

Paying for Maternal Health, Punishing Providers: Why Provider Payment Drives, and Performance Monitoring Suppresses, Maternal Health Service Delivery under Cameroon's Health Voucher Programme

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ABSTRACT

Cameroon's national health voucher programme, launched in 2015 with the support of the French Development Agency and German Financial Cooperation, was extended to the Northwest Region in October 2024 as a demand-side financing mechanism intended to remove financial barriers to maternal healthcare. Although the programme is now operational across 51 accredited facilities, empirical evidence on which of its four core strategic purchasing functions actually move maternal health service delivery remains scarce. This study examines the effect of the core purchasing functions of the health voucher (benefits specification, contracting arrangements, provider payment, and performance monitoring) on maternal health service delivery in selected health facilities in the Northwest Region of Cameroon. A structured questionnaire was administered to 100 healthcare workers (80% female; 69% nurses; 40% with six or more years of experience). Multiple Correspondence Analysis was used to construct continuous indices for each function, and an Ordinary Least Squares regression was estimated, controlling for worker experience. The model is statistically significant overall, $F(7, 92) = 4.32$, $p < 0.001$, and the four purchasing functions jointly explain a meaningful share of the variation in service delivery quality (adjusted $R^2 = 0.190$). Three findings are striking. First, provider payment exerts the strongest positive effect on maternal health service delivery ($\beta = 0.442$, $p < 0.001$), and yet its implementation strength is the lowest of all four functions (MCA index = 0.065). Second, performance monitoring has a statistically significant negative effect on service delivery ($\beta = -0.217$, $p = 0.006$), an unexpected finding that suggests current monitoring practices generate administrative burden faster than they generate accountability. Third, contract management is well-implemented (MCA index = 0.920) but produces only a weakly significant positive effect ($\beta = 0.219$, $p = 0.074$), and benefits specification has no significant effect at all ($\beta = 0.043$, $p = 0.401$). Together, these findings show that the purchasing function on which the programme depends most for impact is also the one in which it invests least. Three policy implications follow: protect and accelerate provider payment, redesign monitoring as a learning instrument rather than a paperwork instrument, and prioritise reform sequencing over symmetric investment across all four functions. The results contribute one of the first quantitative empirical assessments of strategic purchasing function effects on maternal service delivery in a conflict-affected sub-Saharan setting.

Keywords: Strategic Purchasing, Provider Payment, Performance Monitoring, Maternal Health, Health Voucher, Universal Health Coverage, Fragile Settings, Cameroon

INTRODUCTION

Maternal mortality remains among the most stubborn inequities in global health. Sub-Saharan Africa accounts for roughly 70% of global maternal deaths despite three decades of sustained international

investment.[1,2] In Cameroon, the national maternal mortality ratio fell from 467 per 100,000 live births in 2018 to 258 per 100,000 in 2023, but the gain is unevenly distributed.[3] The Northwest Region has historically recorded estimates close to the pre-decline national average, and an ongoing sociopolitical crisis has further strained the health system.[4] Approximately 50% of deliveries continue to occur outside formal health facilities. This figure reflects more than poverty. It reflects the combined effect of geography, transport, conflict, and a public delivery network that has not yet earned full community trust.

To eliminate financial barriers to maternal healthcare, the Government of Cameroon, with the support of the French Development Agency and German Financial Cooperation, introduced a health voucher programme in 2015. The programme operates as a demand-side financing mechanism. Eligible pregnant women receive a voucher card at a beneficiary cost of 6,000 FCFA, which covers the continuum of maternal care from antenatal consultation through 42 days post-delivery. The programme was extended to the Northwest Region in October 2024 and currently operates across 51 accredited facilities.

Health voucher schemes belong to a wider family of strategic purchasing arrangements through which a public purchaser pays providers selectively, conditional on services delivered to a defined population.[5] The World Health Organization has organised the architecture of strategic purchasing around four interrelated functions: defining the services to be purchased (benefits specification), selecting the providers from whom they will be purchased (contracting), establishing how providers will be paid (payment mechanisms), and ensuring that what was contracted is what is delivered (performance monitoring).[6] When these four functions reinforce one another, purchasing becomes strategic. When they are misaligned, purchasing becomes passive disbursement.[7]

The international literature is rich on what strategic purchasing should look like in principle, but considerably thinner on what it actually does to service delivery once implemented in low-resource, conflict-affected contexts.[8,9] Rwanda's results-based financing experience demonstrated that quality-linked provider payment can produce measurable improvements in maternal and child health within five years.[10] Comparable evidence from Nigeria has shown that the purchaser-provider relationship, including how performance is defined and rewarded, is critical to whether strategic purchasing translates into population health gains.[11] Yet very few studies have decomposed the contribution of each of the four purchasing functions empirically, in a single regression model, on a maternal health service delivery outcome, in a fragile setting. This is the gap the present study addresses.

The article reports the first quantitative empirical assessment of the effect of the four core strategic purchasing functions on maternal health service delivery in the Northwest Region of Cameroon. The analysis uses primary data collected from 100 healthcare workers in voucher-accredited facilities and an Ordinary Least Squares (OLS) regression of a Multiple Correspondence Analysis (MCA) derived service delivery quality index on indices of benefits specification, contract management, provider payment, and performance monitoring. The results expose a striking misalignment between where the programme invests its implementation effort and where its measurable impact actually comes from. The article documents this misalignment, examines its plausible mechanisms, and draws three policy implications for the next phase of Cameroon's Universal Health Coverage (UHC) roll-out and for comparable voucher programmes across sub-Saharan Africa.

THEORETICAL FRAMEWORK

The analysis is grounded in three complementary theoretical traditions. Agency theory provides the foundational logic for understanding the purchaser-provider relationship as a principal-agent problem.[12,13] The purchasing agency (the principal) seeks to maximise population health outcomes within a budget constraint. Healthcare providers (the agents) deliver services under conditions of information asymmetry. Strategic purchasing seeks to align agent behaviour with principal objectives through contract design, payment incentives, and monitoring mechanisms.

Health systems financing theory complements agency theory by situating strategic purchasing within the broader functions of revenue generation, pooling, and purchasing.[5,6] In this framework, purchasing is the

active interface between pooled resources and population health needs. The quality of this interface depends on how well the four core functions work together. Benefits specification defines what is purchased. Contracting determines from whom. Provider payment establishes how providers are rewarded. Performance monitoring ensures that contracted services are actually delivered.

Implementation gap theory adds the empirical question that motivates this study.[14,15] Programmes that look identical on paper can produce radically different outcomes once they encounter the operational realities of a fragile health system. The implementation gap is not uniform across the four purchasing functions. Some functions may be implemented strongly but contribute little to measurable outcomes. Others may be implemented weakly but exert a disproportionate effect when they work. Identifying which is the empirical contribution of this paper.

METHODS

3.1 Study Design and Setting

The study employs a cross-sectional quantitative design with primary data collection. The setting is the Northwest Region of Cameroon, in which the health voucher programme was extended in October 2024 across 51 accredited facilities. The region was selected because it combines two features of analytical interest: an early-phase voucher implementation and an active sociopolitical crisis that constrains supply-side service delivery.

3.2 Sample and Data Collection

A structured questionnaire was administered to 100 healthcare workers in voucher-accredited facilities. The instrument captured demographic characteristics, perceptions of seven quality of service delivery indicators, and perceptions of five indicators each for benefits specification, contract management, provider payment, and performance monitoring. All perception items used a five-point Likert scale ranging from "strongly disagree" to "strongly agree." Table 1 presents the demographic profile of respondents.

Table 1. Demographic profile of respondents (n = 100)

Variable	Category	Frequency	Percentage
Gender	Male	20	20%
	Female	80	80%
Age (years)	20 to 30	33	33%
	31 to 40	29	29%
	41 to 50	36	36%
	Above 50	2	2%
Job designation	Nurse	69	69%
	Doctor	4	4%
	Midwife	10	10%
	Health worker	12	12%
	Other	5	5%
Experience	Less than 2 years	21	21%
	2 to 4 years	22	22%

Variable	Category	Frequency	Percentage
	4 to 6 years	17	17%
	6 years and more	40	40%

Source: Author's computation from primary survey data.

Respondents are predominantly female (80%), a distribution that mirrors the maternal health workforce in the region. Nurses and midwives together represent 79% of the sample, with doctors accounting for 4%. The sample is professionally experienced: 40% of respondents have six or more years of work experience and a further 17% have four to six years. This experience profile strengthens the credibility of perception-based data on programme functioning.

3.3 Variables and Index Construction

The dependent variable is a service delivery quality index constructed from seven Likert-scale items covering quality of service rendered, timeliness, supplies and reagents availability, equipment availability, caseload per provider, diagnostic accuracy, and adherence to clinical guidelines. The four explanatory variables of interest (benefits specification, contract management, provider payment, and performance monitoring) were each constructed from five Likert-scale items capturing the principal design features of the corresponding purchasing function. Worker experience was included as a control variable, with respondents grouped into four categories (less than 2 years as the reference, 2 to 4 years, 4 to 6 years, and 6 years and more).

All Likert items were aggregated into continuous indices using Multiple Correspondence Analysis (MCA). MCA is a dimensionality reduction technique that constructs latent dimensions from categorical responses.[16] The resulting indices were normalised to the [0, 1] interval to enable comparison across constructs. Internal consistency was assessed using Cronbach's alpha, with values ranging from 0.690 (contracting arrangements, acceptable) to 0.837 (benefits specification, very good), as reported in Table 2. All four explanatory indices and the dependent variable index meet conventional reliability standards for further analysis.

Table 2. Cronbach's alpha reliability results

Variable	No. of items	Alpha	Decision
Service delivery quality	7	0.7537	Good
Benefits specification	5	0.8366	Very good
Contracting arrangements	5	0.6895	Acceptable
Provider payment	5	0.8153	Very good
Performance monitoring	5	0.7949	Good

Source: Author's computation.

3.4 Estimation Strategy

The effect of the four strategic purchasing functions on maternal health service delivery was estimated using an OLS regression model of the following specification:

$$SERQUAL = \alpha + \beta_1 \cdot BENS + \beta_2 \cdot CMGT + \beta_3 \cdot PPAY + \beta_4 \cdot PMON + \gamma \cdot EXP + \varepsilon$$

where SERQUAL is the service delivery quality index, BENS is the benefits specification index, CMGT is the contract management index, PPAY is the provider payment index, PMON is the performance monitoring index, and EXP is a vector of three worker experience dummy variables (2 to 4 years, 4 to 6 years, and 6 years and more, with less than 2 years as the reference category). Pairwise correlations and Variance Inflation

Factors were examined to rule out multicollinearity. The strongest pairwise correlation between explanatory variables is -0.7503 (contract management and provider payment), below the 0.8 threshold conventionally used to flag multicollinearity. The mean VIF is 2.11, well below the conservative 2.5 threshold for applied research. The Breusch-Pagan test for heteroscedasticity returned $p = 0.6491$, indicating that the error variance is constant and the OLS estimates are efficient.

4. Results

4.1 Descriptive Patterns: A Programme of Asymmetric Investment

The descriptive statistics of the four purchasing function indices reveal a striking asymmetry in how the programme is implemented in the Northwest Region. Table 3 presents the summary statistics for the dependent variable and the four explanatory indices on the normalised [0, 1] scale.

Table 3. Summary descriptive statistics of indices (n = 100)

Variable	Mean	Std. Dev.	Min	Max
Service delivery quality index	0.0280	0.1048	0	1
Benefits specification index	0.2692	0.2228	0	1
Contract management index	0.9203	0.1291	0	1
Provider payment index	0.0653	0.1706	0	1
Performance monitoring index	0.1047	0.1669	0	1

Source: Author's computation from Multiple Correspondence Analysis. Indices normalised to [0, 1].

Three observations are worth flagging at this descriptive stage. The contract management index has a mean of 0.920, indicating that contractual arrangements (provider selection, scope definition, enforcement) are strongly implemented and consistently perceived across facilities. By contrast, the provider payment index has a mean of only 0.065, and the performance monitoring index a mean of 0.105. Whatever the formal design of the programme states, the operational reality is that providers experience payment and monitoring as weak functions and contracting as a strong one. Benefits specification falls in the middle (mean = 0.269). The service delivery quality index itself has a low mean of 0.028, which signals substantial room for improvement in how providers perceive the day-to-day quality of maternal care.

4.2 Regression Results

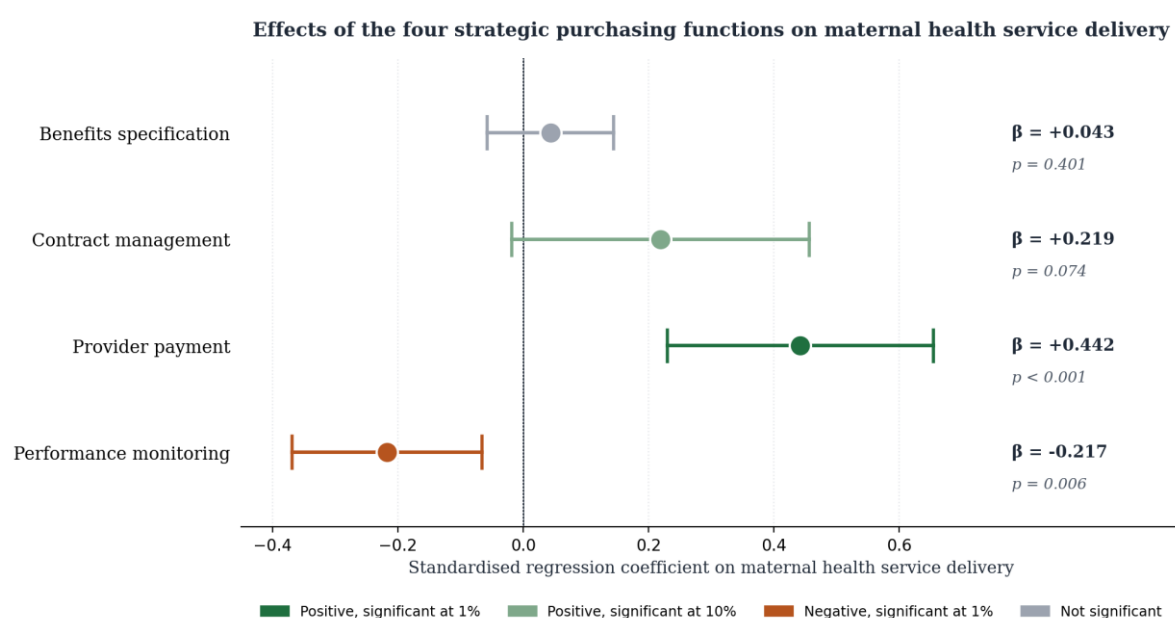
Table 4 presents the OLS regression results. The model is statistically significant overall, with $F(7, 92) = 4.32$, $p < 0.001$. The four purchasing functions and three experience dummies jointly explain 24.7% of the variation in the service delivery quality index (adjusted $R^2 = 0.190$). The Breusch-Pagan test rules out heteroscedasticity ($p = 0.649$). Figure 1 visualises the four function coefficients with 95% confidence intervals.

Table 4. OLS estimates of the effect of strategic purchasing functions on maternal health service delivery

Variable	Coefficient	Std. Error	t-statistic	p-value
Benefits specification index	0.0433	0.0513	0.84	0.401
Contract management index	0.2188 *	0.1212	1.80	0.074
Provider payment index	0.4422 ***	0.1085	4.08	0.000
Performance monitoring index	-0.2174 ***	0.0774	-2.81	0.006

Variable	Coefficient	Std. Error	t-statistic	p-value
Experience: 2 to 4 years	0.0500 *	0.0290	1.72	0.088
Experience: 4 to 6 years	-0.0018	0.0309	-0.06	0.955
Experience: 6 years and more	0.0016	0.0259	0.06	0.952
Constant	-0.2025	0.1173	-1.73	0.088
R ²	0.2472	Adjusted R ²	0.1900	
F(7, 92)	4.32	Prob > F	0.0004	
Breusch-Pagan p	0.6491	Mean VIF	2.11	

Source: Author's computation. Significance codes: *** $p < 0.01$, * $p < 0.10$. Dependent variable: service delivery quality index. Reference category for experience: less than 2 years.



Note: Point estimates with 95% confidence intervals ($CI = \beta \pm 1.96 \cdot SE$). OLS regression, $n = 100$ health workers, adjusted $R^2 = 0.190$, $F(7, 92) = 4.32$, $p < 0.001$.

Figure 1. Effects of the four strategic purchasing functions on maternal health service delivery

Source: Author's visualisation of Table 4 estimates with 95% confidence intervals.

4.3 Function-by-Function Findings

Benefits specification. The benefits specification index has a positive but statistically insignificant effect on maternal health service delivery ($\beta = 0.043$, $p = 0.401$). The 95% confidence interval crosses zero. The substantive interpretation is that defining which services the voucher covers has, on its own, no detectable effect on the quality of maternal care that providers report delivering. The benefit package is well-defined, well-perceived, and well-integrated with other financing schemes (Cronbach's alpha = 0.837), but defining services does not deliver them.

Contract management. The contract management index has a positive and weakly significant effect ($\beta = 0.219$, $p = 0.074$, significant at the 10% level). A one-unit increase in the contract management index is associated with a 0.219 increase in service delivery quality. Substantively, this indicates that the provider selection process, scope-of-service definition, and enforcement mechanisms collectively support service delivery. However, the weak statistical significance and the very high mean of the index (0.920) suggest that

further investment in contract management is unlikely to produce large additional gains. The function is already near its operational ceiling.

Provider payment. The provider payment index has a positive and highly significant effect ($\beta = 0.442$, $p < 0.001$), and is by a clear margin the strongest predictor in the model. A one-unit increase in the provider payment index produces a 0.442 increase in service delivery quality. This is the most consequential finding of the analysis. The function with the lowest implementation strength (mean = 0.065) has the largest measured effect when it works. The implication is uncomfortable but unambiguous: the programme's strongest lever for improving maternal care is the lever it currently pulls the least.

Performance monitoring. The performance monitoring index has a negative and highly significant effect ($\beta = -0.217$, $p = 0.006$). A one-unit increase in the perceived intensity of monitoring is associated with a 0.217 decrease in service delivery quality. The result is contrary to the theoretical expectation that monitoring should improve compliance with quality standards and therefore service delivery. The most plausible explanation, consistent with broader evidence on top-heavy accountability systems in low-resource settings,[17,18] is that monitoring as currently implemented operates as an administrative burden rather than a quality improvement instrument. It demands paperwork, withdraws clinical time from patients, and is not paired with the resource flows that would enable providers to act on monitoring findings.

Worker experience. Workers with 2 to 4 years of experience show a small positive effect on service delivery relative to the reference group ($\beta = 0.050$, $p = 0.088$), but the effect disappears in the 4 to 6 year and 6 years and more categories. The implication is that the marginal value of additional experience above four years is captured by other factors in the model, possibly including the structural constraints under which all experienced workers operate.

4.4 The Strategic Purchasing Paradox

Plotting the function implementation strength (the MCA index mean) against the function impact strength (the OLS coefficient) makes the asymmetry visible at a glance. Figure 2 displays this plot. Two corners of the figure tell the central story of the paper.

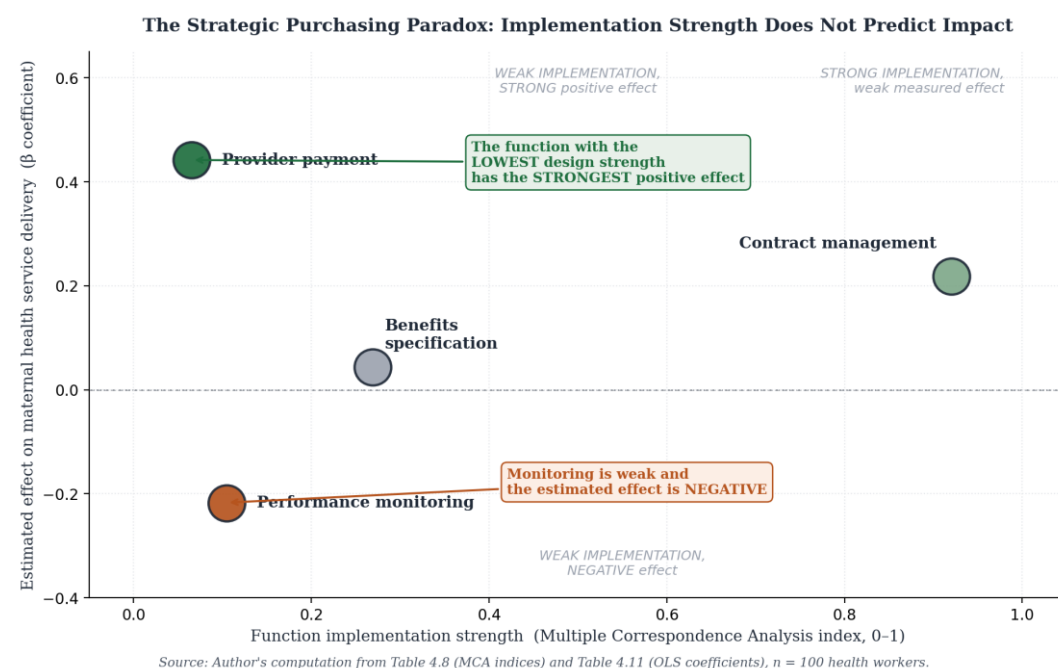


Figure 2. The strategic purchasing paradox: implementation strength does not predict impact

Source: Author's visualisation combining Table 3 (MCA indices) and Table 4 (OLS coefficients).

The top-left corner is occupied by provider payment. It is the function in which the programme has invested the least (mean index = 0.065) and yet it is the function on which service delivery depends the most ($\beta = 0.442$). The lower-left corner is occupied by performance monitoring, where both implementation strength and measured impact are negative for service delivery. Contract management sits in the top-right corner: heavily implemented, modestly effective. Benefits specification sits in the middle, contributing nothing detectable to service delivery quality once the other functions are controlled for. This pattern is the strategic purchasing paradox at the heart of the paper.

DISCUSSION

The results challenge a common assumption in health financing reform, which is that all four strategic purchasing functions deserve symmetric investment because each is necessary for purchasing to be "strategic." [5,6] In the Northwest Region of Cameroon, three of the four functions either contribute marginally or contribute negatively to maternal service delivery once the other functions are controlled for. Only provider payment delivers a large, robust, statistically significant positive effect. Symmetric investment is not what the data recommend. Sequenced investment, with provider payment first, is.

The finding that provider payment is the dominant driver of service delivery aligns with the wider international evidence base. Rwanda's experience demonstrated that quality-linked payment mechanisms produced measurable improvements in maternal and child health within five years of implementation. [10] Comparable Nigerian evidence has emphasised the centrality of how providers are paid to whether purchasing translates into service delivery gains. [11] In both cases, payment functions as the instrument through which the broader purchasing architecture actually touches the patient. The Cameroon data are consistent with this finding and add an important nuance: payment matters most where it currently works least. The function with the largest potential return is also the function with the largest current shortfall. This is precisely the configuration in which targeted reform can yield disproportionate gains.

The negative coefficient on performance monitoring requires more careful interpretation. It does not imply that monitoring is intrinsically counterproductive. It implies that monitoring as currently implemented in the Northwest Region voucher programme is counterproductive. There are at least three plausible mechanisms behind this result. First, monitoring may be experienced by providers as paperwork rather than feedback, in which case it consumes clinical time without producing learning. [19] Second, monitoring may be conducted in the absence of resource follow-through. Providers identify gaps but cannot close them because the money to fill the gap has not arrived (the well-documented post-service reimbursement delay in the programme reaches nine months in 2025). In that context, monitoring intensifies frustration rather than performance. Third, monitoring may be perceived as enforcement rather than support, particularly in a low-trust environment shaped by the ongoing sociopolitical crisis. None of these mechanisms requires that monitoring be abandoned. All three suggest that monitoring must be redesigned to be useful: digital where possible, paired with rapid feedback, and paired with the resource flows that allow providers to act on findings.

The weakly positive but operationally saturated contract management function adds a third strand to the picture. Contracting is the function the programme already does well. The marginal return on additional investment is therefore likely to be small. Resources released from contract management refinement could be redirected toward the functions that are both underperforming and high-impact: principally provider payment, secondarily monitoring redesign.

Taken together, the findings extend the implementation gap framework [14, 15] in three directions. First, they show that the implementation gap is not uniform across the four purchasing functions. Some functions can be over-implemented relative to their measured contribution, and others under-implemented relative to theirs. Second, they show that strong implementation of one function does not compensate for weak implementation of another. Contract management at near-ceiling levels has not pulled overall service delivery quality up because the function that would translate contract terms into patient outcomes (payment) is structurally constrained. Third, they show that monitoring requires institutional preconditions to deliver value, and that imposing monitoring on a resource-constrained system without those preconditions can produce a measurable adverse effect on service delivery.

Table 5. Policy implications by strategic purchasing function

Function	Impact size	Current strength	Recommended action
Provider payment	Large +	Very weak	Top priority. Pre-position facility funds at the start of each fiscal year, eliminate the post-service reimbursement bottleneck, and introduce quality-linked top-ups for high-volume rural facilities.
Performance monitoring	Significant -	Weak	Redesign as a feedback instrument. Digitise data capture, integrate findings into immediate facility-level action plans, and pair monitoring with resource flows so that identified gaps can be closed.
Contract management	Modest +	Near ceiling	Maintain. Introduce performance-based addenda that link a fraction of payment to quality indicators, without dismantling the existing accreditation architecture.
Benefits specification	No effect	Moderate	Evolve the package strategically. Expand to gestational diabetes and hypertension screening once payment is stabilised, with a standing technical review committee.

Source: Author's synthesis of empirical findings and the international evidence base on health financing reform.

Three policy implications follow directly from the data. First, protect and accelerate provider payment. The function with the largest measured effect on service delivery is also the function in which the programme currently underperforms most. Pre-positioned facility funding, mobile money disbursement at scale, and quality-linked top-ups for high-volume rural facilities would address the binding constraint that limits all other purchasing functions from translating into patient outcomes. Second, redesign monitoring before expanding it. Monitoring currently subtracts from service delivery rather than adding to it. The data do not support abandoning monitoring. They support rebuilding it as a digital, feedback-oriented, and resource-linked instrument. Third, sequence reforms rather than spread investment thinly. The temptation to invest equally in all four functions in the name of "strategic purchasing" is theoretically tidy but empirically inefficient. Cameroon's voucher programme would gain more from concentrating its next reform window on payment than from polishing the functions that are already at or near operational ceiling.

CONCLUSIONS

This article has presented the first quantitative empirical decomposition of the effect of the four core strategic purchasing functions on maternal health service delivery in the Northwest Region of Cameroon. The findings reveal a strategic purchasing paradox. The function with the largest measured impact is the one in which the programme invests least. The function that should improve compliance with quality standards is currently associated with a measurable decline in service delivery. Contracting is well-implemented but operationally saturated. Benefits specification is well-defined but contributes nothing detectable to service delivery on its own.

These findings carry implications well beyond the Cameroonian case. Across sub-Saharan Africa, health voucher and demand-side financing programmes have grown rapidly as instruments of progress toward Universal Health Coverage. The analysis presented here is a reminder that the four strategic purchasing functions are not interchangeable and not symmetrically important. Identifying which function is the binding constraint in a given context is a precondition for effective reform. In the Northwest Region of Cameroon today, the binding constraint is provider payment. Loosen it, and the rest of the architecture can begin to deliver what it was designed to deliver. Leave it tight, and no amount of monitoring or contract refinement will close the implementation gap.

Several limitations of this study merit acknowledgement. First, the sample of 100 healthcare workers is geographically situated within the Northwest Region and may not be statistically generalisable to other Cameroon regions with different contextual profiles. Second, the cross-sectional design captures a single implementation moment and cannot trace how the relationships between purchasing functions and service delivery evolve over time. Third, the analysis relies on perception-based indicators rather than direct measurement of clinical outcomes; while perceptions are valid measures of provider experience, they cannot fully substitute for facility-level service delivery data. Fourth, the negative monitoring coefficient invites further qualitative investigation of the mechanisms through which monitoring becomes a burden rather than a benefit, including direct ethnographic observation of monitoring activities in facilities. Notwithstanding these limitations, the study contributes original quantitative evidence to the health financing literature with direct implications for programme redesign, scale-up strategy, and health systems strengthening in Cameroon and comparable settings.

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