

FROM NOMINAL COVERAGE TO EFFECTIVE PROTECTION: BENCHMARKING THE EFFICIENCY OF THE MOROCCAN HEALTH SYSTEM AGAINST MIDDLE-INCOME COUNTRY MODELS

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Abstract

Background: Morocco is undergoing a major health financing transition, marked by the expansion of Compulsory Health Insurance. However, despite increased public spending, household Out-of-Pocket (OOP) expenditure remains critically high (>40%). This creates a "Moroccan Paradox" where nominal coverage expands without commensurate financial protection, raising questions about structural versus regulatory inefficiencies. **Aims:** This study aims to analyze the efficiency of the health financing transition in Morocco by benchmarking it against a panel of Middle-Income Countries. Specifically, it seeks to measure the "crowding-out" effect of public expenditures on private spending to determine if the state's fiscal effort effectively substitutes household costs. **Methods:** We conducted a comparative econometric analysis over the period 2000–2022, benchmarking Morocco against nine Middle-Income Countries divided into three groups: Breakthrough Models (e.g., Turkey, Thailand), Regional Peers, and Controls. We estimated the transmission elasticity of public spending using a linear regression model. Statistical significance of performance gaps was validated using ANOVA and Tukey's post-hoc test. **Results:** The analysis reveals that Morocco exhibits a partial crowding-out effect ($\beta = -0,73$), significantly lower than the efficiency frontier set by Thailand ($\beta = -1,13$). This suggests that nearly 27% of the public fiscal effort is absorbed by system inefficiencies rather than alleviating the household burden. Statistically, Morocco has not yet decoupled from its regional peers, remaining in a "vulnerability zone" with high OOP despite rising income levels. **Conclusion:** The transition to effective financial protection in Morocco cannot be achieved solely through increased funding. To bridge the efficiency gap with successful models, policy reforms must shift from resource mobilization to active regulation of the private sector and strategic purchasing. Without structural supply-side reforms, coverage expansion risks inflating costs without protecting citizens.

Keywords: Health Financing, Out-of-Pocket Expenditure, Crowding-Out Effect, Universal Health Coverage, Morocco, Efficiency, Benchmarking.

Introduction

Universal Health Coverage (UHC) has established itself as the absolute priority of the global health agenda, enshrined in the Sustainable Development Goals (SDGs) as an essential vehicle for social equity and economic efficiency. According to the World Health Organization (WHO), UHC is defined by the ability of a health system to ensure that the entire population has access to necessary services without incurring financial hardship [1]. In this context, Morocco has undertaken a major structural reform of its financing system over the past two decades, marked by the expansion of Compulsory Health Insurance (AMO) and the recent generalization of coverage to vulnerable populations. However, despite these institutional advances and a sustained increase in public spending, the Moroccan health system faces a major challenge that we term the "Moroccan Paradox." While nominal coverage

(*de jure*) has expanded considerably, effective financial protection (*de facto*) remains stagnant. Household Out-of-Pocket (OOP) expenditures remain at a critical level, representing more than 50% of total health expenditures, a threshold far exceeding international recommendations for preventing household impoverishment [2]. As highlighted by the OECD, this excessive reliance on direct payments makes the system's financing inequitable and regressive, exposing populations to high financial risk [3].

This observation raises a fundamental question: why does the state's budgetary effort fail to substitute private spending? Is this a fatality linked to the status of a middle-income country, or a symptom of inefficiency in the purchasing and regulation functions of care?

The objective of this article is to analyze the efficiency of the health financing transition in Morocco through a comparative analysis

(benchmarking) with a panel of middle-income countries that have succeeded or are undergoing transition (such as Turkey and Thailand). By mobilizing an econometric analysis of the transmission elasticity of public funds over the period 2000-2022, this study aims to measure the crowding-out effect of public expenditures on private expenditures, in order to identify structural levers allowing a shift from a logic of nominal coverage to real financial protection.

Literature review

Understanding the "Moroccan Paradox"-coverage expansion without proportional out-of-pocket reduction—requires crossing public health frameworks with health economics. This section examines the WHO normative framework, microeconomic household vulnerability, macroeconomic financing transitions, and international efficiency benchmarks.

The UHC Cube: A Framework for Analyzing Financial Vulnerability

To analyze financial protection, we mobilize the WHO "UHC Cube," which defines coverage via three axes: population, services, and costs [1]. However, expanding population coverage does not guarantee financial protection. The GBD 2019 UHC Collaborators highlight the gap between "service coverage" and "effective coverage," which includes real affordability [4]. In many developing nations, "shallow coverage" persists, where insurance fails to prevent high out-of-pocket payments due to co-payments or forced recourse to the private sector [5].

Out-of-Pocket (OOP) Expenditures and Catastrophic Risk

High Out-of-Pocket (OOP) expenditures constitute the primary obstacle to UHC. Xu et al. define expenditures as "catastrophic" when they exceed 40% of a household's capacity to pay, identifying OOP as the main driver of medical impoverishment [6, 7]. Beyond impoverishment, Islam et al. demonstrate that these costs induce a crowding-out effect on essential consumption; households are forced to reduce spending on food or housing to finance care, creating a cycle of vulnerability [8].

Financing Transition and Crowding-Out Effect

Health financing transition theory anticipates a shift from OOP to public spending as economies develop. However, Behera et al. show this substitution is not automatic across 124 countries [9]. A phenomenon of "partial crowding-out" occurs where weak governance or regulation allows public funds to be absorbed by cost inflation or rent-seeking behaviors

rather than reducing the patient's bill [9]. Additionally, international aid may sometimes substitute rather than complement domestic spending [3].

Efficiency as a Protection Lever: International Lessons

Analyzing efficiency is central to addressing these challenges. Non-parametric approaches like Data Envelopment Analysis (DEA) are widely used to benchmark spending against health outcomes [10, 11]. International trajectories offer critical lessons: Thailand achieved UHC with low OOP through tax-based financing and strategic purchasing, proving regulation outweighs income level [12]. Conversely, Brazil's fragmented system illustrates the difficulty of maintaining equity during economic crises [13]. For Morocco, optimizing the transmission elasticity of public expenditures is therefore essential.

Methods and data

To investigate the efficiency of the health financing transition in Morocco, this study employs a comparative quantitative research design based on longitudinal macro-health data. The methodology is structured around three axes: the constitution of a strategic benchmarking panel, the econometric modeling of the crowding-out effect, and the statistical validation of performance gaps.

Data Sources and Variable Selection

The study utilizes data from the Global Health Expenditure Database (GHED) managed by the World Health Organization (WHO), covering the period from 2000 to 2022 [1]. This timeframe captures the major institutional reforms in Morocco, specifically the introduction of Compulsory Health Insurance (2005) and the generalization of social protection (2020-2022).

Consistent with the "UHC Cube" framework and the financing transition theory [7, 9], two primary variables were selected to measure the substitution elasticity between public effort and financial protection:

- **Independent Variable (Public Effort):** Domestic General Government Health Expenditure (GGHE) as a percentage of Current Health Expenditure (CHE). This indicator reflects the state's fiscal capacity and prioritization of health.
- **Dependent Variable (Financial Protection):** Out-of-Pocket Expenditure (OOP) as a percentage of Current Health Expenditure (CHE). This indicator serves as a proxy for the financial burden borne by households and the "de facto" effectiveness of coverage [6].

Panel Composition and Benchmarking Strategy

To contextualize the "Moroccan Paradox," we constructed a non-random purposive sample of 10 Middle-Income Countries (MICs). The selection criteria included comparable levels of economic development, dualistic health systems (public/private mix), and available time-series data. The panel was segmented into four analytical groups to isolate the impact of governance and regulation models:

- **Target Group:** Morocco (n=23 observations).
- **Breakthrough Models:** Turkey, Thailand, and Brazil. These countries were selected as the "efficiency frontier" because they have successfully achieved UHC or significantly reduced OOP despite facing similar economic constraints [12, 13].
- **Regional Peers:** Tunisia, Jordan, and Egypt. These countries share similar epidemiological profiles and institutional legacies with Morocco in the MENA region.
- **Control Group:** India, South Africa, and Peru. These countries represent diverse trajectories of health financing transition in other geographical contexts.

Econometric Specification: Measuring the Crowding-Out Effect

To measure the efficiency with which public spending translates into household financial protection, we estimated the transmission elasticity using a linear regression model. Drawing on the methodology applied by Behera et al. in low- and middle-income countries [9], we modeled the crowding-out effect as follows:

$$OOP_{it} = \alpha + \beta \cdot GGHE_{it} + \varepsilon_{it}$$

Where:

- OOP_{it} is the share of out-of-pocket expenditure for country i at time t .
- $GGHE_{it}$ is the share of public health expenditure.
- β represents the crowding-out coefficient.

The interpretation of β is central to our analysis:

- A coefficient close to -1.0 indicates a perfect substitution (or "high efficiency"): every unit of public money injected replaces a unit of private money, effectively protecting the household.
- A coefficient significantly higher than -1.0 (e.g., -0.5) indicates a partial crowding-out (or "leakage"): a significant portion of public investment is absorbed by the system (e.g., through cost inflation or inefficiency) without alleviating the financial burden on households.

Statistical Analysis and Validation

The analysis was performed using R software. We first conducted a descriptive analysis of trends and distributions using boxplots to visualize the dispersion of OOP across the four groups. To validate the statistical significance of the observed differences between Morocco and the benchmark models, we performed a one-way Analysis of Variance (ANOVA), followed by a Tukey HSD (Honestly Significant Difference) post-hoc test. This procedure allowed us to determine whether the "efficiency gap" between Morocco and the "Breakthrough Models" is structurally significant or merely due to random variations.

Results

This section presents the empirical findings from our comparative analysis of health financing efficiency across the selected panel of middle-income countries. We first examine the descriptive statistics to assess the magnitude of the financial burden on households in Morocco relative to its peers. Subsequently, we present the econometric estimations of the crowding-out effect to quantify the transmission efficiency of public funds. Finally, we validate the significance of these performance gaps through statistical testing and visualize the current positioning of the Moroccan health system within the global landscape of financial protection.

Descriptive Analysis of the "Incomplete Transition"

The descriptive statistics calculated over the 2000-2022 period reveal a stark contrast between the structure of health financing in Morocco and that of high-performing middle-income countries. The average Out-of-Pocket (OOP) expenditure in Morocco stands at 51.74% (SD=5.32). This level is more than double that of the "Breakthrough Models" group (Turkey, Thailand, Brazil), which averages 22.03% (SD=8.16). Morocco aligns much more closely with the "Regional Peers" group (Tunisia, Jordan, Egypt), which records an average OOP of 44.56% (SD=11.65), while the Control group averages 35.88% (SD=15.03).

The analysis of the distribution of OOP shares highlights a structural segmentation. As illustrated in Figure 1, the temporal trend for Morocco (red line) shows a slow decline, whereas the Breakthrough Models (green line) exhibit a sustained low level of household financial burden. Furthermore, the distribution analysis confirms that there is no overlap between the interquartile range of Morocco and that of the Breakthrough Models. This indicates that even in its best-performing years, the Moroccan financing mix remains more reliant on direct payments than the worst-performing years of the benchmark countries.

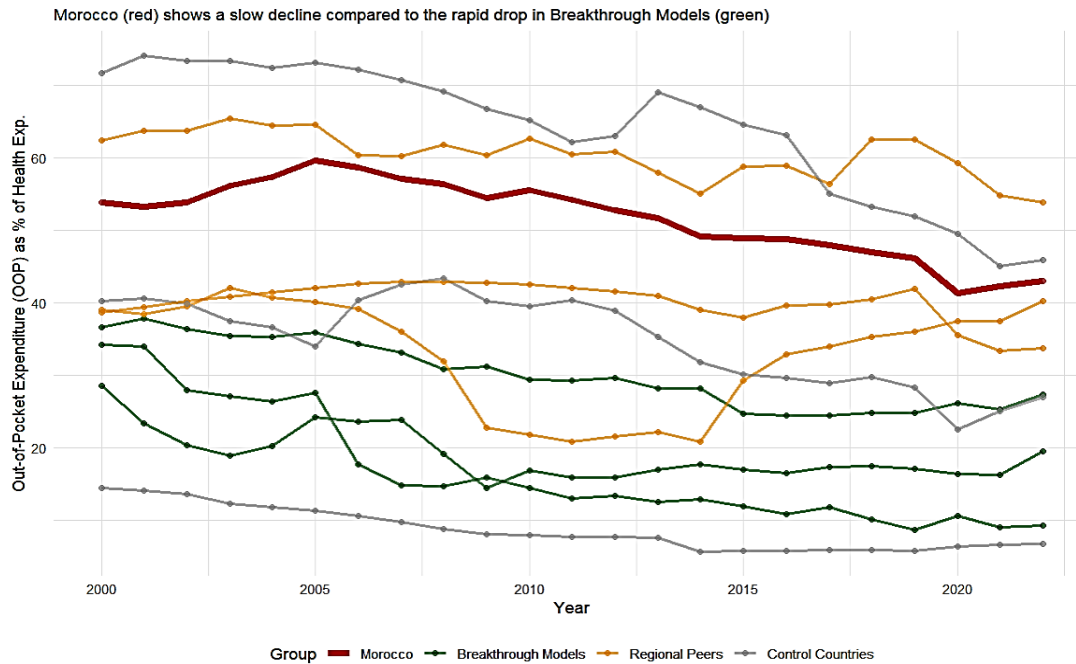


Figure 1: Trends in out-of-pocket expenditure as a share of current health expenditure: Morocco versus benchmark groups (2000–2022) source: Created by the authors using R Studio

Econometric Estimation of the Crowding-Out Effect

The core of our analysis relies on the estimation of the transmission elasticity of public spending, presented in Table 1. The results validate the hypothesis of a partial crowding-out effect in Morocco, but with significant inefficiencies compared to the frontier. The elasticity coefficient (β) for Morocco is estimated at -0.732 ($p < 0,001$). This coefficient implies that for every 1% increase in the share of public health expenditure, the share of out-of-pocket payments decreases by only 0.73%. This "leakage" of approximately 27% suggests that a significant portion of the public fiscal effort is absorbed by the health system—likely through cost inflation or allocative inefficiency—rather than translating directly into financial relief for households. By comparison, the Breakthrough Models exhibit much higher efficiency in

transmission. Thailand, in particular, shows a coefficient of -1.130 , indicating a multiplier effect where public intervention reduces the private burden more than proportionally. Conversely, Morocco performs significantly better than some regional peers like Egypt ($\beta = -0.180$; non – significant) or Tunisia ($\beta = -0.368$), where public spending appears to have reached a saturation point with minimal marginal impact on financial protection. The correlation analysis (Figure 2) visually corroborates this "structural cost premium." The regression line for Morocco is consistently positioned above the efficiency frontier defined by the Breakthrough Models. This signifies that for any given level of public effort (e.g., 40% of total expenditure), Moroccan households bear a systematically higher financial burden than their counterparts in Turkey or Thailand.

Table 1: Econometric estimation of transmission efficiency: impact of a 1% increase in public spending on out-of-pocket expenditure (crowding-out effect) across the panel -Source: Created by the authors using R Studio

Comparison of Transfer Efficiency (2000-2022)				
Impact of a 1% increase in public spending on OOP expenditure				
Country	Category	Crowding-out Coefficient (β)	Significance (p-value)	
India	Control Countries	-1.330	0.000	
Thailand	Breakthrough Models	-1.130	0.000	
Peru	Control Countries	-0.956	0.000	
Brazil	Breakthrough Models	-0.898	0.243	
Morocco	Morocco	-0.732	0.000	
Turkey	Breakthrough Models	-0.662	0.000	
Jordan	Regional Peers	-0.609	0.000	
Tunisia	Regional Peers	-0.368	0.056	
South Africa	Control Countries	-0.300	0.000	
Egypt	Regional Peers	-0.180	0.476	

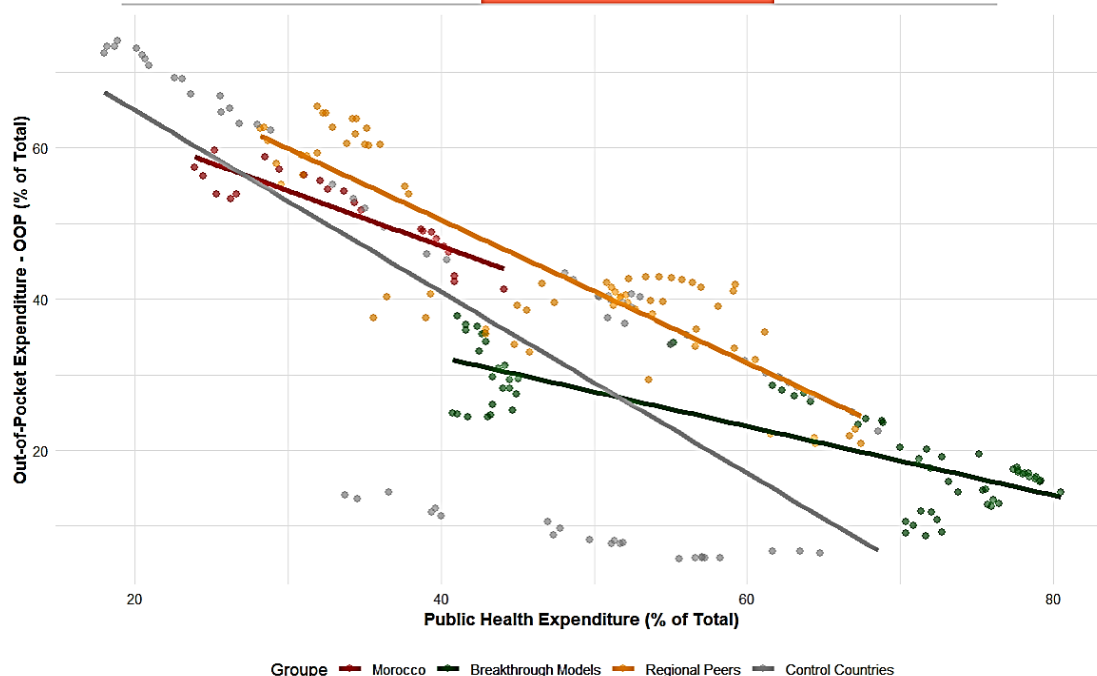


Figure 2: Correlation between public health effort and household financial burden: evidence of a "structural cost premium" in Morocco compared to the efficiency frontier -Source: Created by the authors using R Studio

Statistical Validation of the Efficiency Gap

To confirm that these observed differences are not due to random variations within the panel, we performed a Tukey HSD post-hoc test. The results, detailed in Table 2, provide robust statistical evidence of the gap.

The test reveals two crucial findings:

- The difference in mean OOP between the "Breakthrough Models" and Morocco is -29.70 percentage points ($p < 0,0001$), confirming that the performance gap is structural and statistically significant.
- Crucially, the difference between Morocco and its "Regional Peers" (Tunisia, Jordan, Egypt) is

-7.17 percentage points but is not statistically significant ($p = 0,22$).

These tests confirm that while Morocco has engaged in major reforms, it has not yet statistically broken away from the MENA region's performance cluster to join the trajectory of high-performing emerging economies.

Table 2: Statistical validation of the efficiency gap: results of Tukey HSD post-hoc test comparing mean out-of-pocket expenditure levels between Morocco and benchmark models -Source: Created by the authors using R Studio

Is Morocco Statistically Different?		
Tukey Test (Difference in Mean OOP)		
Comparison	Mean Difference (% Points)	Significance (Adj. P-value)
Breakthrough Models-Morocco	-29.70	0.0000
Regional Peers-Morocco	-7.17	0.2217
Control Countries-Morocco	-15.86	0.0002

Current Positioning and the "Vulnerability Zone"

The analysis of the most recent data (2022) situates Morocco's current standing in the global landscape (**Figure 3**).

With public spending accounting for approximately 41% of total health expenditure and OOP remaining at 43%, Morocco is positioned in the upper-left quadrant, which we characterize as the "Vulnerability Zone." In contrast, Turkey, despite having a similar dualistic health system structure (mix of public insurance and private providers), has successfully moved to the "Safety Zone" (bottom-right quadrant), achieving an OOP share below 20% with public spending reaching 75%. This visualization highlights that the transition to effective protection depends less on the income level than on the capacity to channel public funds effectively to cover costs.

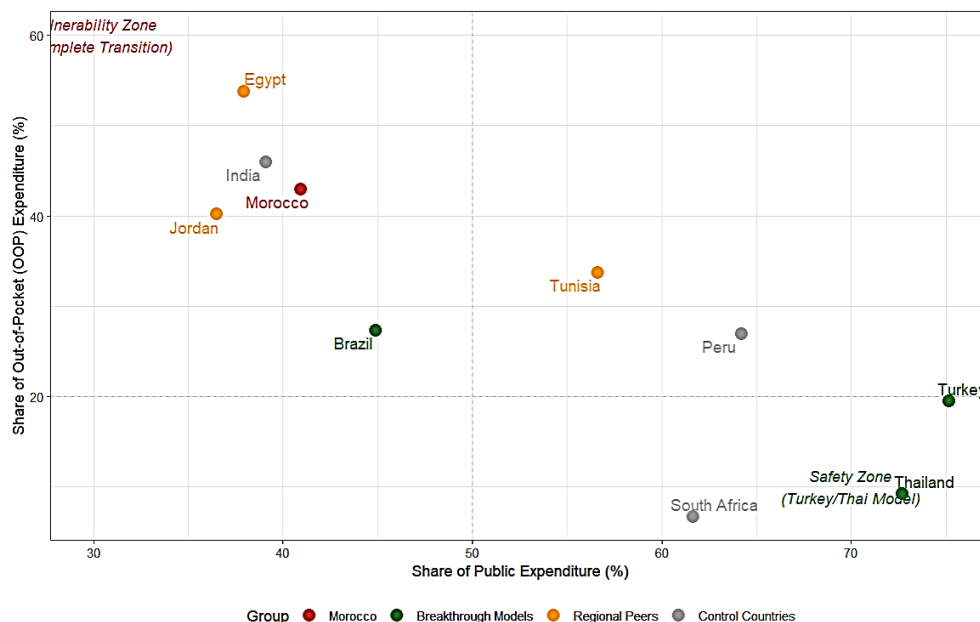


Figure 3: Strategic positioning of health systems in 2022: mapping the transition from the "Vulnerability Zone" to the "Safety Zone" - Source: Created by the authors using R Studio

Discussion

We interpret the empirical results through international best practices, analyzing the causes of the "partial crowding-out" effect in Morocco versus the successful transitions of Turkey and Thailand. We focus on institutional mechanisms—specifically private sector regulation and strategic purchasing—to explain why rising public spending has not yielded the expected financial protection.

The Mechanics of the "Incomplete Transition"

The empirical evidence confirms Morocco is trapped in an "incomplete transition." Despite expanding nominal coverage (AMO), financial protection

remains suboptimal. Our crowding-out coefficient of -0.73 indicates that nearly 27% of the public fiscal effort is lost in transmission.

This aligns with the partial crowding-out theory [9], where weak supply-side regulation allows public funds to fuel private sector price inflation rather than reducing household burdens. This is acute in Morocco's dualistic system: a stagnant public sector pushes patients toward a dynamic, unregulated private sector, forcing out-of-pocket payments to bypass waiting lists and perceived low quality.

The "Structural Cost Premium": Lessons from Turkey and Thailand

Benchmarking highlights a "structural cost premium" for Morocco; households pay significantly more than Thai or Turkish counterparts at similar public spending levels. The "Breakthrough Models" offer critical lessons:

- Thailand achieved UHC with low OOP through strategic purchasing and strict cost containment (the "30 Baht" scheme) [12].
- Turkey succeeded by combining increased funding with public sector revitalization to compete with private providers, effectively capping market prices.

In contrast, Morocco resembles regional peers (Tunisia, Egypt), struggling to break the 40% OOP ceiling. This suggests the barriers are institutional rather than purely economic.

Policy Implications: From Funding to Regulation

Morocco's persistence in the "Vulnerability Zone" (Figure 3) implies that increasing budgets alone is insufficient. Reforms must shift from resource mobilization to regulation:

- Regulating the Private Sector: Transition from passive to active strategic purchasing with strict tariffs to prevent rent-seeking.
- Revitalizing the Public Offer: Invest in public hospital quality to reduce forced recourse to the private sector, following the Turkish model.
- Deepening the Benefit Package: Expand coverage to outpatient drugs and chronic diseases to mitigate the bulk of catastrophic expenditures.

Limitations

Limitations include the use of aggregate macro-data, which may mask rural-urban inequalities, and the inclusion of the COVID-19 shock (2000-2022). While robust regression mitigated temporary distortions, future research should employ micro-level household surveys to identify specific pockets of vulnerability missed by macro-averages.

Ethical approval

This study relies exclusively on secondary data from publicly available databases (WHO Global Health Expenditure Database). No human participants were involved, and no personal data was processed. Therefore, formal ethical approval was not required according to national and international guidelines."

Conclusion

This study assessed Morocco's health financing efficiency by benchmarking it against middle-income peers. Using econometric analysis, we objectified the "Moroccan Paradox": significant nominal coverage expansion has failed to reduce household financial burdens to sustainable levels.

Results reveal a partial crowding-out effect ($\beta = -0,73$), significantly less efficient than "Breakthrough Models" like Thailand ($\beta = -1,13$). Systemic inefficiencies, including private sector price inflation and weak strategic purchasing, absorb substantial public funds rather than protecting citizens. Statistically, Morocco remains tethered to the MENA performance cluster in a "vulnerability zone," with out-of-pocket payments exceeding 40%. The path to effective Universal Health Coverage cannot rely solely on increased funding; the fiscal lever demands a simultaneous regulatory shock. To bridge the efficiency gap, Morocco must shift from passive funding to active regulation, revitalizing public hospitals as price-makers and controlling private tariffs. Addressing these structural "leakages" is essential to translate universal coverage into real financial protection. Future research should complement this macroeconomic diagnosis with micro-level analyses to identify vulnerable populations and simulate the impact of targeted regulatory reforms.

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