise of executive power to manage a country's affairs at all levels.

Figure 1: Characteristics of good governance



Source: Lakshminarayanan and Sharma (2006)

As far as the public sector is concerned, history teaches us that the concept of the state has taken many forms. For M. Weber (1919), the state has the power and sovereignty of the forces of order, justice and police, while legality is already taxed. Subsequently, the emergence of new concepts in the public sphere such as effectiveness, efficiency, governance or the New Public Management (NMP) facilitated the shift from government to governance.

This new public management is characterized by:

- the separation of strategic decision-making by the political authorities from operational management by the administration.
- the orientation of administrative activities and the allocation of resources according to the products and services to be delivered, rather than according to rules or procedures.
- Decentralization is placed at the heart of public management, and the establishment of agencies as a means of regulation.
- The transition from civil servant remuneration based on seniority to merit-based remuneration.
- the introduction of market mechanisms in the supply of goods and services of general interest.
- The importance of transparency in the activities of public administrations.
- the search for efficiency in the use of public funds.
- The evaluation of public services.

The NPM is based on several currents of thought (neoclassical current, agency theory, property rights theory, etc.). It is also based on the Public Choice Theory, in particular, which is based

onindividualism and the idea that the interests of a public institution must first and foremost be analyzed through the individuals who make it up.

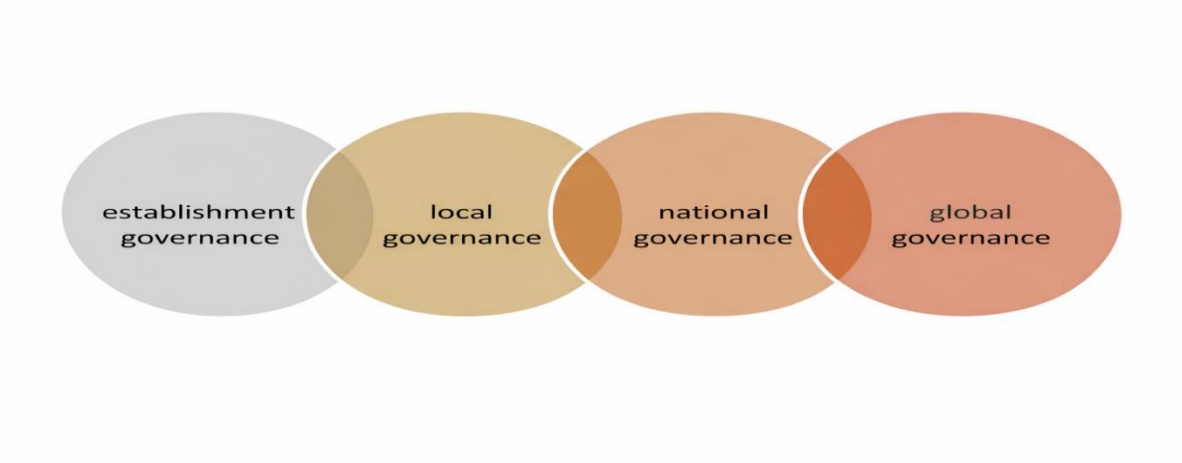


Figure 2: levels of governance in education

Source: UNESCO Report 2015

The governance of the education system is defined by the way in which this sector is administered and managed, and the way in which decisions are taken from the central to the local level (Alain Beitone 2007). This is the way in which decentralization is introduced and used, so the notion of governance in the field of education is introduced as the set of "formal and informal processes by which policies are formulated, priorities identified, resources allocated and reforms implemented and evaluated" (UNESCO Report, 2008).

The first approach to governance of the education system was marked by Keynesian theory, which in 1936 supported state intervention in the economic field to rebuild countries hit by the Second World War.

States were obliged to educate future generations, and were forced to rely on the pedagogical content of teachers. The result, however, was great heterogeneity in the quality and scope of teaching.

Indeed, the state plays a key role in controlling the governance of education systems and in financing the common good of education. Thus, market imperfections prompt the intervention of public sovereignty in primary, secondary and higher education (Plassard and Tran, 2010).

Educational governance is now a key analytical framework for understanding the performance of education systems and their contribution to human development. It refers to all the institutional, organisational and decision-making mechanisms through which education policies are designed, implemented, evaluated and adjusted. Unlike a strictly administrative approach, educational governance emphasises the quality of coordination processes between actors,

transparency in decision-making, institutional accountability and the efficient allocation of resources.

In economic and institutional literature, governance is considered a major determinant of the efficiency of public spending, particularly in the education sector. High levels of governance characterised by coherent strategic planning, effective evaluation systems, and increased accountability of stakeholders maximise the impact of education spending on academic outcomes and, in the longer term, on human capital accumulation. Conversely, weaknesses in governance can significantly reduce the social returns on educational investments, even when spending levels are relatively high.

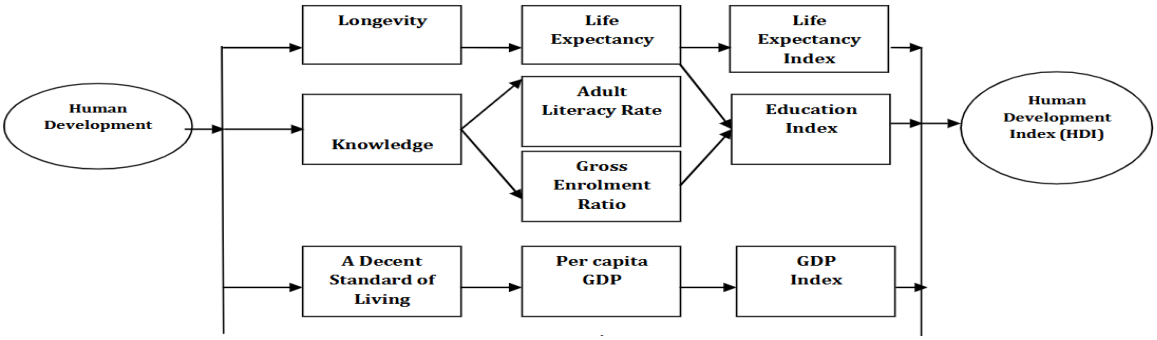
The managerial implications of educational governance are mainly reflected in improved school management, optimised use of financial and human resources, and strengthened performance monitoring and evaluation mechanisms. At the policy level, effective educational governance promotes greater consistency between national strategic objectives, budgetary priorities and expected human development outcomes. It also helps to reduce educational and social inequalities by directing expenditure towards the most vulnerable populations and territories.

From this perspective, human development appears to be an indirect but fundamental outcome of educational governance. By improving access to quality education, strengthening individuals' skills and productive capacities, and promoting equity, efficient educational governance acts as a structuring lever for sustainable human development. Thus, educational expenditure is not an end in itself, but an instrument whose effectiveness depends closely on the quality of the governance mechanisms that frame its mobilization.

1.2. The Human Development Index

The HDI is a synthetic index for assessing long-term progress in three fundamental pillars of human development: a long and healthy life, access to knowledge, education and a decent standard of living (UNDP 2019).

Figure 3: The structure of the Human Development Index



Source: Human Development Report 2002.

For the first dimension, longevity and health are measured by life expectancy. The second dimension is measured by the average number of years of schooling of the adult population, which reflects the average number of years of schooling of the population aged 25 and over during their lifetime. The final dimension is gross national income (GNI) per capita, expressed in constant 2011 dollars, converted using purchasing power parity (PPP) conversion rates.

Table 1: Trends in Morocco's HDI based on consistent temporal data

Year	Life expectancy at birth	Expected duration of schooling	Average length of schooling	GNI per capita ($ PPP 2011)	HDI
1990	66.7	6.5	2.2	3.809	0.458
1995	66.8	7.3	2.8	3.797	0.489
2000	68.7	8.5	3.4	4.402	0.531
2005	71.7	10.1	3.9	5.349	0.581
2010	74.4	11.1	4.2	6.363	0.618
2015	75.7	12.6	5.0	7.183	0.660
2018	76.5	13.1	5.5	7.480	0.676
2022	76.8	13.54	6.1	9.6	0.698

Source: World Bank data

Between 1990 and 2022, Morocco's HDI rose from 0.458 to 0.698, an increase of 34.38%. The table above shows Morocco's progress in each dimension of the HDI. Between 1990 and 2022, life expectancy at birth rose by 10.1 years, the expected duration of schooling accelerated by 7.04 years, the average duration of schooling increased by 3.9 years, and Morocco's GNI per capita rose by 152.03% between 1990 and 2022.

The HDI value recorded by Morocco in 2022 is 0.851, which places it in the middle range of human development and ranks it 120 out of 193 countries.

1.3. Interaction between educational governance and human development

In the long term, governance has a significant impact on the sustainability of economic evolution and development, as well as on human well-being. This important effect has been studied by many authors, such as Kaufmann and Kraay (2002), Pradhan (2011), Sebudubudu and Botlhomilwe (2012) and Tourneur (2011).

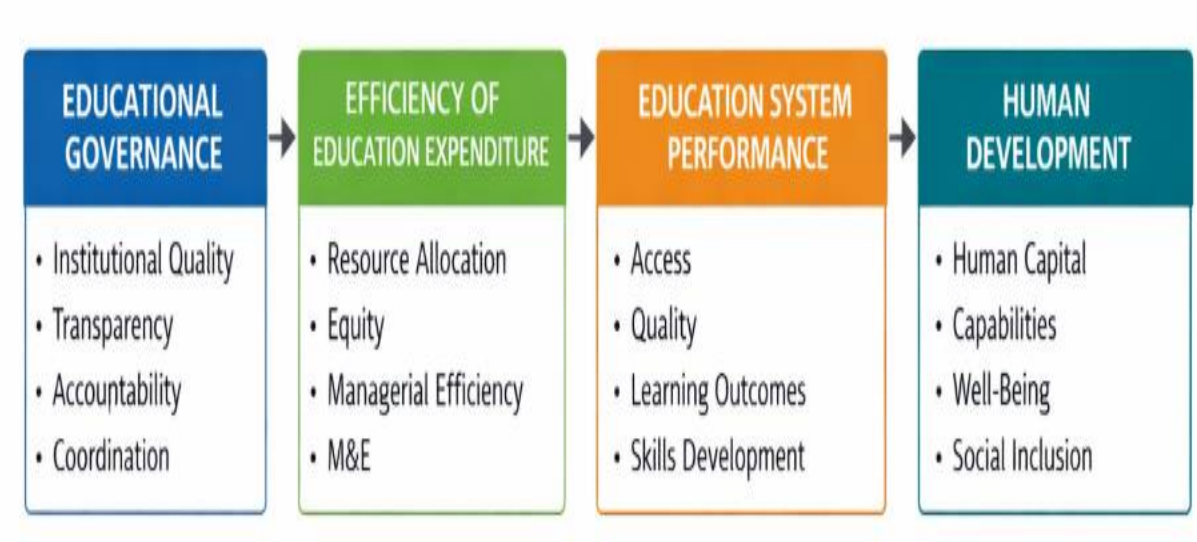
Pahlévi (2017) measured the impact of social expenditure governance on human development in Indonesia. He used health and education spending for human development in 33 provinces from 2008 to 2012. The research study concluded that spending and governance have a significant effect and positive impact on human development.

Pradhan (2012) measured the relationship between corruption and the HDI in Nepal. The study identified certain reasons for the relationship between corruption and the HDI. These reasons are a well-functioning rule of law, ineffective political parties, a scientific culture and a lack of government intervention. The study also revealed a "W"-shaped correlation trend between HDI and corruption, based on past interfaces.

Caron et al (2012) examined the evolution of governance quality in twenty-seven European countries at state level. The proportion of good governance is explained by indicators of participation and accountability in governance, corruption, government effectiveness and protection of the law. The study concluded that there is a significant relationship between the governance index and the social variable. In this study, the authors assert that good governance has a significant impact on economic growth.

The World Bank also underlines the close relationship between governance and development, stating that governance is "the way in which power is exercised in the management of a country's economic and social resources for development" (Holzer and Byong-Joon (Eds.), 2002). Abdullatif (2003) states that, according to the World Bank's definition, "the concept of governance refers directly to the management of the development process, involving both the public and private sectors".

Figure 4: A Conceptual Model of the Relationship Between Education Governance, Expenditure Efficiency, and Human Development Outcomes



Source: authors

This conceptual framework elucidates the structural interrelationships between education governance, the efficiency of education spending, and the performance of the education system, viewing them as fundamental determinants of human development. Effective governance

mechanisms can enhance transparency, accountability, and institutional coordination, thereby improving the allocation and management of educational resources.

These improvements will lead to better educational opportunities, higher quality education, better learning outcomes, and stronger capacity development. In turn, a more robust education system contributes to the accumulation of human capital, the enhancement of individual skills, and the promotion of social inclusion and well-being. In conclusion, this model emphasizes the central role of education policy as a strategic lever for achieving sustainable and inclusive development.

2. Estimation methodology and presentation of variables

2.1. Estimation methodology

We are therefore interested in studying three simple linear regression models using the method of least squares, which consists in seeking an affine relationship linking the variables x and y, where x is the independent variable and y is the dependent variable. This amounts to defining a straight line equation of the type y = ax + b that is as close as possible to all the points, in other words it makes the sum of the squared deviations of the observations as small as possible, essentially adjusting the points represented on the plane (scatterplot) Scatterplots (observations).

In this study, the dependent variable is Human Development, which will be measured by the Human Development Index (HDI), for the independent variables we will focus on the impact of three variables on human development and other determinants, namely the composite governance index, public health expenditure as a percentage of GDP, education expenditure as a percentage of GDP, net enrolment ratio, infant mortality rate and GDP per capita. The investigation of this study will focus on data from 2000 to 2022 for Morocco. Our research therefore relies heavily on secondary data sources available online, mainly from the World Bank, UNESCO, UNDP and the Moroccan Ministry of Finance.

2.2. Presentation of variables

The model estimated in this section is as follows:

Ln (IDH) = α + β1ISG + β2ln (depeduc) + β3ln (depsant) + β4ln (gdp/cap) +β5ln (txnetscol) + β6ln (txmortinfant) + error term.

Where HDI stands for human development index, GSI stands for synthetic governance index, depeduc stands for total public expenditure on education relative to GDP, depsant stands for total public expenditure on health relative to GDP, gdp/capita stands for GDP per capita, txnetscol stands for net enrolment ratio and txmortinfant stands for infant mortality rate.

Table 2: Study data sources

Variables	Source
HDI	UNDP official website
Synthetic governance index	World Bank database
Public expenditure in the	Official website of the Ministry of Economy, Finance
Education (% of GDP)	Finance and Administration
	Reform
Public spending in the education sector	Official website of the Ministry of Economy, Finance and
health (% of GDP)	Finance and Administration Reform
GDP per capita	World Bank database
Net enrolment ratio	UNESCO database
Infant mortality rate	World Bank database

2.3. Model robustness tests

In this section, we will carry out several tests to check whether the model proposed by the research respects the basic assumptions of the ordinary least squares method.

2.3.1. A look at error autocorrelation:

One of the basic assumptions of the linear regression model is that the random error components or disturbances are identically and independently distributed. Thus, in the y □X □□u model, it is assumed that:

$$E(u_t, u_{t-s}) = \begin{cases} \sigma_u^2 & \text{if } s = 0 \\ 0 & \text{if } s \neq 0 \end{cases}$$

The correlation between the disturbances must therefore be zero.

More precisely, serial correlation (also known as autocorrelation) is the transfer of error terms in a time series from one period to another. In other words, the error for a period A is correlated with the error for a subsequent period B. For example, underestimating earnings in one quarter can lead to underestimating earnings in subsequent quarters. This can lead to a multitude of problems, including:

- Inefficient ordinary least squares estimates and any forecasts based on these estimates. An efficient estimator gives us the most information from a sample; inefficient estimators can perform well, but require much larger samples to do so.

- Standard errors - *Std.Error* too low (for a time series with positive serial correlation and an independent variable increasing over time).

- False positives for significant regression coefficients. In other words, a regression coefficient appears to be statistically significant when in fact it is not.

With regard to the causes of autocorrelation, we cite at this stage model misspecification, coefficient instability and neglect of an important explanatory variable.

If the model suffers from genuine autocorrelation, it will be more appropriate to use the GCM estimation method.

In our case, we'll be using the Breusch-Godfrey test, which is generally used in econometrics to assess the validity of some of the modeling assumptions inherent in the application of ordinary least squares models.

The Breusch-Godfrey test is a test of the autocorrelation of errors in a regression model. The null hypothesis is that there is no serial correlation of any order up to p.

Therefore:

H0= Errors are not self-correlated.

H1= Errors are self-correlated.

Using Eviews, we obtain

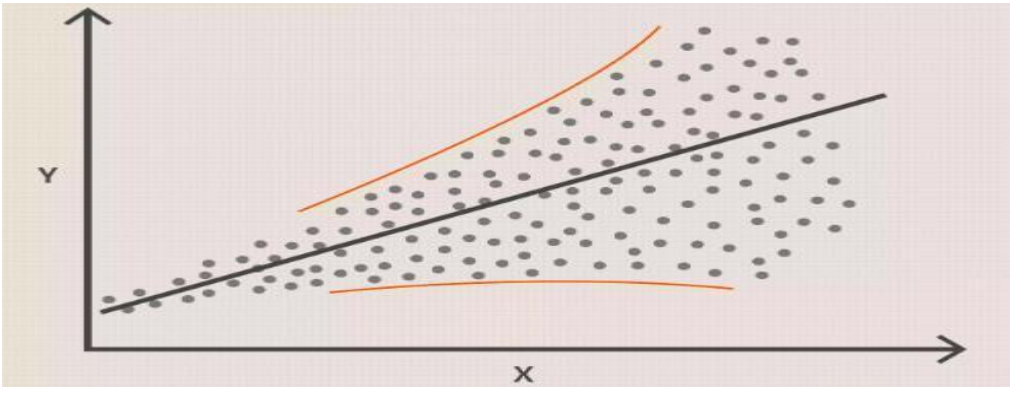
We therefore deduce that P-value is greater than 0.05, so we accept H0 and conclude that the errors are not autocorrelated.

2.3.2. A look at the heteroscedasticity of errors

In econometrics, heteroscedasticity can occur when the standard errors of a monitored variable over a specific time period are not constant.

Heteroscedasticity often takes two forms: conditional and unconditional. Conditional heteroscedasticity identifies non-constant volatility when future periods of high and low volatility cannot be identified. Unconditional heteroscedasticity is used when future periods of high and low volatility can be identified.

Figure 4: Heteroscedasticity



Source: Zakweli

More specifically, another assumption of linear regression is that the estimator must be homoscedastic, meaning that the variance of each disturbance must be constant. Heteroscedasticity violates this assumption and occurs when the variance perturbation is no longer constant (Gujarati 2009). Although the estimator with heteroscedasticity always remains linear and unbiased, hypothesis testing becomes unreliable, leading to an erroneous conclusion. Two methods that can be used to detect heteroscedasticity, which are both informal and formal methods. In the informal method, it could be detected by examining the nature of the problem using a graphical method. Whereas, in the formal method, the following tests could be applied, namely Park's test, Glejser's test, Spearman's correlation test and White test.

Heteroscedasticity can be remedied using a number of methods. The first is the Generalized Least Squares (GLS) method. "GCM is an OLS on transformed variables that satisfy the assumptions" (Gujarati 2009). The GCM method yields an estimator that transforms the disturbance into homoscedastic; consequently, it can produce linear and unbiased estimators. Another corrective method is standard error correction, known as HAC (Newey-West).

Eviews provides us with this integrated tool (HAC) which will enable us to avoid standard errors when the problem of heteroscedasticity is present. This allows us to correct problems linked to the violation of homoscedasticity by re-estimating the equation with standard deviations that take these perturbations into account.

2.3.3. A look at error normality

In statistics, normality tests give us the opportunity to check whether real data in our model follow a normal distribution. Normality tests are special cases of goodness-of-fit tests, which allow us to compare distributions applied to a normal distribution. The MMCO does not require the error term to follow a normal distribution in order to produce unbiased estimates with minimum variance. However, satisfying this assumption enables statistical hypothesis testing and the generation of reliable confidence intervals and prediction intervals.

The hypotheses of this test are as follows:

$$\begin{cases} H_0 : \varepsilon_t \sim> N(0, \sigma_\varepsilon^2) \\ H_1 : \text{les erreurs ne suivent pas une loi normale.} \end{cases}$$

H0= Errors are normally distributed H1= Errors do not follow a normal distribution

Using the Eviews test, we obtain:

We therefore deduce that P-value is greater than 0.05, so we accept H0 and conclude that the errors are normally distributed.

2.3.4. Multicollinearity

The presence of multicollinearity in the regression estimator means that there are perfect relationships among the explanatory variables (Gujarati 2009). If multicollinearity is perfect, the coefficients of the X variables are indeterminate and their standard errors are infinite. If multicollinearity is far from perfect, the regression coefficient has large standard errors, i.e. the coefficients cannot be estimated with great precision or accuracy, multicollinearity can be detected by correlating the repressors. It is a major problem if the correlation between two variables is greater than 0.8.

The estimator with high multicollinearity has a large variance, covariance and confidence interval, so the estimation results are not precise and tend to be statistically insignificant (Hadri.E 2021).

There is a formal way of detecting collinearity among regressors on Eviews called "Coefficient Variance Decomposition".

The test for collinearity in our case is that of Besley, Kuh and Welsch (2004).

In general, a high degree of collinearity exists if:

- A certain number of conditions is less than 1/900 (0.001)
- Three, two or more variance decomposition proportions are greater than 0.5. Using Eviews we obtained:

The central panel displays the variance decomposition proportions. It clearly shows that some variables with two values are greater than 0.5, confirming that there is a fairly high degree of collinearity between them.

In this respect, one of the methods that can be used to remedy multicollinearity is the deletion of one of the correlated variables. However, since the explanatory variables are of interest in our research, this option may not be possible in our case. Consequently, the best option for this problem in this situation is to do nothing.

According to Gujarati, "although the model cannot estimate the regression with greater precision, a linear combination of them can be estimated relatively efficiently" (Gujarati 2009). Thus, multicollinearity is not necessarily a problem in the case when the R^2 is high and the regression coefficients are individually significant, as revealed by the higher t-value.

3. Results and discussion

3.1. Presentation of results

Table 3: Study results

Variables	Without integration of governance Model 1	Without integration of health ratio Model 2	Include all the indicators Model 3
Synthetic index of governance		0,012 793 (0,097 8)	0,011 613 (0,258 9)
Ratio of expenses ratio on health at GDP	0,007 617 (0,1462)		0,001 657 (0,817 4)
Ratio of expenditure s spending education of GDP	0,020 036 (0,020 9)	0,022 636 (0,040 5)	0,022 248 (0,066 7)
GDP per capita	0,027 576 (0,066 9)	0,044 337 (0,003 7)	0,041 450 (0,024 0)
Rate net of enrolment	0,161 126 (0,000 8)	0,157 445 (0,003 6)	0,159 151 (0,005 4)
Rate of mortality rate	-0,232 801 (0,000 0)	-0,220 170 (0,000 0)	-0,221 569 (0,000 0)
Constant	-0,695 947 (0,003 2)	-0,835 591 (0,000 2)	-0,817 944 (0,000 3)
R^2	0,993 759	0,994 051	0,994 060
Observations	23	23	23

Source: Eviews

Note: Probabilities are in brackets

Estimation with the first model (without integration of the synthetic index of governance):

(1) Ln (IDH) = α + β 1ln (depeduc) + β2ln (depsant) + β3ln (GDP/cap) +β4ln (txnetscol) + β5ln (txmortinfant) + error term.

Estimation with the second model (without integration of the ratio of public health expenditure to GDP):

(2) Ln (IDH) = α + β 1ISG + β2ln (depeduc) + β3ln (gdp/cap) + β4ln (txnetscol) + β5ln (txmortinfant) + error term.

Estimation with the third model (including all variables):

(3) Ln (IDH) = α + β 1ISG + β2ln (depeduc) + β3ln (gdp/cap) + β4ln (txnetscol) + β5ln (txmortinfant) + β6ln (depsant)+ error term.

3.2. Help with data interpretation

In order to better clarify the interpretation of the various variables, it seems sensible to devote this section to learning how to theoretically interpret the coefficients of a model, let's consider our example in which we would like to measure the impact of public education spending expressed in GDP on the human development index.

Level-level model:

Consider the following linear model estimated by the method of least squares:

HDI = β0 + β 1Educ + εi (1) with εi the error term.

In this case, the coefficient β 1 is interpreted as the marginal effect of an additional unit of education expenditure on the HDI. It corresponds to the β1-unit change in HDI induced by the one-unit change in education expenditure.

Log-log model

Let's now consider the same model as above, but in which both variables (exogenous and endogenous) are expressed in logarithm this time.

ln (IDH) = β0 + β 1ln (Educ) + εi (2) with εi the error term

Thus, $\partial IDH/\partial Edu = \beta 1\ (IDH/Educ)$

Isolating β 1, we obtain:

$\beta 1 = (Educ\ /\partial Educ)\ (\partial IDH/IDH)$

We therefore deduce that this is indeed an elasticity. It can be interpreted as the β1% change in HDI induced by a one-percent change in the public expenditure ratio.

Hence, the coefficient estimated by regression β 1 is interpreted in this case as the elasticity coefficient *e*. More precisely, this model tells us that an increase of x% improves y by β1%. It is this latter specification that allows us to interpret β1 as an elasticity parameter.

Log-level model:

Let's now consider the regression model with the dependent variable IDH in log:

ln (IDH) = β0 + β 1Educ + εi (3) with εi the error term.

Thus, ∂IDH/∂Educ =β1SIDH

and β1 is obtained by:

$\beta 1 = \partial IDH/\partial EducIDH$

Hence, this model tells us that a one-unit increase in x increases y by ($\beta 1 * 100$) %. We say that $\beta 1$ measures the semi-elasticity of y with respect to x.

In our case, we interpret $100 \times \beta 1$ as the percentage change in HDI when the ratio of public spending on education to GDP increases by one unit, all else equal: when the latter increases by one unit, HDI in this case increases by $100 \times \beta 1$.

Level-log model:

Finally, this case infers that the dependent variable is level and the independent variable is log:

$IDH = \beta 0 + \beta\ 1 \ln (Educ) + \varepsilon i$

In this case, the unit change in HDI relative to a one percent increase in the ratio of public spending on education to GDP, all else equal: when the latter increases by one percent, the HDI increases by ($\beta 1/100$). In other words, a 1% increase in x increases y by (1/100) units.

3.3. Interpretation and analysis of results

Model (1) estimates the effect of spending on education and other determinants of human development without taking into account the influence of governance on the HDI.

The results clearly show that the education system significantly affects the HDI in a positive direction at the 5% risk. A 1% increase in the ratio of public spending on education to GDP should raise the HDI by around 0.02%. A 1% increase in the net enrolment ratio would increase the variable to be explained by 0.16%.

Next come the other determinants of human development. GDP per capita is statistically significant at the conventional 10% threshold, contributing a 0.027% improvement in the HDI for every 1% increase. As for the infant mortality rate, it is significant at the 5% risk, but this time in the negative direction. More precisely, the HDI can increase by 0.23% for every 1% reduction in infant mortality.

However, the ratio of public health expenditure is not significant in this model.

In the second model, we have included the synthetic governance index to estimate the influence of governance, education and other determinants of human development on the HDI. As a result, and due to the insignificance of the public health expenditure ratio, we eliminated the latter to ensure the significance of all variables and their contributions in explaining the model.

The results obtained provide information on the importance of the governance of the education system for improving human development, since the synthetic governance index is statistically significant in this case at the 10% risk, with a positive contribution of 1.2% to the HDI for each one-unit improvement in the GSI, the variables reflecting the education system (ratios of public

expenditure on education to GDP and net enrolment ratio) are also significant at 5% risk, with each 1% increase in the first variable improving the HDI by 0.022%, and the second positively affecting human development by 0.15%.

For the other variables, they are all statistically significant at 5% risk in this model. In this context, a 1% increase in GDP per capita can increase Morocco's HDI by 0.04%.

The impact of the infant mortality rate on the HDI remains negative, since the latter can decrease by 0.22% for each 1% increase in infant mortality.

For the third model, we integrated all the variables selected in this study. Using Eviews, we can confirm that the majority of variables are significant and contribute to explaining the model (Meryem.L 2011).

Starting with the variables explaining the education system, the ratio of public spending on education to GDP is statistically significant at the conventional 10% risk, and can accelerate the HDI by 0.02% for every 1% improvement. Similarly, the net primary school enrolment ratio is significant at 5% and positively enriches human development in Morocco by 0.15% for every 1% increase.

Next come the other determinants of human development. GDP per capita is significant at 5% risk, and each 1% increase in GDP per capita improves the HDI by 0.04%. The influence of the infant mortality rate on the HDI is significant and always remains negative and compatible with theory; in this case, a 1% reduction in infant mortality increases human development by 0.22%.

However, the synthetic governance index and the ratio of public health expenditure to GDP are not statistically significant and do not contribute to explaining the HDI.

With regard to R^2, the R squared of the three models ranges from 0.993 to 0.994.

The R^2 of our research is more than 0.99, which means that the equation of the regression line is capable of determining more than 99% of the distribution of points and encompasses more than 99% of the information.

As a result, the level of public governance, spending on health and education relative to GDP, and other determinants of human development (infant mortality rate, net primary school enrolment ratio, GDP per capita) are highly effective in explaining the HDI.

These results are confirmed by the study of Baldacci et al. (2008). They study the impact of social spending on economic growth in 118 developing countries.

They find that education spending contributes significantly to growth when accompanied by good governance. Furthermore, our study is also consistent with that of Cooray (2009), who

concludes that the size and quality of government are crucial to achieving the goal of development.

Conclusion

Human development asserts that development must be woven around people, not development. Development must therefore be participatory, and for this to happen, people must have the opportunity to invest in improving their health, education and training capabilities (Ait ben assila. R 2021).

They must have the opportunity to use their capabilities by participating fully in community decision-making, and to enjoy human, economic and political freedom (Sen, 2000; Diener and Biswas-Diener, 2000; Helliwell, 2002; Clark, 2005; Stroup, 2007).

The results of our study support Charon et al's (2010) conclusion that good governance of countries contributes to higher GDP per capita and contributes to higher human development. Moreover, it is consistent with the work of Acemoglu et al. (2004), Gupta (2002) and Herrera (2005), who explain that governance improves government effectiveness and efficiency in the provision of public goods and services. Thus, the performance and efficiency of government institutions lead to improved economic performance and human well-being. As Prasetyo and Zuhdi (2013) point out, the more efficient countries are in their spending, the higher the contribution of those who spend to the development of human potential.

We also cite in this regard that government efficiency and performance should not be presented as an alternative to, confused with, economic growth or the mobilization of additional resources. The latter are necessary and important, since the development of the essential elements of human development cannot be financed without mobilizing expenditure. But the best way to direct these resources is to spend them wisely by strengthening institutional quality (Haq 1995). Governance indicators influence human development and ultimately improve a country's economic growth in two ways. Firstly, good governance creates a set of institutions that increases the productivity of human and physical development, and attracts investment to develop the latter. This process finally allows economic growth to accumulate, following Solow's model and the new growth theory developed in our theoretical framework.

Secondly, following social infrastructure theory, good governance improves a country's key institutions and creates a set of government policies conducive to economic growth.

Thus, good governance is more accountable to citizens, since it stimulates interaction between government, the private sector and civil society in the execution of public work; consequently, the programs and policies generated will be more favorable.

As far as public spending on education and net enrolment rates are concerned, we find that they influence the HDI significantly and in a positive direction. This finding reinforces the results of most studies in this field, and is consistent with the work of Qureshi (2009), who concludes that high education spending contributes to improved human development. Qureshi studied the impact of public social spending on human development in Pakistan and found that education spending could not only improve HDI indicators, but also simultaneously increase other economic indicators.

Henceforth, the Iheoma research (2014) which obtains results similar to the consensus of the literature by carrying out the study in 20 sub-Saharan African countries. His study reveals that spending on education in its various cycles explains the HDI in a positive direction. The result also validates UNDP and Mahbub ul Haq's theory of human development, which argues that well-controlled and directed social spending and successive policies of school enrolment are considered important factors in achieving sustainable human development.

In this respect, spending in the education sector can accumulate skilled, high-performance human development which, in turn, can enable the use of modern technologies in the production process by minimizing the enormous costs of adoption (ZAOUJAL, N 2021) . Thus, public policies must focus first and foremost on building a quality education system for all, and this will only be possible if governments devote a significant proportion of their spending to the education sector.

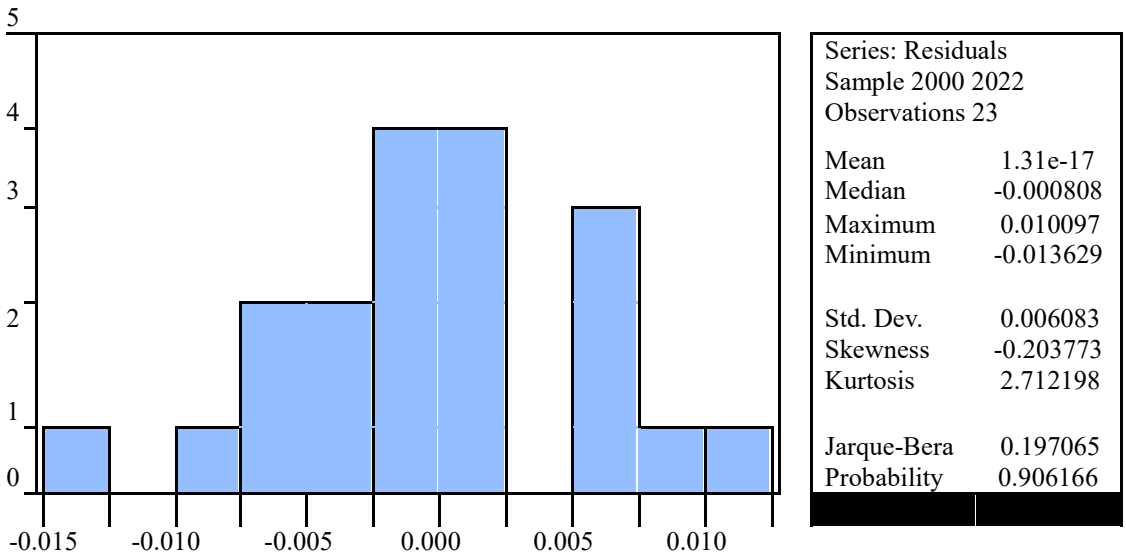
Appendices

1. The Breusch-Godfrey test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.225236	Prob. F(2,11)	0.8019
Obs*R-squared	0.747479	Prob. Chi-Square(2)	0.6882

2. Jarque Bera test



3. Multicollinearity test

Eigenvalues	0.027985	0.001394	0.000170	3.39E-05	2.12E-05	3.37E-06	7.87E-09
Condition	2.81E-07	5.65E-06	4.62E-05	0.000232	0.000372	0.002335	1.000000

Variance Decomposition Proportions

	Associated Eigenvalue						
Variable	1	2	3	4	5	6	7
C	0.998353	0.001644	2.02E-06	3.86E-07	4.19E-07	3.23E-07	3.05E-09
LOG(DEPEDU)	0.004073	0.194950	0.675441	0.120865	0.004394	0.000276	1.96E-06
LOG(gdp/cap)	0.027418	0.961647	0.000215	0.003201	0.006091	0.001407	1.88E-05
LOG(TXDEATHINFANT)	0.405374	0.420731	0.101847	0.001624	0.060146	0.010271	7.27E-06
LOG(TXNETSCOL)	0.550012	0.447957	0.001791	0.000236	1.36E-07	3.43E-06	7.45E-07
LOG(DEPSANT)	0.021424	0.377565	0.356328	0.064950	0.149774	0.029958	3.11E-07
ISG	0.052225	0.199901	0.555568	0.149763	0.040863	0.001677	1.22E-06

Model 1 result

Sample: 2000 2022

Included observations: 23

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.695947	0.192767	-3.610292	0.0032
LOG(DEPEDU)	0.020036	0.007628	2.626721	0.0209
LOG(gdp/cap)	0.027576	0.013793	1.999252	0.0669
LOG(TXINFANTDEATH)	-0.232801	0.015349	-15.16758	0.0000
LOG(TXNETSCOL)	0.161126	0.037217	4.329304	0.0008
LOG(DEPSANT)	0.007617	0.004929	1.545368	0.1462

R-squared	0.993759	Mean dependent var	-0.497950
Adjusted R-squared	0.991359	S.D. dependent var	0.077005
S.E. of regression	0.007158	Akaike info criterion	-6.789036
Sum squared resid	0.000666	Schwarz criterion	-6.490792
Log likelihood	70.49584	Hannan-Quinn criter.	-6.738561
F-statistic	414.0117	Durbin-Watson stat	2.198743
Prob(F-statistic)	0.000000	Wald F-statistic	1255.527
Prob(Wald F-statistic)	0.000000		

Model 2 result

Sample: 2000 2022

Included observations: 23

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.835591	0.162994	-5.126517	0.0002
LOG(DEPEDU)	0.022636	0.009949	2.275302	0.0405
LOG(gdp/cap)	0.044337	0.012564	3.528751	0.0037
LOG(TXINFANTDEATH)	-0.220170	0.011124	-19.79300	0.0000
LOG(TXNETSCOL)	0.157445	0.044374	3.548141	0.0036
ISG	0.012793	0.007170	1.784072	0.0978

R-squared	0.994051	Mean dependent var	-0.497950
Adjusted R-squared	0.991763	S.D. dependent var	0.077005
S.E. of regression	0.006989	Akaike info criterion	-6.836979
Sum squared resid	0.000635	Schwarz criterion	-6.538735
Log likelihood	70.95130	Hannan-Quinn criter.	-6.786504
F-statistic	434.4719	Durbin-Watson stat	2.133092
Prob(F-statistic)	0.000000	Wald F-statistic	1485.918
Prob(Wald F-statistic)	0.000000		

Result of model 3:

Sample: 2000 2022

Included observations: 23

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.817944	0.163561	-5.000851	0.0003
LOG(DEPEDU)	0.022248	0.011033	2.016479	0.0667
LOG(PIBHAB)	0.041450	0.016056	2.581511	0.0240
LOG(TXINFANTDEATH)	-0.221569	0.011340	-19.53805	0.0000
LOG(TXNETSCOL)	0.159151	0.046926	3.391533	0.0054
ISG	0.011613	0.009799	1.185177	0.2589
LOG(DEPSANT)	0.001657	0.007021	0.235983	0.8174

R-squared	0.994060	Mean dependent var	-0.497950
Adjusted R-squared	0.991090	S.D. dependent var	0.077005
S.E. of regression	0.007269	Akaike info criterion	-6.733144
Sum squared resid	0.000634	Schwarz criterion	-6.385193
Log likelihood	70.96487	Hannan-Quinn criter.	-6.674257
F-statistic	334.6895	Durbin-Watson stat	2.142267
Prob(F-statistic)	0.000000	Wald F-statistic	1463.831
Prob(Wald F-statistic)	0.000000		

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