

Management Control Systems in Public Healthcare Institutions: From Governance to Performance Management

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ABSTRACT

Does management control actually turn budgetary intent into hospital results, or does governance reform simply outrun the diagnostic systems meant to support it? This paper tests that question in Morocco, drawing on Simons' (1995) Levers of Control framework. Two levers are examined empirically: routine budget allocation, a diagnostic mechanism, and discrete reform milestones (AMO expansion, Law 06-22), an interactive one. Using national data from 2013 to 2023, three tests are run. First, budget growth is correlated with hospital production; the association is weak and not significant ($N = 8$). Second, a segmented time-series regression checks for a structural break in hospital performance at the 2022 reform date; surgical interventions and bed occupancy show none, and the one significant break, in admissions, rests on only two post-reform years and holds up under an alternate break-year test, but cannot be separated from ordinary pandemic recovery. Third, household out-of-pocket health spending fell from 45.6% in 2018 to 38% in 2022, coinciding with reform rollout, a decline not obviously mirrored elsewhere in the region. Cour des Comptes audit evidence points to a persistent gap between allocated health budgets and their execution, most starkly a 46.8% execution rate for infrastructure investment in 2023 against an 82.5% national average. Together these results suggest governance reform has done more for financial protection in Morocco than budgetary control has done for measurable production gains.

Keywords: management control systems, public healthcare governance, New Public Management, hospital performance, Morocco, levers of control

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Introduction

Public hospitals occupy an uneasy position between two competing logics. As clinical institutions, they are judged on the quality and continuity of care they provide to populations that often have no alternative source of treatment. As public organizations financed from constrained state budgets, they are also judged on how efficiently they convert appropriations into activity. Management control systems (MCS) are the formal and informal mechanisms through which this second logic is supposed to discipline the first: budgets, performance indicators, audits, and reporting routines that translate governance intentions into measurable operational outcomes (Simons, 1995). Whether these mechanisms actually achieve that translation in resource-constrained public health systems is an open empirical question, and one with direct relevance for health policy in low- and middle-income countries.

Morocco is a good test case for this question. Since the early 2000s the Ministry of Health has pushed a New Public Management style reform agenda: decentralization, contractualization, expanded social health insurance, and most recently

the 2022 health system framework law (Loi-cadre n° 06-22) alongside the continued rollout of Assurance Maladie Obligatoire, AMO (Errami & Cargnello, 2018). Yet independent assessments, including a recent IMF analysis, point to a persistent efficiency gap in public health spending, close to 27%, and an investment budget execution rate stuck around 70%. Reform on one side, an unresolved efficiency gap on the other. That tension is what this paper investigates. Has management control, understood narrowly here as routine budget allocation and discrete governance reform milestones rather than the full range of Simons' (1995) levers, been associated with measurable gains in hospital performance and financial protection in Morocco between 2013 and 2023?

This study is quantitative and descriptive-correlational in design. It draws on eleven years of national hospital performance data and eight years of ministry budget data, supplemented by narrative evidence from Cour des Comptes (Court of Accounts) audit reports of individual public hospitals. The paper does not claim to establish causal effects; the data structure, a single-country annual time series rather than a cross-sectional

panel, does not support such claims. Instead, it offers a transparent, trend-based assessment of whether the direction and timing of governance reform in Morocco line up with the direction and timing of performance change, and it is explicit about where the available data are too thin to support formal hypothesis testing.

The remainder of the paper is organized as follows. The literature review situates the study within contingency theory, the Levers of Control framework, and the NPM literature on public healthcare reform, with particular attention to the Moroccan and broader MENA context. The conceptual framework section develops the study's hypotheses and clarifies which are tested statistically and which are treated as contextual. The methodology section describes the data sources, variable operationalization, and analytical approach, including the rationale for using trend and correlation analysis rather than panel regression. The results section reports descriptive statistics and correlation findings. The discussion interprets these findings against the qualitative audit evidence and the wider literature, and the conclusion summarizes the contribution and its limits.

Literature Review

Management Control Systems and the Levers of Control Framework

This study draws on three theoretical strands that address different parts of the same question and are combined here rather than treated as competing accounts. Simons' (1995) Levers of Control framework supplies the specific mechanisms examined empirically, diagnostic control through routine budget allocation and interactive control through discrete reform milestones. Contingency theory supplies the reason these mechanisms are tested separately rather than as one composite variable: it holds that a control mechanism's effectiveness depends on its fit with the organizational and institutional context in which it operates, so budgetary control and reform-driven change are expected to relate to performance through different pathways and time horizons, not a single uniform effect. New Public Management theory supplies the institutional context itself, describing the reform template, performance measurement, managerial autonomy, and financing restructuring, that Morocco has applied incrementally to its public health system since the early 2000s. Together, these three strands motivate the paper's central expectation: that a reform undertaken within an NPM logic, and a diagnostic control mechanism examined through Simons' framework, need not move in step, and that contingency theory gives a principled reason, not just a data limitation, for testing them as separate hypotheses.

Simons (1995) redefined management control as a set of four interacting levers rather than

a single diagnostic apparatus: diagnostic control systems that monitor variance against predetermined targets, interactive control systems that focus managerial attention on emerging strategic uncertainties, belief systems that communicate organizational purpose, and boundary systems that delimit acceptable action. Tessier and Otley (2012) later refined the framework's conceptual ambiguities, separating managerial intent from employee perception and distinguishing the enabling and constraining functions each lever can serve. Martyn, Sweeney, and Curtis (2016), reviewing twenty-five years of empirical application, found the framework used far more often in qualitative field studies than in quantitative ones, and noted that its extension beyond the private-sector strategic contexts in which it originated has been uneven. More recent evidence offers a partial counterpoint on this point: Wang, Wang, Ma, and Zhang (2025), replicating Widener's (2007) original survey-based test of the framework among Chinese organizations, found results broadly consistent with the original US-based study, suggesting the framework's core relationships travel reasonably well across at least some non-Western institutional settings, even if its application to public-sector and developing-country contexts specifically remains far less tested. A large-scale meta-analysis by Bellora-Bienengräber, Derfuss, and Endrikat (2023), synthesizing 58 independent samples and over 10,000 observations, found that organizations consistently use the four levers in combination rather than in isolation, a stylized fact that is worth flagging against this paper's own choice to examine only two levers separately, given the data constraints described below. Baird, Su, and Munir (2023), surveying 410 Australian managers, likewise found belief, interactive, and diagnostic control jointly mediating the relationship between sustainable leadership and organizational resilience, further evidence that the levers tend to operate as a package rather than as independent, freely substitutable mechanisms.

Applications to hospitals specifically have tended to confirm that formal control mechanisms alone rarely explain performance variation; the interaction between control design and organizational context does. De Harlez and Malagueño (2016), studying 117 top-level managers across Belgian hospitals, found that the performance benefits of aligning performance measurement systems with strategic priorities depended heavily on whether managers had a clinical or an administrative background, a moderating effect the budget-execution literature in developing-country settings rarely accounts for. Adhikara, Sumarli, Andry, and Sutisna (2020) reported a comparable pattern in Indonesian public hospitals, where environmental uncertainty and information technology jointly shaped how management control

systems related to organizational performance, again pointing to contingency rather than direct effects. Lunkes, Naranjo-Gil, and Lopez-Valeiras (2018), surveying 364 hospital managers across Brazilian public hospitals, similarly found that clinical background shaped which type of management information managers found useful and how strongly horizontal control mechanisms related to financial versus operational performance, reinforcing that the effect of formal control systems on hospital outcomes is conditional rather than uniform.

Contingency Theory and Public Sector Adoption of Management Control

Contingency theory holds that no single control configuration is optimal across all organizational settings; effectiveness depends on the fit between control design and contextual variables such as environmental uncertainty, task structure, and organizational strategy (Adhikara et al., 2020). In the public sector this logic is complicated by the fact that objectives are frequently multiple, only partially measurable, and politically negotiated rather than market-determined. Felício, Samagaio, and Rodrigues (2021), using a fuzzy-set qualitative comparative analysis of public organizations, found that management control systems were associated with the accomplishment of organizational objectives only in particular configurations, not as a uniform main effect, reinforcing the case for contingency-sensitive rather than universal claims about MCS effectiveness in government settings.

New Public Management, Health Sector Reform, and the MENA Region

New Public Management doctrine, with its emphasis on performance measurement, managerial autonomy, and market-like incentives, has been the dominant reform template in public healthcare internationally since the 1990s. Its record is mixed. Andrews, Beynon, and McDermott (2019), applying fuzzy-set qualitative comparative analysis across fourteen European healthcare systems, found that no single combination of NPM reforms, whether privatization, consumerism, performance management, or corporatization, produced success or failure uniformly; reform packages interacted with one another in ways that made partial adoption a weaker strategy than either comprehensive or minimal reform. This configurational sensitivity is directly relevant to Morocco, where NPM elements have been introduced incrementally rather than as a coherent package.

The Moroccan case has been examined directly by Errami and Cargnello (2018), who traced the country's health system reform from 2002 to 2012 and concluded that despite several positive outcomes, the reform generated organizational dysfunction and a marked increase in managerial friction, a finding they argue is symptomatic of the institutional prerequisites for NPM reform being

only partially met in many developing-country contexts. Alami (2018), examining management control specifically within Moroccan public and university hospitals through interviews with hospital officials, found that the country's dual preventive and post-operation financial control system, established under Law 69-00, has struggled to move hospitals from resource-based to results-based management, and characterized the control function at one major university hospital center as largely non-reactive.

Comparative evidence from elsewhere in the MENA and broader low- and middle-income country context reinforces this picture of uneven reform traction. Katoue, Cerda, García, and Jakovljevic (2022), reviewing health system development across the MENA region from 1975 to 2022, identified workforce shortages, weak health information systems, and leadership capacity constraints as recurring obstacles to reform effectiveness, independent of the specific policy instruments adopted. Giusti, Romolini, and Persiani (2023), studying healthcare decentralization in Tunisia, found that decentralization reduced regional health inequalities only when management capacity was engaged from the earliest stages of implementation, a differentiated rather than uniform decentralization being the more effective model. Both studies point toward the same conclusion that the present paper investigates empirically for Morocco: the presence of a reform on paper does not guarantee its translation into measurable operational gains, and the size of that gap is itself an empirical question. This gap is not unique to Morocco or to health specifically. Herrera, Isaka, and Ouedraogo (2025), benchmarking public spending efficiency across 195 countries, found that developing countries systematically lose potential output to inefficient spending, with the size of the loss varying by sector and negatively associated with governance quality, evidence that the disconnect between resource allocation and delivered results identified in the present study is a documented cross-country pattern in public administration rather than an idiosyncratic feature of the Moroccan case.

Synthesis and Positioning of the Present Study

Three observations from this literature shape the design of the present study. First, the Levers of Control framework and its extensions suggest that budgetary control (a diagnostic lever) and reform milestones (closer to an interactive or boundary-setting lever) may relate to performance through different mechanisms and on different time horizons, which is one reason this paper treats them as separate hypotheses rather than a single composite governance variable. Second, the public sector MCS literature (Felício et al., 2021; De Harlez & Malagueño, 2016) cautions against expecting uniform, statistically strong main effects; configurational and contextual dependence is the

norm, not the exception. Third, the Moroccan and MENA-specific literature (Errami & Cargnello, 2018; Alami, 2018; Katoue et al., 2022) converges on the existence of an implementation gap between formal control mechanisms and operational reality, a gap this paper attempts to quantify, however partially, using the national time-series data available for Morocco.

Conceptual Framework and Hypotheses

The conceptual model treats governance and control variables as the independent side of the relationship and hospital performance and financial protection outcomes as the dependent side, with reform milestones acting as a moderating or discrete-shift condition and population and macroeconomic variables acting as controls. Three governance mechanisms are considered, corresponding loosely to Simons' (1995) diagnostic and interactive control functions: routine budget allocation (a diagnostic, resource-input mechanism), budget execution efficiency (a diagnostic, compliance-monitoring mechanism), and discrete governance reform milestones such as AMO expansion and Law 06-22 (an interactive, structural-change mechanism).

Two hypotheses are tested statistically in this study.

H1: Increases in Ministry of Health budget allocation are positively associated with hospital production capacity, measured by admissions and surgical interventions, over the period for which both series are available (2016–2023).

H2: The governance reform period associated with AMO expansion and Law 06-22 is associated with a decline in the out-of-pocket share of household health spending between 2018 and 2022.

A third proposition, concerning budget execution efficiency, is retained in the conceptual model but is not tested as a formal regression hypothesis:

H3 (contextual): Higher budget execution efficiency is associated with improved hospital operational performance (bed occupancy, length of stay).

H3 is downgraded to a contextual proposition because the only available execution-rate figure for Morocco is a single cross-sectional benchmark (approximately 70%, per IMF estimates) rather than an annual series comparable in structure to the performance variables. Testing it as a regression hypothesis would therefore not be methodologically defensible; it is instead examined qualitatively in the Discussion section using hospital-level audit evidence from the Cour des Comptes. A fourth, exploratory proposition, that workforce density growth has not been matched proportionally by performance gains, is likewise treated as an interpretive point in the Discussion rather than a tested hypothesis, since workforce data

are available only for non-annual snapshot years. For context, the available snapshot years show the ratio of inhabitants per doctor falling steadily, from 1,925 in 2013 to 1,255 in 2023, indicating consistent workforce growth over the same period in which production and control indicators showed no comparable improvement, a contrast noted descriptively in the Discussion but not tested statistically.

Scope of the MCS Construct

This paper tests two of Simons' (1995) four control levers, not all four. Diagnostic control is captured through routine budget allocation, and interactive control through discrete reform milestones such as AMO expansion and Law 06-22. Belief systems and boundary systems are left out, and this is a deliberate choice, not an oversight. Both levers describe organizational culture, stated values, and the rules that define acceptable action. Measuring them requires interview data, survey instruments, or document analysis of internal codes of conduct, none of which exist at the national level for Morocco's public hospital system in a form comparable across 2013 to 2023. Secondary statistics simply cannot speak to what a hospital's staff believe about their mission or how boundary rules are enforced day to day.

Restricting the empirical test to two levers narrows what the paper can claim. It says nothing about whether Moroccan public hospitals have a strong or weak belief system, and nothing about how boundary controls function in practice. What it can say, with the data available, is whether resource-based and reform-based control mechanisms show any measurable link to performance outcomes. That is a smaller claim than the full Levers of Control model implies, and it is the honest one given what a national statistical record can support.

Methodology

Data Sources

The study draws on a compiled dataset of Moroccan public health indicators assembled from four primary sources: the Ministry of Health's annual "Santé en Chiffres" reports (2020 and 2023 editions, cross-checked for consistency across overlapping years), the Haut-Commissariat au Plan's "Les Indicateurs Sociaux du Maroc" (2024 edition), International Monetary Fund Selected Issues Paper SIP/2026/027, and the Cour des Comptes annual reports for the 2018 reporting cycle, covering the Ministry of Health's central budget management and two individual public hospital audits (Centre Hospitalier Préfectoral Mohamed V, Casablanca, and Centre Hospitalier Préfectoral Moulay Abdallah, Mohammedia). Where the same indicator appeared in more than one source, values were cross-validated; all overlapping years matched exactly across the Ministry and HCP series, which supports the reliability of the core performance and

budget figures. A small number of sources cited in this paper, including the IMF Selected Issues Paper and several Cour des Comptes reports, carry publication dates in 2025 and 2026; these are recently released or forthcoming official documents rather than errors, and are cited as such.

Variables

The dependent variables for H1 are national hospital admissions and total surgical interventions, both available annually from 2013 to 2023. The independent variable for H1 is the Ministry of Health's total budget in current million dirhams, available annually from 2016 to 2023; the overlap between the two series restricts the H1 analysis to eight years (2016–2023). The dependent variable for H2 is the out-of-pocket share of total household health spending, drawn from the Ministry of Health and Social Protection's National Health Accounts (2022 edition), available for 2018 and 2022 only. Bed occupancy rate (Taux d'Occupation Moyen, TOM) is reported descriptively as a secondary performance indicator. Population and nominal GDP are available as control variables from 2016 onward.

Table 1 summarizes each variable used in this study, its precise definition, unit, source document, and years of coverage, to make the operationalization of every hypothesis fully transparent and independently checkable.

Variable	Definition	Unit	Source	Years covered
Hospital admissions	Total annual admissions to public hospitals, national	Count	Ministère de la Santé, Santé en chiffres (2020, 2023 editions)	2013 – 2023
Surgical interventions	Total annual surgical interventions performed in public hospitals, national	Count	same	2013 – 2023
Bed occupancy rate (TOM)	Taux d'Occupation Moyen, average proportion	%	same	2013 – 2023

	on of functional beds occupied over the year			
Ministry health budget	Total Ministry of Health annual budget, current prices	Million DH	Ministère de la Santé, Santé en chiffres; Ministère de l'Économie et des Finances	2016 – 2023
Out-of-pocket health spending share	Household out-of-pocket payments as a share of total health spending	%	Ministère de la Santé et de la Protection Sociale, Comptes Nationaux de la Santé (2022 edition)	2018, 2022
Budget execution rate (health infrastructure)	Share of allocated investment credits actually disbursed, health infrastructure program	%	Cour des Comptes, Rapport sur l'exécution de la loi de finances (2023)	2023 only
Reform milestone indicator	Dummy variable marking adoption of Law 06-22 and accelerated AMO expansion	0/1 (year ≥ 2022)	Constructed from documented policy dates	2013 – 2023

Population, GDP	National population; nominal GDP	Thousands; million DH	Haut-Commissariat au Plan	2013 – 2023
Physician density	Inhabitants per doctor, public and private sectors combined	Ratio	Haut-Commissariat au Plan (2024)	Snap shot years : 2013, 2017, 2020 – 2023

Table 1. Variable definitions and data sources.

Analytical Approach

The dataset structure is a single-country annual time series, not a cross-sectional panel with multiple hospitals or regions observed repeatedly. Panel data techniques such as fixed-effects or pooled ordinary least squares regression, which require cross-sectional variation, are therefore not applicable and are not used here. For H1, this study instead reports Pearson correlation coefficients between the budget series and each production variable, computed twice: once on the raw annual levels, and once on first-differenced series (year-over-year changes) to reduce the risk of spurious correlation arising from the fact that both series may trend upward over time independent of any underlying causal link. Given the small sample size ($N = 8$ years), all reported associations should be read as descriptive trend indicators rather than as evidence of statistically robust or causal relationships; the analysis is explicitly underpowered for formal inferential claims, and this limitation is treated as a finding in its own right rather than concealed. For H2, with only two observation points (2018 and 2022), no regression is performed; the analysis is a before-after descriptive comparison, interpreted alongside the documented timing of AMO expansion and the 2022 framework law. In addition, a segmented (interrupted time series) regression is applied to the full 2013–2023 hospital performance series, using 2022 as the intervention year, to test for a level shift or trend change coinciding with reform adoption; this approach makes use of the complete $N = 11$ series rather than restricting the analysis to the years for which budget data overlap.

Results

Table 2 reports descriptive statistics for the principal performance and budget variables over their respective observation windows.

Variable	N (years)	Mean	SD	Min	Max
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Hospital admissions (national)	11	1,113,647	100,065	939,149	1,246,425
Surgical interventions (total)	11	306,134	29,152	234,399	332,760
Bed occupancy rate, TOM (%)	11	62.26	3.15	56.60	68.00
Ministry health budget (million DH)	8	18,728.4	4,976.5	14,281.0	28,130.0

Table 2. Descriptive statistics for hospital performance and Ministry health budget variables, Morocco. Admissions, surgical interventions, and bed occupancy rate (TOM) are reported for 2013–2023 ($N = 11$); the Ministry health budget series is reported for 2016–2023 ($N = 8$), reflecting data availability constraints described in the Methodology section.

Hospital admissions varied moderately over the observation period, from a low of 939,149 in 2021 to a high of 1,246,425 in 2014, with a visible trough in 2020 and 2021 consistent with pandemic-related disruption to routine hospital activity. Surgical interventions followed a similar pattern, dipping sharply in 2020 before recovering toward, though not fully to, pre-pandemic levels by 2023. Bed occupancy rate remained comparatively stable, averaging 62.3% across the period, below internationally recommended benchmarks of 80 to 85% for efficient bed utilization.

Figure 1 plots the Ministry health budget against national hospital admissions over the 2016–2023 window. The budget series rises steadily and substantially, nearly doubling in nominal terms from 14,281 million DH in 2016 to 28,130 million DH in 2023. Admissions, by contrast, follow a comparatively flat and pandemic-disrupted trajectory over the same period, ending 2023 only marginally above its 2016 starting value.

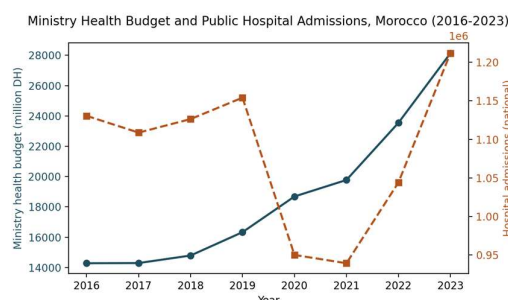


Figure 1. Ministry of Health budget (million DH, left axis) and national public hospital admissions (right axis), Morocco, 2016–2023. Source: compiled from Ministry of Health “Santé en Chiffres” reports and Haut-Commissariat au Plan (2024).

Table 3 reports the correlation results underlying H1. The association between the budget series and both production variables is weak and statistically non-significant in levels. First-differencing produces a moderate positive correlation between year-over-year budget growth and year-over-year admissions growth ($r = .475$), though this remains non-significant at conventional thresholds given the small sample, and the corresponding relationship with surgical interventions remains negligible.

Variable pair	N	Pearson r (levels)	p	Pearson r (first differences)	p
Ministry budget ↔ Admissions	8	0.062	.884	0.475	.281
Ministry budget ↔ Surgical interventions	8	-0.239	.568	0.048	.919

Table 3. Pearson correlation coefficients between Ministry health budget and hospital production indicators, Morocco, 2016–2023 ($N = 8$ annual observations). First-difference columns report correlations computed on year-over-year changes in each series, reducing the influence of a shared upward time trend.

H1 is therefore not supported at conventional levels of statistical significance in either specification, although the direction of the first-differenced association is consistent with the hypothesized relationship. Given $N = 8$, this result should be read as inconclusive rather than as evidence against a budget-performance link; the sample is simply too small, and the production series too heavily disrupted by the COVID-19 pandemic in 2020 and 2021, to detect a moderate effect with confidence.

Table 4 reports the descriptive comparison underlying H2. The out-of-pocket share of total health spending fell from 45.6% in 2018 to 38.0% in 2022, a decline of 7.6 percentage points over four years, alongside a 34.1% nominal increase in total health spending and a rise in health insurance coverage of expenditure to 31.0% by 2022.

Indicator	2018	2022	Change
Out-of-pocket share of total health spending (%)	45.6	38.0	-7.6 pp
State (government) contribution (%)	n/a	30.3	-
Health insurance coverage of expenditure (%)	n/a	31.0	-
Total health spending (billion DH)	n/a	81.7	+34.1% vs. 2018

Table 4. Household out-of-pocket health spending and related financing indicators, Morocco, 2018 and 2022. Source: Ministry of Health and Social Protection, *Comptes Nationaux de la Santé* (2022 edition).

This decline coincides with the period of AMO expansion and the drafting and adoption of Law 06-22, lending descriptive support to H2, although with only two observation points the finding cannot be attributed statistically to the reform rather than to other concurrent changes in health financing, including rising total health expenditure itself.

Morocco's decline doesn't look like part of some uniform regional wave. Tunisia's out-of-pocket share stayed roughly flat over the same years (World Bank, 2026; Ismaïl, 2021). Egypt's health financing is still structurally dependent on out-of-pocket payments, reviews put the share above 60% there, with no comparable drop (Fasseeh et al., 2022). Jordan and Algeria start from a lower share than Morocco, but nothing in the comparative literature says they kept falling further over 2018–2022 either (Ismaïl, 2021). These comparisons are rough. Data years and methods don't line up perfectly across countries. Still, nothing here points to Morocco simply riding a passive MENA-wide trend. If anything, Morocco moved from a position of fairly heavy out-of-pocket dependence toward the regional middle, and that fits a country-specific reform story better than a passive one.

To test whether the timing of reform coincides with a structural break in hospital performance, rather than relying on correlation alone, a segmented (interrupted time series) regression was applied to the full 2013–2023 admissions, surgical intervention, and bed occupancy series, using 2022, the year Law 06-22

was adopted, as the intervention point, since it is the clearest single legal marker in an otherwise incremental reform process. The model estimates a pre-reform trend, a level shift at 2022, and a change in trend after 2022. As a robustness check, the same model was re-estimated using 2021, the year AMO expansion accelerated, as an alternative break point; the direction and statistical significance of the admissions trend reversal held under both specifications (2021 break: $b = 163,551$ per year, $p = .005$; 2022 break: $b = 199,782$ per year, $p = .049$), which is reassuring given how sensitive segmented regression results can be to the choice of break year in a short series.

Outcome variable	Pre-reform trend (per year)	Level shift at 2022	Post-reform trend change (per year)	R-square
Hospital admissions	-31,921 ($p = .004$)	+93,014 ($p = .243$)	+199,782 ($p = .049$)*	0.756
Surgical interventions	-5,962 ($p = .166$)	+24,151 ($p = .534$)	+20,744 ($p = .640$)	0.264
Bed occupancy rate, TOM (%)	-0.42 ($p = .253$)	-0.14 ($p = .967$)	-3.78 ($p = .346$)	0.511

Table 5. Interrupted time series (segmented regression) results, Morocco public hospitals, 2013–2023, intervention year 2022 (Law 06-22). $N = 11$ annual observations for each outcome; only two annual observations (2022, 2023) follow the intervention point.

**This estimate rests on only two post-intervention years and should be read as provisional; see interpretation below.*

Admissions show a significant declining pre-reform trend and a significant reversal in trend after 2022. This reversal should be read with real caution. Only two annual observations, 2022 and 2023, follow the break, so the post-reform slope is effectively estimated from two points rather than a genuine multi-year trend, and a single additional year of data could change it substantially. Surgical interventions and bed occupancy rate show no significant pre-trend, level shift, or post-trend change, indicating no detectable structural break in either series coinciding with the reform date. Taken together, the segmented regression does not provide strong evidence of a reform-linked structural break in hospital production or bed utilization; the one significant result available is fragile by construction, given how few post-reform years exist in the data. It

is also worth noting that three outcome variables were tested here, in addition to the two correlation tests reported in Table 3; running multiple significance tests on a small dataset increases the chance that one result reaches conventional significance by chance alone, which is a further reason to treat the admissions finding as suggestive rather than confirmatory.

A further concern is whether the admissions reversal reflects the reform itself or simply a mechanical rebound from the COVID-19 disruption of 2020 and 2021. A useful check is whether post-2022 admissions merely return to their pre-pandemic baseline or exceed it. The 2013–2019 average was 1,157,911 admissions per year, close to the 2019 value of 1,154,157. Admissions in 2022 were 1,043,904, still below this pre-pandemic baseline, while 2023 reached 1,211,765, about 4.7% above it. In other words, 2022 looks more like partial pandemic recovery than a reform effect, and only by 2023 do admissions modestly exceed pre-pandemic levels. This pattern does not rule out a genuine reform-linked improvement, but it is equally consistent with a delayed, ordinary recovery from the pandemic shock, and the two explanations cannot be separated with only two post-break years of data.

Discussion

The central empirical pattern in this study is an asymmetry between the two governance mechanisms examined. Budget allocation, a diagnostic control lever in Simons' (1995) terms, shows at best a weak and statistically inconclusive relationship with hospital production capacity over the period for which data are available. Reform-driven structural change, closer to an interactive or boundary-setting lever, coincides with a substantial and directionally consistent improvement in financial protection. This asymmetry is broadly consistent with the contingency-theoretic expectation that different control mechanisms operate through different mechanisms and on different time horizons (Adhikara et al., 2020; Tessier & Otley, 2012), and it echoes De Harlez and Malagueño's (2016) finding that the performance consequences of formal control instruments in hospitals depend heavily on how and by whom they are used, rather than on their existence alone. The segmented regression reported in Table 5 reinforces this reading from a different angle. Surgical interventions and bed occupancy show no detectable shift in level or trend around the 2022 reform date, and the one series that does show a significant post-reform trend change, admissions, rests on only two post-break years and should not be read as firm evidence of a reform effect on hospital production.

The weak budget-production association is also consistent with the qualitative evidence assembled from the Cour des Comptes audit reports, which point to a persistent gap between resource

allocation and its operational deployment. At the national level, the 2018 Cour des Comptes report on the Ministry of Health's budget management documented that investment credits were repeatedly frozen or under-executed during the study's earlier years, with a 2011 budget freeze of 36.5 million DH and a 2013 freeze exceeding 531 million DH, alongside a rising volume of litigation related to public procurement contracts, from three concluded judgments in 2012 to twenty in 2016. At the hospital level, the Centre Hospitalier Préfectoral Mohamed V in Casablanca saw its rate of medicine and medical device delivery against allocated credits collapse from 100% in 2011 to just 1% in 2016, and the Centre Hospitalier Préfectoral Moulay Abdellah in Mohammedia saw its own-revenue coverage of operating expenditure decline from 69% in 2012 to 56% in 2016, alongside a fall in total personnel from 240 to 215 over the same period. These hospital-level findings illustrate, without statistically testing, the same implementation gap that H3 was originally intended to capture and that this study's data structure could not support as a formal regression hypothesis.

The IMF's single-point estimate of a 70% investment execution rate is not the only evidence available on this question. Cour des Comptes reports on the execution of the national budget give a national investment execution rate of 82.5% for both 2022 and 2023, falling to roughly 73% once transfers to special treasury accounts and public entities are excluded. Health fares worse than this national average. The 2023 report breaks execution down by ministerial program for the first time, and the health infrastructure upgrade program (renforcement et mise à niveau des infrastructures et équipements sanitaires) executed at just 46.8%, well below both the gross and the adjusted national figures. This single data point cannot support a formal regression, since no comparable sector breakdown exists for the other years in this study's window. But it does something useful anyway. It turns a vague, single-country benchmark into a specific, sourced comparison: whatever is dragging down health investment execution, it is not simply a national problem showing up in every ministry equally. Health is underperforming the government's own average, and by a wide margin.

This pattern situates the Moroccan case within, rather than as an exception to, the broader literature on NPM implementation in developing-country health systems. Errami and Cargnello (2018) describe a Moroccan reform trajectory marked by organizational dysfunction despite positive intent, and Alami (2018) characterizes hospital-level control at a major university hospital center as largely non-reactive rather than diagnostic in Simons' sense. The present study's finding that budget growth alone shows little measurable relationship with production, while reform

milestones coincide with genuine financial-protection gains, is consistent with Andrews et al. (2019) configurational argument that partial NPM adoption, reform on some dimensions but not others, tends to underperform relative to either comprehensive reform or the pre-reform baseline. Morocco's health reform agenda has been comprehensive on the financing and coverage dimension (AMO, Law 06-22) but comparatively partial on the operational control dimension audited by the Cour des Comptes, a configuration that Andrews et al.'s framework would predict to yield exactly the uneven results observed here.

The comparative evidence from Tunisia is also instructive. Giusti et al. (2023) found that decentralization reduced health inequalities in Tunisia only where hospital management was engaged early in implementation; where it was not, decentralization produced the homogenization problems it was meant to solve. The recurring governance weaknesses documented in the Moroccan audit reports, absent hospital establishment projects, inactive consultative bodies, unfilled leadership roles, describe precisely the kind of management engagement gap that the Tunisian case identifies as the binding constraint on reform translation. Read together, the Moroccan and Tunisian evidence suggests that the missing ingredient in public hospital reform across the region may be less the design of financing mechanisms, which both countries have advanced considerably, than the operational management capacity required to convert financing reform into measurable production and quality gains at the facility level, a conclusion also reached in the region-wide review by Katoue, et al. (2022).

Limitations

Several limitations qualify these findings. First, the analysis rests on a single-country annual time series rather than a cross-sectional panel; the sample size for the H1 correlation analysis ($N = 8$) is small, and the resulting estimates should be interpreted as descriptive rather than as statistically powered tests of association. Second, the budget execution rate proxy for H3 is a single cross-sectional benchmark rather than an annual series, which prevented formal hypothesis testing of the budget-execution-to-performance relationship; the qualitative audit evidence used in its place, while informative, covers only two individual hospitals and one national ministry-level report from a single reporting cycle (2018), and cannot be assumed representative of the full national hospital system. Third, the COVID-19 pandemic introduces a substantial disruption to the 2020 and 2021 observations that is only partially separable from the underlying budget-performance relationship given the short time series available. Fourth, the segmented regression reported in Table 5 has only two annual observations following the 2022

intervention point; its post-reform trend estimates, particularly the significant reversal found for admissions, should be treated as provisional rather than as firm evidence of a reform-linked structural break, since a single additional year of data could substantially change them. Fifth, the out-of-pocket spending series used for H2 has only two observation points, which supports a before-after descriptive comparison but not a statistical test of the reform's independent contribution net of other concurrent changes in health financing. Future research extending the observation window, incorporating sub-national or hospital-level panel data where available, and obtaining a longer annual series of budget execution and audit compliance indicators from the Cour des Comptes, would substantially strengthen the inferential basis for claims of this kind.

Conclusion

This study examined whether management control mechanisms, understood as budgetary governance and reform implementation, have been associated with measurable performance and financial-protection gains in Morocco's public hospital system between 2013 and 2023. The evidence does not support a strong or statistically robust relationship between routine budget allocation and hospital production capacity, a finding corroborated by Cour des Comptes audit evidence documenting persistent gaps between allocated resources and their operational execution at both the ministry and individual hospital levels. By contrast, the period associated with governance reform, specifically AMO expansion and the 2022 health system framework law, coincides with a substantial decline in the household out-of-pocket share of health spending, from 45.6% to 38.0% between 2018 and 2022. Read alongside the broader NPM literature on the region, this asymmetry suggests that structural and financing reform has outpaced operational management control in Morocco's public healthcare system, a configuration consistent with findings from comparable MENA and developing-country settings. For policymakers, the implication is that further gains in hospital operational performance may depend less on the volume of budget allocated and more on strengthening the diagnostic and compliance mechanisms, audit follow-through, procurement discipline, and facility-level management capacity, that translate allocated resources into delivered care. For researchers, the study underscores the value of being explicit about what a given data structure can and cannot support: not every governance hypothesis that seems reasonable in principle is testable with the data a health system currently makes available, and stating that limitation plainly is preferable to forcing an inappropriate statistical technique onto a mismatched dataset.

A more recent Cour des Comptes report, published in January 2026 and outside this study's observation window, suggests the tension hasn't gone away. The Ministry of Health's budget kept growing, from 19.7 billion DH in 2019 to 32.6 billion DH in 2025, and yet the Court flagged the AMO scheme's financial sustainability as a real concern, calling for urgent reform to contain spending and shore up the system's resource base. Budget growth alone, even at this larger scale, hasn't settled the governance question this paper set out to examine.

References

- Adhikara, M. A., Sumarli, J. N., Andry, & Sutisna, D. (2020). Management control system and hospital performance among public sector: Is environment uncertainty and information technology the issue? *Journal of Talent Development and Excellence*, 12(1), 2381–2394.
- Alami, S. (2018). Hospital management control system. *Journal of Academic Finance*, 9(2), 104–115.
<https://doi.org/10.59051/JOAF.V9I2.132>
- Baird, K., Su, S., & Munir, R. (2023). The mediating role of levers of control on the association between sustainable leadership and organisational resilience. *Journal of Management Control*, 34(2), 187–212.
<https://doi.org/10.1007/s00187-023-00354-1>
- Bellora-Bienengräber, L., Derfuss, K., & Endrikat, J. (2023). Taking stock of research on the levers of control with meta-analytic methods: Stylized facts and boundary conditions. *Accounting, Organizations and Society*, 106, Article 101414.
<https://doi.org/10.1016/j.aos.2022.101414>
- Andrews, R., Beynon, M. J., & McDermott, A. (2019). Configurations of New Public Management reforms and the efficiency, effectiveness and equity of public healthcare systems: A fuzzy-set Qualitative Comparative Analysis. *Public Management Review*, 21(8), 1236–1260.
<https://doi.org/10.1080/14719037.2018.1561927>
- Cour des Comptes du Royaume du Maroc. (2018). Rapport annuel de la Cour des comptes au titre de l'année 2018: Gestion budgétaire et comptable du ministère de la santé. Cour des Comptes.
- Cour des Comptes du Royaume du Maroc. (2018). Rapport annuel de la Cour des comptes au titre de l'année 2018: Le Centre hospitalier préfectoral Mohamed V de Casablanca. Cour des Comptes.
- Cour des Comptes du Royaume du Maroc. (2018). Rapport annuel de la Cour des comptes au titre de l'année 2018: Le Centre hospitalier

- préfectoral Moulay Abdellah de Mohammedia. Cour des Comptes.
- Cour des Comptes du Royaume du Maroc. (2024). Rapport sur l'exécution de la loi de finances au titre de l'année 2022: Principales conclusions et recommandations. Cour des Comptes.
- Cour des Comptes du Royaume du Maroc. (2025). Rapport sur l'exécution de la loi de finances pour l'année 2023: Principales conclusions et recommandations. Cour des Comptes.
- Cour des Comptes du Royaume du Maroc. (2026). Rapport annuel de la Cour des comptes (2024-2025 cycle). Cour des Comptes.
- De Harlez, Y., & Malagueño, R. (2016). Examining the joint effects of strategic priorities, use of management control systems, and personal background on hospital performance. *Management Accounting Research*, 30, 2–17. <https://doi.org/10.1016/j.mar.2015.11.004>
- Errami, Y., & Cargnello, C. E. (2018). The pertinence of new public management in a developing country: The healthcare system in Morocco. *Canadian Journal of Administrative Sciences*, 35(2), 304–312. <https://doi.org/10.1002/cjas.1417>
- Fasseeh, A., ElEzbawy, B., Adly, W., ElShahawy, R., George, M., Abaza, S., ElShalakani, A., & Kaló, Z. (2022). Healthcare financing in Egypt: A systematic literature review. *Journal of the Egyptian Public Health Association*, 97(1), Article 3. <https://doi.org/10.1186/s42506-021-00089-8>
- Felício, T., Samagaio, A., & Rodrigues, R. (2021). Adoption of management control systems and performance in public sector organizations. *Journal of Business Research*, 124, 593–602. <https://doi.org/10.1016/j.jbusres.2020.10.069>
- Giusti, M., Romolini, A., & Persiani, N. (2023). The inequalities reduction through healthcare decentralisation in low-middle income countries: The case of Tunisia. *International Journal of Health Planning and Management*, 38(4), 936–950. <https://doi.org/10.1002/hpm.3632>
- Haut-Commissariat au Plan. (2024). Les indicateurs sociaux du Maroc, édition 2024. Haut-Commissariat au Plan.
- Herrera, S., Isaka, H., & Ouedraogo, A. (2025). Efficiency of public spending in education, health, and infrastructure: An international benchmarking exercise. *Journal of Applied Economics*, 28(1), Article 2480985. <https://doi.org/10.1080/15140326.2025.2480985>
- International Monetary Fund. (2026). Morocco: Selected issues (IMF Selected Issues Paper No. SIP/2026/027). International Monetary Fund.
- Ismail, S. (2021). *Healthcare expenditure progress in Tunisia: a qualitative analysis*. MPRA Paper. <https://mpra.ub.uni-muenchen.de/111493/>
- Katoue, M. G., Cerda, A. A., García, L. Y., & Jakovljevic, M. (2022). Healthcare system development in the Middle East and North Africa region: Challenges, endeavors and prospective opportunities. *Frontiers in Public Health*, 10, Article 1045739. <https://doi.org/10.3389/fpubh.2022.1045739>
- Lunkes, R. J., Naranjo-Gil, D., & Lopez-Valeiras, E. (2018). Management control systems and clinical experience of managers in public hospitals. *International Journal of Environmental Research and Public Health*, 15(4), Article 776. <https://doi.org/10.3390/ijerph15040776>
- Martyn, P., Sweeney, B., & Curtis, E. (2016). Strategy and control: 25 years of empirical use of Simons' levers of control framework. *Journal of Accounting & Organizational Change*, 12(3), 281–324. <https://doi.org/10.1108/JAOC-03-2015-0027>
- Ministère de la Santé et de la Protection Sociale du Maroc. (2020). Santé en chiffres 2020. Ministère de la Santé.
- Ministère de la Santé et de la Protection Sociale du Maroc. (2022). Comptes nationaux de la santé, édition 2022. Ministère de la Santé et de la Protection Sociale.
- Ministère de la Santé et de la Protection Sociale du Maroc. (2023). Santé en chiffres 2023. Ministère de la Santé.
- Simons, R. (1995). Levers of control: How managers use innovative control systems to drive strategic renewal. Harvard Business School Press.
- Tessier, S., & Otley, D. (2012). A conceptual development of Simons' Levers of Control framework. *Management Accounting Research*, 23(3), 171–185. <https://doi.org/10.1016/j.mar.2012.04.003>
- Wang, J., Wang, Z., Ma, C., & Zhang, X. (2025). A research note on the levers of control framework in management accounting: Replication and cross-cultural extension. *Accounting & Finance*, 1–21. <https://doi.org/10.1111/acfi.70148>
- Widener, S. K. (2007). An empirical analysis of the levers of control framework. *Accounting, Organizations and Society*, 32(7–8), 757–788. <https://doi.org/10.1016/j.aos.2007.01.001>

World Bank. (2026). Health financing in Tunisia: A post-COVID update and policy options. World Bank Group.