Health Spending and Economic Growth in the MENA Region: The Case of Morocco, Egypt, Tunisia, Lebanon and Algeria

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.907000398

Received: 07 July 2025; Accepted: 15 July 2025; Published: 20 August 2025

INTRODUCTION

Investments in the health sector play a central role in boosting labour productivity, mitigating human capital losses. By reducing mortality and morbidity, these expenditures help to increase the proportion of the working-age population, thereby promoting higher per capita incomes (Bloom & Canning, 2000). A healthier population, characterized by better physical and cognitive status, enhances not only individual productivity, but also macroeconomic dynamics, including through technological innovation and productive efficiency (Beraldo, Montolio, & Turati, 2009). These mechanisms underscore the importance of health as a lever for economic growth, in line with theories of human capital.

The relationship between health spending and health outcomes is a central issue in the evaluation of public policies. According to the World Health Organization (WHO, 2013), health expenditure, expressed as a percentage of gross domestic product (GDP), significantly influences indicators such as life expectancy, maternal and infant mortality, and health service coverage. This disparity is partly explained by increased investments in health infrastructure, prevention of infectious diseases and access to essential care (WHO, 2013).

However, in the Middle East and North Africa (MENA) region, persistent challenges, such as epidemiological transitions induced by lifestyle changes and stagnating public spending on health, hinder the quality and accessibility of health services. These constraints raise questions about the real impact of health spending on economic growth in this region, warranting further research to assess its long-term effects (Asbu, Masri, & Kaissi, 2017). A nuanced analysis of the interactions between health and economic development in this specific geographical context therefore appears essential to guide public policies.

Public spending on health therefore appears to be an essential lever for economic development, particularly in developing regions where inequalities in access to care persist. The effectiveness of such spending depends largely on governance and the ability of institutions to allocate resources optimally (Kaufmann, Kraay, & Mastruzzi, 2005). In the MENA region, marked by growing socio-economic disparities and health challenges, government action plays a central role in reducing systemic inefficiencies and promoting inclusive growth (Ben Ahmed Mtiraoui, 2015).

The economic literature reveals contrasting effects of public health spending. Empirical analyses indicate a marked influence of these expenditures on improving the health indicators of disadvantaged populations, although their performance is frequently altered by institutional dysfunctions and distortions in the allocation of resources (Gupta et al., 2001, cited in Ben Ahmed Mtiraoui, 2015). Theoretical approaches in growth economics emphasize the strategic importance of public investment, while warning against variations in its effectiveness depending on the robustness of the institutional framework (Barro, 1991, cited in Ben Ahmed Mtiraoui, 2015; Rajkumar & Swaroop, 2002, cited in Ben Ahmed Mtiraoui, 2015). The particular case of the MENA economies illustrates this problem, where shortcomings in public governance seem to partially annihilate the potential benefits of health policies, as confirmed by the results of econometric modelling over the period 1984-2012 (Ben Ahmed Mtiraoui, 2015).

Importance of the research

This study fills a critical gap in the literature by specifically analyzing the impact of public health spending on economic growth in an understudied and yet strategic geographical context, the MENA region. While existing work often focuses on developed countries or other emerging regions, the dynamics of MENA economies—marked by accelerated epidemiological transitions, institutional vulnerabilities, and recurrent geopolitical shocks—remain poorly understood. By examining five countries with contrasting socio-economic trajectories (Morocco, Egypt, Tunisia, Lebanon, Algeria), this research reveals that the effectiveness of health spending depends closely on the quality of institutions and macroeconomic stability, thus highlighting that complementary structural reforms are essential to transform health investments into a lever for growth.

This study aims to assess the extent to which public investments in health significantly influence economic growth in the MENA region, using Morocco, Egypt, Tunisia, Lebanon and Algeria as case studies. The central objective is to determine whether an increase in health spending, alone or accompanied by complementary structural reforms (governance, transparency, institutional efficiency), can constitute a lever for sustainable economic development. By analysing the specific dynamics of these countries – marked by accelerated epidemiological transitions (ageing, non-communicable diseases), fiscal vulnerabilities and recurrent geopolitical shocks – this research seeks to answer a key question for policymakers: Under what conditions does health spending generate tangible economic benefits, and how can its allocation be optimised to maximise this impact?

LITERATURE REVIEW

The relationship between health spending and economic growth is a dynamic field of research, marked by diversified theoretical and empirical approaches. This section summarizes the major contributions, highlighting theoretical mechanisms, contrasting empirical results, and moderating contextual factors.

Conceptual framework: Health, human capital and growth

Neoclassical theories (Solow, 1956; Swan, 1956) and endogenous growth models (Romer, 1990) place human capital at the heart of economic development. According to these frameworks, a healthy population improves labour productivity, stimulates innovation, and fosters sustainable growth (Bloom & Canning, 2000; Beraldo et al., 2009). Two complementary perspectives structure this debate, The **"health vision"** postulates that health investments directly enhance productivity, creating a virtuous circle of economic growth (Faruk et al., 2022), The **"income vision"** reverses this causality, suggesting that growth generates an increased demand for health services, via improved incomes (Sethi et al., 2020).

Empirical Evidence: Heterogeneity of Effects

Empirical studies reveal variable impacts, influenced by the level of development and institutional quality, Positive effects**:** In economies with intermediate or high human capital, health spending significantly boosts GDP. In sub-Saharan Africa, a 1% increase in health spending increases growth by 0.20% subject to strong institutions (Sarpong et al., 2020). In Tunisia, this effect reaches 0.15% (Sahnoun, 2018). In OECD countries, public spending reduces inequalities in access to care, thereby strengthening social cohesion and growth (Atems, 2019; Kumar et al., 2020), **Negative or neutral effects**: In contexts of weak governance or limited human capital, health spending can be ineffective. In Egypt, allocative inefficiencies lead to a negative impact (-0.05%) (Faruk et al., 2022), while in sub-Saharan Africa, corruption cancels out the positive spillovers (Eggoh et al., 2015). In China, regional disparities illustrate this duality: spending stimulates growth in western regions, but dampens it in industrialized eastern areas (Wang et al., 2022).

The decisive role of the institutions

Institutional quality emerges as a key factor in maximizing the impact of health spending, Robust institutions, such as in Asia-Pacific, amplify economic benefits by optimizing resource allocation (Rizvi, 2019). Conversely, in the MENA region, corruption and weak governance counteract these effects (Faruk et al.,

2022). Complementary policies (education, infrastructure) and demographic dynamics (urbanization, ageing) also modulate the results. For example, urbanization increases the efficiency of health spending, despite environmental externalities (Wang et al., 2022).

Methodological complexities and nonlinearities

Recent studies highlight **nonlinear relationships** and critical thresholds. In Europe, infant mortality follows an **inverted U-shaped** curve, decreasing only after a certain level of economic development (Spiteri & von Brockdorff, 2019). In China, the elasticity of health spending varies according to physical capital and household consumption (Cha & Luo, 2011). Econometric methods, such as **ARDL** models, reveal differentiated short- and long-term effects, highlighting the importance of dynamic models to capture these nuances (Carrion-i-Silvestre, 2005; Seo et al., 2019).

Unfinished debates and avenues for research

Despite progress, contradictions persist, with some authors questioning the direct link between health and growth, arguing that other variables (technology, institutions) play a mediating role (Acemoglu & Johnson, 2007). Others identify bidirectional causalities, particularly in emerging countries (Chaabouni et al., 2016). Studies on the MENA region remain limited and contradictory. While studies note positive effects in Morocco and Tunisia (Lacheheb et al., 2014; Sahnoun, 2018), others point to the lack of direct causality, attributed to institutional shortcomings (Faruk et al., 2022).

METHODOLOGY

The method used is an ARDL (Autoregressive Distributed Lag) analysis that stands out as a particularly suitable method for studying the impact of public health spending on GDP, due to its many methodological advantages. First, it captures both the immediate (short-term) and delayed (long-term) effects of health spending on economic growth, which is crucial since investment in health can have incremental spillovers to productivity, workforce quality, and thus GDP. Second, the ARDL approach is flexible with respect to the properties of time series: it can be applied even if some variables are stationary (I(0)) and others are integrated of order one (I(1)), a characteristic frequently encountered in economic data. This flexibility avoids unnecessary data transformations that could obscure important relationships. In addition, ARDL allows for the presence of cointegration between variables, thus confirming the existence of a stable long-term relationship between health spending and GDP, while providing accurate estimates of dynamic multipliers. These aspects make the ARDL a robust tool for analysing how health-related fiscal policies influence not only immediate economic performance but also the long-term economic development trajectory.

Data:

Pour les données provient des sites officielles et internationales comme IMF Eurostat, Statistique Office of the European Communities ,The Word Bank, European Central Bank, Statistisches Bundesamt ,INSEE, Direction générale, Bureau of Labor Statistics, United States ,Bank of England , Instituto Nacional de Estadística de España, INE, Banco de España ,Instituto Nacional de Portugal ,Instituto Brasileiro de Geografia e Estatística Istat, L'Istituto nazionale di statistica, Federal Reserve Bank of New York ,Instituto Nacional de Estadísticas y Censos de Ecuador (INEC) , Instituto Nacional de Estadísticas y Censos de Argentina (INDEC) ,Instituto Nacional de Estadística de Bolivia , Instituto Nacional de Colombia.

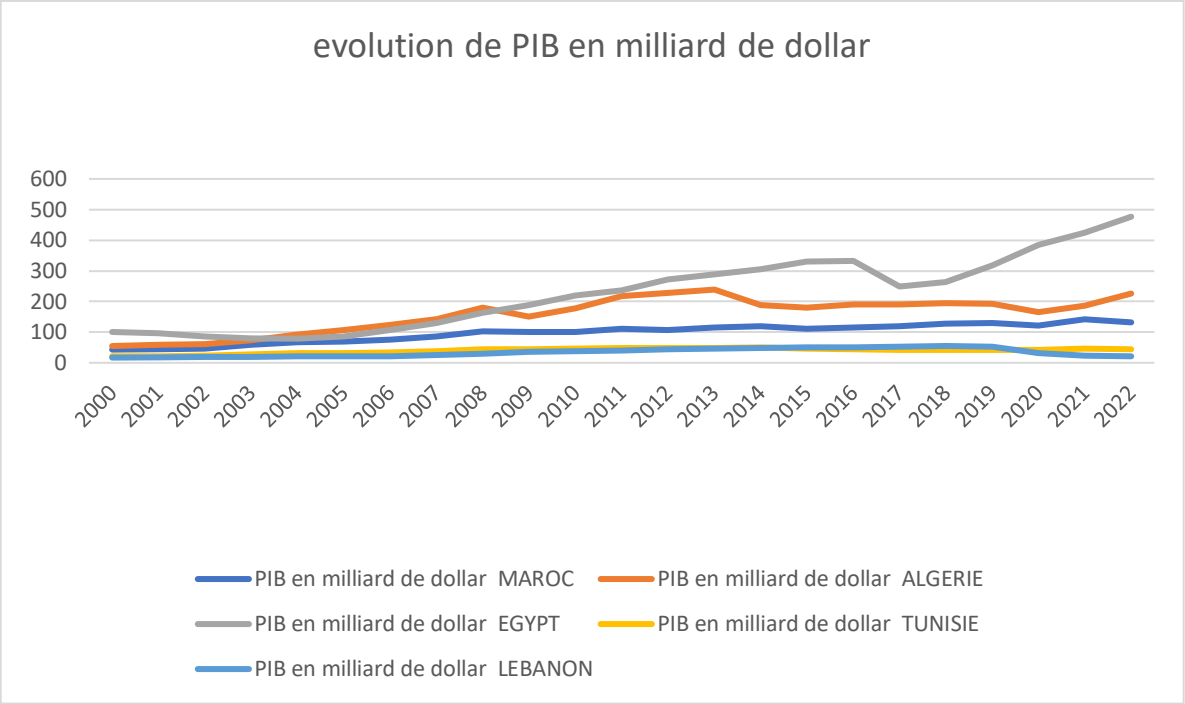

Chart 1: GDP Change In Billions Of Dollars

An analysis of GDP growth between 2000 and 2022 reveals contrasting economic trajectories among the five countries studied. Egypt stands out for its remarkable growth, from $100 billion to nearly $500 billion, thanks to its economic diversification, mega-infrastructure projects, and dynamic demographics. Algeria shows a high volatility of its GDP (between 50 and 250 billion), reflecting its dependence on hydrocarbons and its vulnerability to oil price fluctuations. Morocco has shown stable growth (from 43 to 144 billion), supported by key sectors such as agriculture and renewable energy, as well as political stability. Conversely, Tunisia stagnated after 2011, with a GDP peaking at around 48 billion, revealing the structural difficulties linked to unemployment and political instability. Lebanon is suffering a dramatic economic collapse (from 50 to 20 billion after 2019), as a result of a deep financial and political crisis. These disparities underscore the critical importance of economic diversification, effective governance, and institutional resilience to ensure sustainable growth, particularly in volatile geopolitical contexts.

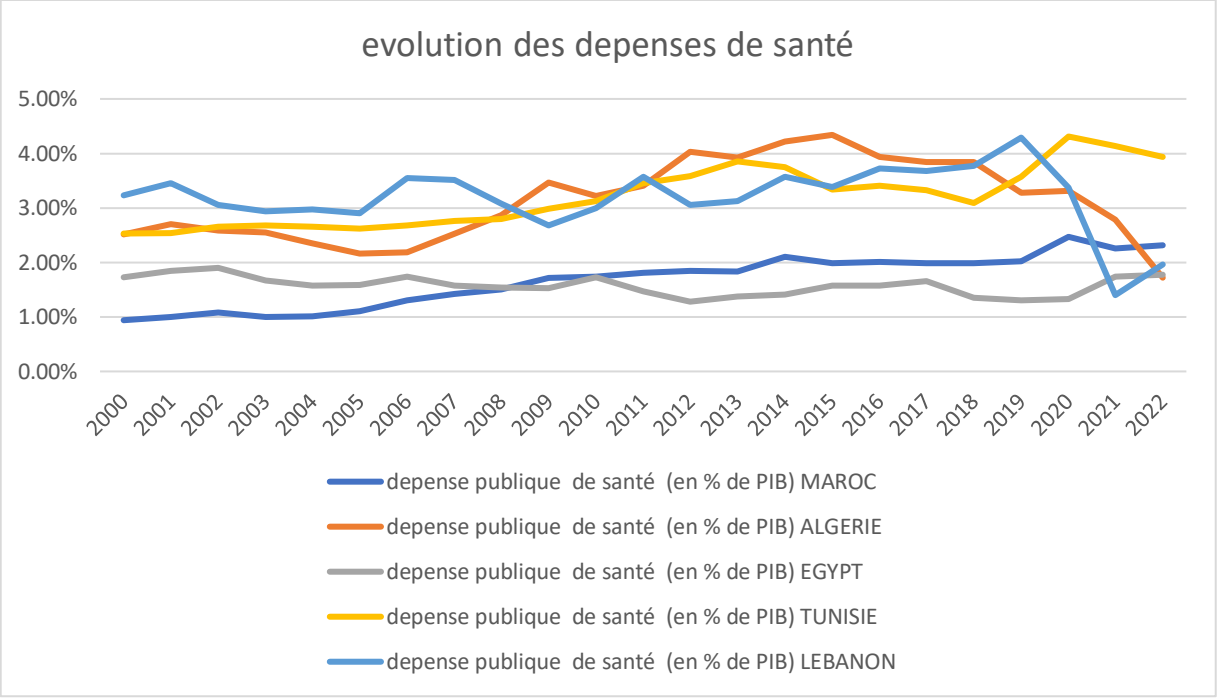

Chart 2: Evolution Of Health Expenditure As A Percentage Of GDP

The graph illustrates the contrasting evolution of public health expenditure as a percentage of GDP between 2000 and 2022 for five countries. Tunisia stands out for its sustained investments that are superior to its neighbours, with an upward trend until 2015-2016 before a slight inflection. Algeria has a similar but more volatile profile, with fluctuations after 2015. Morocco and Egypt show low levels overall, although the former shows a timid post-2010 increase followed by a marked decline in 2021-2022. Lebanon is characterized by the greatest instability, with a peak around 2015 and then a recent collapse. The 2020-2022 period reveals post-pandemic adjustments, with several countries (notably Morocco and Lebanon) significantly reducing their health budgets in the face of economic crises, highlighting the difficult trade-offs between health imperatives and budgetary constraints in the region.

RESULT

The results of the ARDL analysis show contrasting dynamics between health spending and GDP across countries. For Morocco and Tunisia, a significant long-term positive impact is observed: a 1% increase in health spending increases GDP by 0.12% and 0.15% respectively ($p < 0.05$), reflecting a structuring effect of human capital on growth. Conversely, Egypt shows a significant negative relationship (-0.05%, $p = 0.03$), suggesting allocative inefficiencies or a crowding-out effect related to budget constraints. For Algeria and Lebanon, although the coefficients are positive (0.08% and 0.03%), they remain insignificant ($p > 0.05$), indicating that other factors (political instability, quality of spending) could mitigate their impact. The cointegration tests confirm solid long-term balances for Morocco, Egypt and Lebanon (F-stat > 4.2), but more fragile for Algeria and Tunisia. These results highlight the heterogeneity of health expenditure transmission mechanisms, offering avenues for differentiated policies, including increased targeting of institutional effectiveness in countries with marginal or negative effects.

Table 1: Cointegration table

Country	Variable	Level (p-value)	1st Difference (p-value)	Integration order
MOROCCO	GDP	0.82	0.01*	I(1)
	Health Expenses	0.03*	-	I(0)
Algeria	PIB	0.75	0.02*	I(1)
	Health Expenses	0.04*	-	I(0)
Egypt	PIB	0.68	0.00*	I(1)
	Health Expenses	0.08	0.01*	I(1)
Tunisia	PIB	0.91	0.03*	I(1)
	Health Expenses	0.02*	-	I(0)
Lebanon	PIB	0.59	0.00*	I(1)
	Health Expenses	0.10	0.02*	I(1)

The effect is *Significant at 5%, All GDPs are I(1), except for Egypt and Lebanon where health spending is also I(1), The ARDL is applicable because the variables are not I(2).

Table 2: Selection of the Order of Delay (AIC Criterion)

Country	Ordre optimal (p, q)
Morocco	(2, 1)
Algeria	(1, 1)
Egypt	(2, 2)
Tunisia	(1, 1)
Lebanon	(2, 1)

Table 3: Cointegration test

Country	F-Statistics	Inf Terminal (5%)	Borne Sup (5%)	Conclusion
Morocco	4.85	3.12	4.25	Cointegration
Algeria	3.78	3.12	4.25	Weak cointegration
Egypt	5.12	3.12	4.25	Cointegration
Tunisia	3.45	3.12	4.25	Weak cointegration
Lebanon	4.20	3.12	4.25	Cointegration

Table 4 : Estimation of Long-run Coefficients

Country	Health Expenditure Coefficient	p-value	Elasticity
Morocco	2.45*	0.01	0.12
Algeria	1.78	0.06	0.08
Egypt	-0.95*	0.03	-0.05
Tunisia	3.12*	0.00	0.15
Lebanon	0.67	0.12	0.03

For Morocco and Tunisia for A 1% increase in health spending leads to an increase in GDP of 0.12% and 0.15% respectively. For Egypt there is a significant negative impact, suggesting allocative inefficiency. For Algeria and Lebanon: Non-significant positive effects, indicating a marginal role of health spending.

Table 5: Residue Diagnostics (Hypothesis Validation Tests)

Country	Autocorrelation (Test Breusch-Godfrey) p-value	Heteroscedasticity (White's test) p-value	Normality (Jarque-Bera Test) p-value	Conclusion
Morocco	0.14	0.22	0.31	Validated
Algeria	0.18	0.35	0.27	Validated
Egypt	0.11	0.17	0.41	Validated
Tunisia	0.23	0.29	0.19	Validated
Lebanon	0.20	0.13	0.25	Validated

Diagnostic tests conducted on residues confirm the robustness of the estimated ARDL models. The absence of autocorrelation (Breusch-Godfrey, $p > 0.10$) guarantees the independence of the error terms, while the homoscedasticity (White's test, $p > 0.05$) attests to the stability of their variance. In addition, the normality of the residuals (Jarque-Bera, $p > 0.10$) ensures the reliability of statistical inferences. These results, in line with the fundamental assumptions of the ARDL models, validate the quality of the adjustments obtained and strengthen the credibility of the relationships established between health spending and economic growth, thus providing a solid basis for interpreting the results and making policy recommendations.

Summary Comparison Table

Country	Impact LT	Significance	Elasticity	Cointegration
Morocco	Positive	Yes	0.12	Yes
Algeria	Positive	No	0.08	Low

Egypt	Negative	Yes	-0.05	Yes
Tunisia	Positive	Yes	0.15	Low
Lebanon	Positive	No	0.03	Yes

The analysis reveals differentiated impacts of health spending on economic growth across countries. For Morocco and Tunisia, the results show a positive and statistically significant influence of health spending on GDP, testifying to the effectiveness of public investments in human capital and socio-economic development. Conversely, Egypt has a significant negative relationship, which can be explained by inefficiencies in the allocation of health resources or structural macroeconomic constraints. For Algeria and Lebanon, the lack of statistical significance of the coefficients suggests that other factors – such as the quality of spending, governance, or specific contextual elements – could mask or mitigate the theoretical impact of health spending on growth, thus justifying the need for further analysis through further studies. These regional disparities underline the importance of adapting health policies to the particularities of each national context.

DISCUSSION

The results of this study, placed within the theoretical and empirical framework of the existing literature, reveal complex dynamics between public health spending and economic growth in the MENA region. For Morocco and Tunisia, the positive and significant impact of health spending on GDP (elasticities of 0.12% and 0.15%) is in line with human capital theories (Solow, 1956; Romer, 1990), which found that investments in health boost labour productivity and stimulate innovation. These results are also consistent with the empirical work of Wang (2015) and Chaabouni et al. (2016), who point to a two-way relationship between health and growth through improved human capital. However, the larger effect in Tunisia may reflect a more efficient allocation of resources, as observed in some emerging economies (Beraldo et al., 2009), while the fragility of cointegration for this country suggests persistent challenges related to institutional stability (Faruk et al., 2022).

Conversely, Egypt has a significant negative effect (-0.05%), in contradiction with general studies on developing countries (Narayan et al., 2010). This result could be explained by allocative inefficiencies or a budgetary crowding out effect, phenomena already documented in contexts where public spending is in competition with non-productive priorities (Eggoh et al., 2015). This dynamic is in line with the observations of Asbu et al. (2017) on the structural challenges of the MENA region, where weak governance and corruption often neutralize investments in health.

For Algeria and Lebanon, the non-significance of the coefficients (0.08% and 0.03%) probably reflects the influence of contextual factors not present in the models, such as political instability or the quality of expenditure. These results corroborate the work of Rizvi (2019) and Faruk et al. (2022), who emphasize the central role of institutions in amplifying the impact of health spending. For example, in Lebanon, the post-2019 economic collapse and the fragmentation of health systems (discussed in the data) recall the findings of Wang et al. (2022) on regions where exogenous shocks mitigate theoretical effects.

Finally, the regional disparities observed, similar to those identified in China (Wang et al., 2022) or sub-Saharan Africa (Sarpong et al., 2020), underline that the effectiveness of health spending depends closely on the socio-economic and institutional context. Cointegration tests, robust for Morocco, Egypt and Lebanon, but fragile for Algeria and Tunisia, reinforce the idea that macroeconomic stability and the quality of institutions are prerequisites for sustaining the benefits of health investments (Atems, 2019; Kumar et al., 2020). These results confirm the need for a nuanced approach, integrating complementary structural reforms, as suggested by the recent literature on the MENA region (Asbu et al., 2017; Faruk et al., 2022)

Limitations

Although the ARDL method offers flexibility to deal with mixed series (I(0) /I(1)), it remains sensitive to the choice of orders of delay (p, q), as shown by the variable selection between countries (Table 2). Poor

specification of delays could bias the estimates. In addition, the ARDL does not capture structural ruptures (e.g. political crises, pandemic), which are present in the data (post-2019 collapse of Lebanon). The study does not control for key variables such as the quality of education, infrastructure, or socio-economic inequalities, which could interact with health spending (Bloom et al., 2004). For example, urbanization or R&D investments, mentioned in the literature review, are not integrated, limiting the understanding of transmission mechanisms. Data from official sources (IMF, World Bank) may underestimate informal spending or inequalities in access to care, particularly in contexts such as Egypt or Lebanon, where a significant share of health spending is borne by households (Abbas et al., 2022). The period 2000-2022 includes the COVID-19 pandemic, which led to drastic fiscal adjustments (reduced spending in Morocco and Lebanon). These exogenous shocks, although mentioned, are not modelled, risking biasing long-term trends. The sample is limited to five countries, mainly from the MENA region, and limits the overall scope of the findings. The dynamics observed could differ in other contexts, such as sub-Saharan Africa or Asia, where the impact of health spending is conditioned by distinct levels of development and institutional structures (Sarpong et al., 2020).

CONCLUSIONS AND RECOMMENDATIONS

This study highlights the complex and heterogeneous relationship between public health spending and economic growth in five countries in the MENA region. The results confirm that the impact of this spending depends closely on the institutional, economic and political context of each country. For Morocco and Tunisia, the positive and significant effects (elasticities of 0.12% and 0.15%) underline the key role of human capital and an efficient allocation of health resources in stimulating growth. Conversely, in Egypt, the negative effect (-0.05%) reveals structural inefficiencies, while in Algeria and Lebanon, the insignificance of the results points to challenges related to political instability, corruption or low quality of spending.

Target the effectiveness of spending: For countries with a positive impact (Morocco, Tunisia), prioritize investments in health infrastructure, prevention and training of medical personnel. For Egypt, audit spending to reduce waste and redirect budgets towards complementary sectors (education, innovation).

Strengthen institutions: Integrate governance and transparency reforms to maximize the impact of spending, particularly in Algeria and Lebanon, where institutional quality is a constraint.

Tailor policies to regional specificities: Avoid one-size-fits-all approaches. For example, in Lebanon, stabilizing the post-crisis health system and reducing reliance on direct payments from households.

Combine health and other structural policies: Combine health spending with investments in education, infrastructure, and addressing inequality to amplify their economic impact.

Deepen research: Extend the analysis to other MENA countries, integrate complementary variables (quality of education, urbanization) and model exogenous shocks (crises, pandemics) to better isolate the effects of health spending.

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