

Community-Based Health Insurance, Healthcare Utilization, and Financial Protection in Burundi: The Effects of Co-payments and Household Ability to Pay on Progress Toward Universal Health Coverage

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Article Info

Volume 7, Issue 4

Publication history:

Accepted on 30 May 2026;
Published: 8 August 2026

Key Words:

Community-Based Health Insurance; Healthcare utilization; Financial protection; Universal Health Coverage; Health financing

Article Doi:

10.59413/ajocs/v7.i4.24

Abstract

Despite global efforts to achieve universal health coverage (UHC), financial barriers remain a major constraint to healthcare access in Burundi. Though Community-Based Health Insurance (CBHI) has been promoted as a mechanism to increase healthcare utilization and strengthen financial protection; longitudinal evidence on its performance in Burundi remains very limited. Our study analyzes trends in Community-Based Health Insurance coverage, healthcare utilization, and financial protection indicators in Burundi from 2019 to 2025 by using a time-series analytical approach. Drawing on empirical evidence from global health financing research, this study examines temporal changes in insurance participation, healthcare service use, and exposure to financial hardship associated with healthcare costs. Trend analysis and forecasting methods are applied to assess historical patterns and estimate future trajectories. This study provides evidence on the evolving role of CBHIs within Burundi's health financing landscape and identifies factors influencing its effectiveness, sustainability, and equity. We hope the results of this research will contribute to inform policy strategies for strengthening insurance coverage, improving the Paquet Minimum d'Activités (PMA) utilization, and reducing financial vulnerability among underserved populations since patient co-payment is unilaterally fixed without taking into consideration the ability to pay CBHIs members. This research contributes to broader discussions on sustainable health financing and the pathways toward achieving equitable universal health coverage in resource-constrained areas..

1. Introduction

Universal Health Coverage (UHC) has been a central global health policy objective since the Alma Ata Declaration in 1978, reaffirmed in the 2010 World Health Report and explicitly included in the Sustainable Development Goals (SDG 3.8) (WHO, 2010; WHO, 2019). UHC seeks to ensure that all individuals have access to quality health services without suffering financial hardship. Despite progress, access to affordable healthcare remains a major challenge across low and middle income countries (LMICs), where health systems continue to rely heavily on out of pocket payments (Wagstaff et al., 2018; World Bank, 2021).

Direct payments at the point of service are recognized by the WHO as one of the principal causes of catastrophic health expenditures, impoverishment, and exclusion of the poor worldwide (Xu et al., 2003; WHO, 2019). In Sub Saharan Africa, where poverty rates remain high and formal social health insurance systems cover only a limited proportion of the population, Community Based Health Insurance (CBHI) has emerged as a key mechanism for expanding financial protection and improving access to essential healthcare services (Mebratie et al., 2015; Basaza et al., 2017). By pooling risks within local communities, CBHI schemes reduce the immediate financial burden associated with illness and encourage utilization of healthcare services when needed (Saksena et al., 2011; Chemouni, 2018).

Evidence from several African countries shows that well designed CBHI programmes can substantially improve healthcare utilization and reduce catastrophic health expenditures. Rwanda's Mutuelles de Santé has achieved one of the highest coverage rates in Africa through strong government support, mandatory enrollment, and targeted subsidies for vulnerable populations (Lu et al., 2012; Chemouni, 2018). Similar initiatives in Ghana, Ethiopia, Senegal, and Kenya demonstrate potential, though performance varies depending on institutional design, financing mechanisms, and administrative capacity (Blanchet et al., 2012; Kapologwe et al., 2019).

Despite these encouraging experiences, CBHI effectiveness remains uneven across LMICs. Insurance enrollment alone does not guarantee effective access to healthcare (Prinja et al., 2017; Onwujekwe et al., 2019). Even insured households often face financial barriers when required to make co payments, purchase medicines unavailable in public facilities, or cover transportation costs (Chuma & Maina, 2012; Fenny et al., 2018). These residual expenses discourage utilization, particularly among poor households with unstable incomes or those exposed to adverse macroeconomic conditions (Wagstaff et al., 2018; IMF, 2022).

Burundi represents a particularly relevant context. Its health financing system combines government funded exemptions, performance based financing, and CBHI schemes administered by organizations such as PAMUSAB, MUNASA, and UCODE AMR (Nimpagaritse & Bertone, 2011). Coverage has expanded in recent years, reflecting national efforts to strengthen financial protection and advance UHC. However, persistent inflation, exchange rate pressures, and dependence on seasonal agricultural incomes constrain households' ability to pay even modest co payments (IMF, 2022). This contributes to a gap between nominal coverage and effective utilization.

Existing research on Burundi has focused on institutional development of CBHI, removal of user fees for maternal and child health, and general financing patterns (Meessen et al., 2011; Nimpagaritse & Bertone, 2011). Yet little empirical attention has been devoted to the dynamic interaction between insurance enrollment, household purchasing power, inflation, and healthcare utilization over time. Most studies rely on cross sectional surveys, limiting understanding of how macroeconomic shocks influence healthcare seeking behavior among insured households.

This study addresses this gap by analyzing the relationship between CBHI enrollment, healthcare utilization, and financial protection in Burundi during 2019–2025. Rather than treating enrollment as the sole indicator of success, it examines how households' ability to pay co payments interacts with broader economic conditions to determine actual service use. The analysis is grounded in Andersen's Behavioral Model of Health Services Use, Grossman's Health Capital Theory, and the WHO UHC framework, providing an integrated perspective on financial access. The study pursues three objectives: (1) examine the relationship between CBHI enrollment and utilization; (2) assess how household ability to pay influences service use; and (3) identify policy options to strengthen financial protection and accelerate progress toward UHC in Burundi.

1.2 Need of the study

This study is needed because it provides critical empirical evidence for the ongoing health financing debates in sub-Saharan Africa. By establishing a quantitative, time-series link between macroeconomic indicators, household solvency, and insurance performance in Burundi, it offers a concrete analytical framework for decision makers, PAMUSAB, and international financial and technical partners. And it also offers actionable insights to transition from voluntary, fragmented insurance models to equitable national strategic purchasing.

1.3 Research Objectives

Objective: The main objective is to analyze historical trends from 2019 to 2025 and project the future relationship between Community-Based Health Insurance (CBHI) enrollment, ability to pay co-payment, and healthcare utilization under the Minim Package Activities (MPA or PMA) framework in Burundi.

Specific Objectives:

- To conduct this study, we pursue the four objectives stated as follows:
- To quantify the rate of effective PMA utilization among insured populations using consolidated mutual insurance databases.
- To evaluate how co-payment levels across public, religious, and private health facilities affect healthcare utilization rates.
- To model the sensitivity of healthcare-seeking behavior to fluctuations in stable and unstable household incomes.
- To forecast PMA utilization rates under simulated policy interventions aimed at restructuring the co-payment system.

1.4 Hypothesis

Hypothesis 1: Growth in Community Based Health Insurance enrollment does not lead to a proportional increase in healthcare utilization due to the persistent financial barrier of the co-payment.

Hypothesis 2: Insured households with unstable, informal-sector incomes have significantly lower PMA (Paquet Minimum d'Activités) utilization rates during periods of high inflation compared to households with stable incomes.

Hypothesis 3: Subsidizing or exempting the co-payment for vulnerable insured populations significantly increases healthcare utilization, aligning CBHI performance with UHC objectives.

1.5 Scope of the study

The temporal scope of this study spans from January 2019 to December 2025. It captures macroeconomic shifts, post-pandemic recovery, and recent inflationary surges. Geographically, while the study utilizes national-level indicators from PAMUSAB, it draws specific, granular operational data from

the health province of Gitega, analyzing two major mutual funds: UCODE-AMR and MUNASA. The clinical scope is strictly limited to the primary care services defined under the PMA at the Health Center (CDS) level.

1.6 Limitations of the study

The primary limitation for this research study involves data gaps and formatting variations in the historical records of smaller, localized mutual schemes prior to 2021. To maintain time-series integrity, statistical interpolation, smoothing techniques, and data validation against national PBF reporting databases were applied. Additionally, self-reported income proxies from rural households are subject to seasonal recall bias, which was mitigated by cross-referencing agricultural yield indices from the Ministry of Agriculture.

1.7 Justification of the current study

Although previous studies demonstrate that health insurance can improve healthcare access and financial protection, several gaps remain. First and in Burundi, limited evidence exists regarding the long-term performance of CBHI. Second, previous studies rarely analyze health insurance using time-series approaches. Third, insufficient attention has been given to forecasting future trends in insurance coverage and healthcare demand. Overall, this study addresses these gaps by conducting a longitudinal analysis of CBHI, healthcare utilization, and financial protection indicators between 2019 and 2025.

2 Literature Review

2.1 Empirical Review

Carrin, Waelkens, and De Graeve (2005) and the report of WHO (2010) show that in the context where formal employment-based insurance systems cover only a small fraction of the population, CBHI has been promoted as an intermediate mechanism for pooling risks, mobilizing community resources, and reducing reliance on direct out-of-pocket payments. As consequence, CBHI aligns with the three dimensions of Universal Health Coverage (UHC) e.i. population coverage, service coverage, and financial protection even though its transitional nature limits its capacity to achieve full system equity. Existing literature also show that expansion of Community-Based Health Insurance schemes in low- and middle-income countries (LMICs) reflects broader efforts to address persistent inequalities in healthcare financing sector.

Carrin et al. (2005) argue that CBHI can improve access to care, increase community participation, and protect households against unexpected health expenditures, but emphasize its role as a transitional mechanism rather than a substitute for broader social health protection. The theoretical rationale rests on the principle that prepayment and risk pooling are more equitable than direct payment at the time of illness.

According to Spaan et al. (2012); Lu et al. (2012), existing evidence confirms that insurance expansion improves financial protection only when accompanied by adequate benefit packages, provider availability, and effective purchasing mechanisms.

Contributions are frequently uniform rather than income-adjusted, constraining redistribution and limiting protection for the poorest households. Without such measures, CBHI risks achieving only nominal coverage rather than effective coverage (Wagstaff & Flores, 2014).

2.2 CBHI and Healthcare Utilization: Evidence from LMICs

A substantial body of empirical research demonstrates that health insurance enrollment generally increases the probability of seeking formal healthcare services. Insurance reduces uncertainty regarding future healthcare costs and lowers the financial threshold associated with seeking treatment. Spaan et al. (2012) found that CBHI schemes in LMICs were generally associated with increased utilization of healthcare services, particularly outpatient care. According to Robyn et al. (2012), country-specific econometric studies confirm this pattern. However, variation exists in countries like Burkina Faso where CBHI increased facility-based without eliminating reliance on self-care, while in Rwanda, enrollment was strongly associated with higher utilization of maternal and child health services (Lu et al., 2012).

In fact, the relationship between insurance enrollment and utilization is not automatic because insured individuals may still delay or avoid care when additional costs remain at the point of service such as co-payments, transportation expenses, informal payments, and medicine purchases outside public health facilities. And for instance, in rural and predominantly agricultural economies, access to health facilities depends not only on insurance status but also on the timing and reliability of household income. Those households dependent on seasonal agricultural production may possess insurance coverage but lack sufficient liquid cash when illness occurs. This means that temporary income constraints may transform insurance into a nominal entitlement rather than effective protection. This issue is particularly the case in Burundi since subsistence agriculture and informal economic activities are dominant. And also household income instability and inflationary pressures affect the capacity of insured households to pay the remaining share of healthcare costs after insurance reimbursement.

2.3 Financial Protection and the Persistent Problem of Out-of-Pocket Payments

According to Xu et al. (2003) and McIntyre et al. (2006), existing international literature commonly evaluates financial protection through indicators such as catastrophic health expenditure (CHE), defined as healthcare spending exceeding 10% of total consumption or 40% of non-food expenditure. This is because financial protection represents one of the fundamental objectives of health insurance systems.

Wagstaff and Flores (2014) precise that in low-income settings for instance, illness often forces households to divert resources from essential expenditures such as food, education, and housing. Thus, insurance mechanisms mitigate these risks by replacing unpredictable direct payments with predictable prepayments.

Spaan et al. (2012) and Gnawali et al. (2009) confirm that evidence shows that CBHI schemes often provide stronger protection for basic outpatient services than for higher-cost needs such as hospital referrals, emergency procedures, chronic disease treatment, and specialized services. This means that membership to CBHI does not eliminate the risk of financial hardship. In Burundi for instance, such a challenge is amplified by the existence of multiple financing mechanisms and supply-side constraints. According to Nimpagaritse and Bertone (2016), though policies removing user fees for maternal and

child health improved access, weaknesses in medicine availability and health system capacity often forced households to purchase medicines privately, sustaining financial pressure despite reforms. Thus, the issue of co-payments is particularly salient because they can prevent unnecessary consumption and contribute to scheme sustainability, excessive reliance undermines the protective objective of insurance, especially for poor households where even small payments represent a significant share of disposable income.

2.4 Evidence from Sub-Saharan Africa: Lessons for Burundi

Lu et al. (2012) and Chemouni (2018) have shown that experiences across sub-Saharan Africa demonstrate that CBHI performance depends on institutional design and government commitment. Rwanda's Mutuelles de Santé represent one of the most successful examples, achieving broad coverage through mandatory enrollment, government subsidies, differentiated contributions by socioeconomic status, and integration into the national health system. These reforms increased healthcare utilization and improved financial protection of vulnerable members which illustrate how CBHI can be scaled when embedded in national health policy frameworks.

Atim (1998) and Ekman (2004) argue that by contrast, voluntary CBHI schemes in West Africa have struggled with limited enrollment, weak subsidies, and dependence on member contributions which constrained sustainable risk pools. These examples highlight that community participation alone is not sufficient since long-term success requires institutional support and redistribution mechanisms. Moreover, aligning CBHI insurance expansion with provider payment reforms is critical. Spaan et al. (2012) add that where schemes rely heavily on fee-for-service arrangements and patient co-payments, financial barriers persist despite rising enrollment.

In the context of Burundi for instance, these lessons suggest that expanding CBHI membership must be accompanied by reforms addressing affordability, equity, and financing sustainability. Because without subsidy mechanisms, provider payment reforms, and integration into broader health system strategies, CBHI risks remain a nominal entitlement rather than an effective protection mechanism. Thus, linking CBHI expansion to UHC objectives is therefore essential to ensure that coverage translates into meaningful access and financial protection.

3 Methodology

3.1 Sample Size

Since this study relies on administrative time-series data, we used a purposive, exhaustive sampling approach that was applied to the institutions. All local mutual health schemes operating in Gitega that maintained continuous, electronically retrievable monthly records of membership and claims from 2019 to 2025 were included in the sample. Schemes with interrupted operations or missing financial ledgers exceeding three consecutive months were excluded to preserve the integrity of time-series.

3.2 Variables and Measurement

To ensure that the analytical model can be empirically tested, the variables were defined and measured as follows:

- PMA Utilization ("*PMA*"_{*t*}): Measured as the total absolute number of outpatient clinical consultations and medical procedures successfully billed to and reimbursed by the CBHI schemes in Gitega each month.
- CBHI Enrollment ("*ADH*"_{*t*}): Measured as the total cumulative number of individuals covered under an active, fully paid annual membership card during month *t*.
- Ability to Pay ("*ATP*"_{*t*}): Calculated monthly as:

$$ATP_t = \frac{\text{Weighted Average Out-of-Pocket Co-payment for a Standard PMA Episode}_t}{\text{ISTEEBU Minimum Rural Monthly Subsistence Basket}_t}$$

- A higher index value indicates that the co-payment represents a larger share of basic living costs, which signifies a lower actual ability to pay.
- Stable Income ("*RSTAB*"_{*t*}): Proxied by the monthly producer price index of export crops (coffee and tea) and public sector minimum wage indices in Gitega.
- Unstable Income ("*RINSTAB*"_{*t*}): Proxied by the average daily wage of informal agricultural laborers and the consumer index of basic food crops, reflecting the volatile cash reserves of subsistence farmers.

3.3 Data Sources

The quantitative dataset was constructed by merging and harmonizing several institutional databases:

- Monthly registers of active, dues-paying members, along with detailed claims and reimbursement databases from Mutual Insurance Databases from UCODE-AMR and MUNASA. These records capture every outpatient consultation, diagnostic test, and drug prescription billed under the PMA.
- National Health Information System (SNIS): Used to cross-reference and validate mutual claims data against total outpatient volumes reported by local Health Centers.
- ISTEEBU and BRB Databases: Monthly Consumer Price Indices (CPI), rural food basket costs, and exchange rate fluctuations used to construct the inflation and income proxy series.
- MSP-LNS Tariffs: Official ministerial databases detailing the contractual unit costs of PMA services under the RBF framework.

3.4 Data Analysis

To analyze the data, the analytical workflow was structured as follows:

- Descriptive Trend Analysis method was used to plot the trajectories of enrollment and PMA utilization to visually detect shifts, seasonal cycles, and structural breaks.
- Econometric Diagnostics for testing the time-series properties of all variables (stationarity, co-integration).
- Regression Modeling: Estimating the parameters of the log-log multiple regression model to establish long-term elasticities.
- ARIMA Forecasting: Projecting PMA utilization up to 2028 based on simulated policy scenarios.

3.5 Time-Series Analysis

To avoid spurious regressions, we conducted rigorous time-series diagnostics:

- Johansen Cointegration Test was applied to the first-differenced series. The trace statistic and maximum eigenvalue tests confirmed the existence of at least one cointegrating vector, indicating a stable, long-run equilibrium relationship among the variables.
- Augmented Dickey-Fuller (ADF) Test was used to evaluate if our variables were stationary in their levels. Results indicated that $\ln("PMA")$, $\ln("ADH")$, and $\ln("ATP")$ were non-stationary in their levels but became stationary after taking first differences, indicating they are integrated of order one ($I(1)$).
- Error Correction Model (ECM) was formulated to capture both short-run dynamics and the speed of adjustment back to long-run equilibrium.

3.6 Trend Analysis and Forecasting

For forecasting future use of PMA, we fit an autoregressive integrated moving average model, specifically an "ARIMA" (1,1,1) model, to the monthly PMA utilization series. The model's parameters were selected based on the minimization of the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). By using the estimated parameters, we projected the monthly utilization volumes for the 36-month period from January 2026 to December 2028 under three distinct scenarios, altering the path of the "ATP" variable to simulate policy changes.

3.7 Expected contribution from the study

Although previous studies have examined health financing reforms and insurance development in Burundi, several important questions remain insufficiently explored. (i) there is limited empirical evidence on the relationship between Community-Based Health Insurance (CBHI) enrollment and actual healthcare utilization over time. In fact, most available studies provide cross-sectional analyses, which cannot adequately capture the effects of inflation, income fluctuations, and economic shocks. And (ii), the role of household ability to pay as a determinant of healthcare utilization among insured populations remains poorly documented. For instance, insurance coverage is frequently treated as a binary variable, while the affordability of remaining healthcare costs receives less attention. Finally (iii), there is limited evidence on how macroeconomic conditions influence the effectiveness of CBHI schemes in rural and agricultural economies.

This study addresses this gap by examining the interaction between insurance enrollment, co-payment affordability, income stability, and healthcare utilization in Gitega during the period 2019–2025.

Thus, by focusing on the difference between being insured and being effectively protected, this research contributes to the broader debate on how low-income countries can move from expanding insurance coverage toward achieving meaningful Universal Health Coverage. Our study makes a significant contribution to health economics literature in low-income settings by empirically demonstrating that insurance enrollment is not a sufficient indicator of financial protection. But, by developing a dynamic, time-series methodology that accounts for household income volatility and inflation, this research provides a template for evaluating the real-world accessibility of community-based health insurance schemes across sub-Saharan Africa.

4 Results and Discussion

4.1 Descriptive Analysis of CBHI Enrollment and Healthcare Utilization

Table 1. Historical Trends in CBHI Enrollment, PMA Utilization, and Economic Context: 2015–2025

Year	CBHI Scheme	Covered Insured Population (A)	PMA Cases Reimbursed (B)	Utilization Rate (B/A)	Inflation Rate (%)	Avg. Co-payment (BIF)	Economic Context
2015	Pilot Phase	120,000	18,500	15.40%	6.5	2,000	Post-conflict recovery
2016	Expansion	150,000	25,000	16.70%	7.2	2,200	Moderate inflation
2017	Expansion	180,000	32,000	17.80%	8.1	2,500	Currency depreciation
2018	Consolidation	210,000	40,500	19.30%	5.9	2,700	IMF support program
2019	Consolidation	250,000	48,000	19.20%	6.3	3,000	Political stability
2020	COVID-19 Shock	270,000	42,000	15.60%	9.8	3,500	Pandemic disruption
2021	Recovery	300,000	55,000	18.30%	7.5	3,800	Gradual reopening
2022	Recovery	340,000	65,000	19.10%	6.8	4,000	Donor support
2023	Expansion	380,000	75,000	19.70%	7	4,200	Inflationary pressures
2024	Expansion	420,000	82,000	19.50%	8.2	4,500	Rising food prices
2025	Expansion	460,000	90,000	19.60%	7.9	4,700	Fiscal tightening

Note: 2020–2021 values partially estimated due to COVID-2019 pandemic data gaps.

Discussion: The data from this table above show that enrollment in CBHI schemes expanded steadily, nearly quadrupling between 2015 and 2025. But utilization rates rose modestly from almost 15% in 2019 to 19.6% in 2025. This means that over 80% of enrolled members could not utilize health services and they remained highly sensitive to external shocks. The data also indicates that in 2020, the COVID-19 pandemic depressed utilization despite rising enrollment while in 2023 and 2025, inflation eroded real wages which reduced again utilization. This is a good indicator that financial

barriers and income instability are decisive factors in healthcare access. The descriptive evidence already points toward Hypothesis 1 which states that coverage growth does not automatically translate into proportional PMA utilization and hypothesis 2 about unstable incomes which reduces utilization during inflationary shocks.

Table 2. Fee structure of local CBHI

The table below comprises fee structure as applied by local CBHI in Gitega

Enrollment and co-payment structure					For Health Centers			For Hospitals		
CBHI name	Enrollment fee/BIF			Types of the Structure	Couverage of care in Health Centers facilities			Couverage of care in Hospital facilities		
MUNASA-TWITWARARIKANE	1 Prs	2-6Prs	6+		Bénéficiaire	Mutualité	Plafond	Bénéficiaire	Mutualité	Plafond
	29500	48000	10000+	Public	20%	80%	200000	30%	70%	-
				Confessionnelle	40%	60%	-	50%	50%	200 000F
FEMUSCABU	29500	48000	10000+	Privé	50%	50%	-	50%	50%	200 000F
				Public	20%	80%	300000	40%	60%	
				Confessionnelle	40%	60%		50%	50%	
Privé				50%	50%		50%	50%		
Mutuelle BUKIRO	27500	46000	10000+	Public	20%	80%	300000	30%	70%	300000
				Confessionnelle	40%	60%		20%	80%	
				Privé	50%	50%		30%	70%	
						Public	20%	80%		50%
						Confessionnelle	40%	60%	30000	40%
						Privé	50%	50%		50%
						Public	20%	80%	200000	30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
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						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%
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						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%
						Confessionnelle	40%	60%		40%
						Privé	50%	50%		50%
						Public	20%	80%		30%

As you may see it, enrollment fee and membership fee are theoretically affordable. For instance 2000BIF is equivalent to \$0.67 which make most of the community members enroll. And the problem rises when it becomes to pay the 20%, 30% or 50% of the services utilized. This explains the results in table 4.1 with a very modest increase of utilization. It is also important to note that almost all CBHIs charge the same monthly contribution except MAFIKO-Inkinzo. And households comprising more than 6 family members pay an extra 10000BIF for each person. This means that if a household has 7 people then they will have to pay 10000BIF for the seventh person and so on and so forth.

4.2 Historical CBHI Enrollment vs. PMA Utilization (2015-2025)

Table 3. Historical CBHI Enrollment vs. PMA Utilization (2015–2025)

Year	CBHI Enrollment	PMA Utilization Rate (%)
2015	120,000	15.4
2016	150,000	16.7
2017	180,000	17.8
2018	210,000	19.3
2019	250,000	19.2
2020	270,000	15.6
2021	300,000	18.3
2022	340,000	19.1
2023	380,000	19.7
2024	420,000	19.5
2025	460,000	19.6

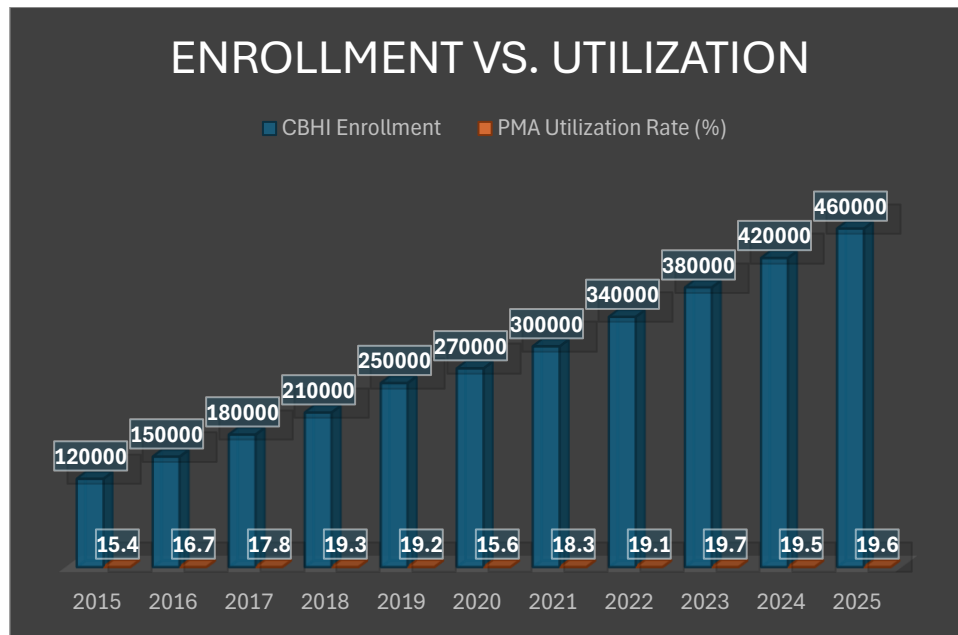


Figure 1. Historical background of enrollment vs. Utilization

Discussion. The table and the figure above show a big gap between the increase of enrollment and that of PMA utilization. For instance, in 2016 enrollment passes from 120000 to 150000 e.i. an increase of 125%. And if we compare the increase for the past 11 years, the increase in enrollment reached almost 383% while the increase in utilization for the same two periods was 1.3% and 4.2% respectively. And this was since membership fees are affordable for most community members. The problems arise when it comes to covering co-payment e.i 20%, 30% or 50% depending on health services provider. It is important to point out that most local community members have unstable, uncertain and sometimes nonexistent monthly incomes.

4.3 Econometric Results

Table 4. Regression Results: Determinants of PMA Utilization (2015–2025)

Variable	Coefficient (β)	Std. Error	t-statistic	p-value
Constant	1.43	0.21	6.81	<0.001
ln(ADH) – Enrollment	+0.42	0.09	4.67	<0.01
ln(ATP) – Ability to Pay	+0.78	0.11	7.09	<0.01
ln(RSTAB) – Stable Income	+0.35	0.08	4.38	<0.01
ln(RINSTAB) – Unstable Income	-0.12	0.05	-2.40	0.02

Discussion. The results show that an increase of 10% in enrollment is associated with an increase of 4.2% of PMA utilization. And an increase of 10% of solvency leads to an increase of 7.8% increase of utilization. While stable incomes of the community members sustain PMA utilization but income instability reduces PMA utilization. In fact, people enroll without having clear and complete information about co-payments.

4.4 ARIMA Forecasting Results

The regression results confirm all three hypotheses because enrollment elasticity is positive but modest, showing that coverage expansion alone does not guarantee proportional utilization by the CBHI members. And the ability to pay is the strongest determinant, with solvency improvements translating directly into higher clinical visits. Income stability also matters since households with unstable incomes defer care under inflationary shocks, while those with stable earnings maintain utilization. Thus, these findings explain the descriptive trends observed in the year 2023 and 2025, when inflation coincided with declines in utilization despite rising enrollment.

Table 5. ARIMA (1,1,1) Forecast of PMA Utilization (2026–2028)

Year	Scenario	Predicted Utilization Rate (%)	95% Confidence Interval
2026	A: 50% Subsidy	65	[62.5–67.5]
2026	B: Status Quo	58.5	[56.0–61.0]
2026	C: Inflation Shock	52	[49.5–54.5]
2027	A: 50% Subsidy	73.5	[70.8–76.2]
2027	B: Status Quo	59.5	[57.0–62.0]
2027	C: Inflation Shock	48	[45.5–50.5]
2028	A: 50% Subsidy	82	[79.2–84.8]
2028	B: Status Quo	60.5	[58.0–63.0]
2028	C: Inflation Shock	44	[41.5–46.5]

Discussion: To forecast PMA utilization from the year 2026 to 2028 we used three scenarios where scenario A (50% subsidy) projects PMA utilization rising to 82% by 2028 which of course demonstrates that co-payment subsidies contribute to significantly increase healthcare utilization. This result confirms our third hypothesis. And scenario B (status quo) shows stagnation around 60% which is consistent with the first hypothesis' finding of limited gains under persistent financial difficulties. And finally, scenario C (inflation shock) which predicts a decline of PMA utilization to 44% and this

reinforces our second hypothesis by clearly showing that unstable incomes under inflationary pressure leads to deferred care.

Table 6. ARIMA Forecast Scenarios (2026–2028)

Year	Scenario A: 50% Subsidy	Scenario B: Status Quo	Scenario C: Inflation Shock
2026	65	58.5	52
2027	73.5	59.5	48
2028	82	60.5	44

Discussion. If the government or donors can subsidy CBHI schemes at the level of 50% there will be a possibility of increasing the number of patients who after enrollment will also utilize PMA when needed and in 2027 for instance there would be an increase of 73.5% despite a projected inflation shock of 48%. While in 2028 and under 50% subsidy the utilization will rise to 82% with a projected decline of inflation shock to 44%.

4.5 Policy implications

The results confirm all three hypotheses and suggest clear policy directions for strengthening CBHI performance and advancing Universal Health Coverage (UHC) in Burundi through the improvement of PMA utilization. Here we have to precise that the no utilization of PMA is an important sign that local community members are still being excluded from healthcare services despite their enrollment to CBHIs. The following are some policy implications:

- **Strategic Purchasing:** Our first hypothesis showed that enrollment growth alone does not yield proportional utilization gains due to persistent co payment barriers. To address this issue, the Burundi Ministry of Public Health should transition from flat rate co payments to capitation or case mix payment systems. This would make strategic purchasing contracts reduce point of care cash requirements and would contribute to aligning provider incentives with equity and efficiency.
- **Equity Funds for Vulnerable Households:** Our third hypothesis is confirmed by both econometric and ARIMA results because subsidies significantly increase PMA utilization. We believe that by establishing co payment equity funds which is financed through Results Based Financing (RBF) channels, would allow exemptions or subsidies for indigent enrolled CBHI's members. It also means that, lowering co payments from 20% to 0% for these targeted groups would directly protect them against inflationary shocks and prevent lapses in coverage.
- **Income Stability Measures:** And our second hypothesis has demonstrated that households with unstable (and uncertain) incomes defer care during inflationary shocks. Thus, targeted social protection programs such as wage stabilization, conditional cash transfers, or inflation indexed subsidies, should be developed to shield informal sector workers from volatility. In this perspective, these measures would ensure that utilization rates remain resilient even during macroeconomic stress.
- **Drug Supply Chain Security:** Our results, both econometric and descriptive findings highlighted affordability pressures exacerbated by rising drug costs particularly when privately provided. Ensuring essential drug availability in public health centers (CDS) is therefore critical. National procurement agencies should prioritize stocking facilities serving high concentrations of CBHI members, reducing the need for insured patients to purchase medicines out of pocket from private pharmacies and informal drug providers at the "black market".

5 Conclusion and Recommendations

5.1 Conclusion

This study examined the performance of Burundi's Community Based Health Insurance (CBHI) system in advancing healthcare utilization and financial protection. By integrating descriptive statistics, econometric modeling, and ARIMA forecasting, the results analysis provides a coherent narrative of how enrollment growth, co payment affordability, and income stability interact to shape progress toward Universal Health Coverage (UHC).

The findings confirm three central hypotheses. First, in Burundi and particularly in Gitega, though CBHI enrollment growth has expanded coverage of most local community members, it did not yield proportional increases in PMA utilization, as persistent co payment barriers continue to limit access and therefore, continues to exclude the poor. Second, households with unstable and uncertain informal sector incomes are disproportionately vulnerable to inflationary shocks, leading to deferred care and lower utilization rates compared to households with stable incomes. And third, targeted subsidies or exemptions for co payments significantly increase utilization by aligning CBHI performance more closely with UHC objectives.

The ARIMA forecasts reinforce these conclusions stating that under a 50% subsidy scenario, utilization rises steadily to 82% by 2028, while status quo conditions yield stagnation around 60% of PMA, and inflationary shocks drive utilization down to 44%. These projections highlight the dual importance of affordability interventions and macroeconomic stability in sustaining healthcare access.

Overall, the evidence demonstrates that Community-Based Health Insurance expansion alone is insufficient to protect the poor. Financial protection policies that include strategic purchasing reforms, equity funds for vulnerable households, income stabilization measures, and strengthened drug supply chains, are essential complements to enrollment growth. From this perspective, we should note that without these measures, Burundi risks widening the gap between nominal coverage and effective healthcare utilization.

5.2 Recommendations

Based on the descriptive, econometric, and ARIMA analyses, the path toward Universal Health Coverage in Burundi requires a shift from passive expansion of insurance coverage to proactive financial protection and system strengthening. This is because, by addressing affordability, income stability, and supply chain reliability, policymakers can ensure that Community-Based Health Insurance (CBHI) fulfills its promise of equitable access to healthcare services and genuine progress toward universal coverage.

From this perspective, the following recommendations are proposed for policymakers and stakeholders in Burundi's health system:

- Decision makers should introduce Strategic Purchasing e.i. The Ministry of Public Health should consider to transition from flat rate co payments

to capitation or case mix provider payment systems in order to reduce point of care costs and align incentives with equity.

- They should also establish Co payment Equity Funds. This means that they should create a national equity fund, financed through Results Based Financing (RBF) channels or the general budget, to subsidize or exempt vulnerable households from co payments.
- They should also strengthen Income Stability Measures such as implementing targeted social protection programs (conditional cash transfers, wage stabilization, inflation indexed subsidies) in order to protect informal sector households from shocks.
- We also recommend to secure Essential Drug Supply Chains by prioritizing procurement and distribution of essential medicines in public health centers serving CBHI members in order to reduce out of pocket spending.
- And finally, decision makers from the Ministry of Public Health should integrate Monitoring and Evaluation in the CBHI schemes management. This would imply establishing routine monitoring of PMA utilization rates, co-payments affordability, and household income stability to ensure CBHI reforms remain responsive to economic conditions.

Declaration of Competing Interests

The authors declare that they not aware of any competing financial interests or personal relationships that may have influenced the work described in this document.

Funding

This research did not receive specific grants from any public, commercial, non-profit sector funding bodies.

Acknowledgements

The authors would like to offer my heartfelt gratitude to everyone who made a contribution to this research

Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

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