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Active membership and claim pressure in Indonesia's national health insurance: An exploratory regression study of BPJS Kesehatan monitoring data

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ABSTRACT

Indonesia's Jaminan Kesehatan Nasional (JKN), administered by BPJS Kesehatan, is one of the world's largest single-payer social health insurance programs and has become central to Indonesia's progress toward universal health coverage. Yet high population registration is not identical to fiscal sustainability. This study examines whether the active population coverage rate is associated with claim pressure and financial resilience in JKN during the 2023-2024 monitoring period. The analysis uses official aggregate data from Dewan Jaminan Sosial Nasional's Monthly Report Monitoring JKN as of December 31, 2024. The data set contains 11 monthly observations for which active coverage, registered participants, active participants, net Dana Jaminan Sosial (DJS) health assets, fund resilience, and the claim ratio could be extracted consistently from public reporting. Ordinary least squares regressions with heteroskedasticity-robust standard errors were estimated. Descriptive results show that active population coverage increased from 76.07% in December 2023 to 78.83% in December 2024, while the claim ratio remained above 100% in every observed month. In the simplest specification, a one percentage-point increase in active population coverage was associated with a 1.84 percentage-point lower claim ratio. This relationship became statistically non-significant after adding a monthly trend, indicating that the observed association should be interpreted as exploratory rather than causal. The findings suggest that improving active membership is necessary for revenue adequacy but insufficient on its own; health economics policy should also address utilization growth, hospital payment incentives, chronic disease management, and contribution compliance. The paper contributes a transparent regression template for further BPJS research using microdata or provincial panels.

Keywords: BPJS Kesehatan; Jaminan Kesehatan Nasional; universal health coverage; claim ratio; health financing; Indonesia; regression analysis.

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1. INTRODUCTION

Indonesia's National Health Insurance program, Jaminan Kesehatan Nasional (JKN), was launched in 2014 and is administered by Badan Penyelenggara Jaminan Sosial Kesehatan (BPJS Kesehatan). The program consolidated several insurance arrangements into a national purchasing and risk-pooling framework intended to expand access, reduce financial barriers, and move Indonesia toward universal health coverage (Agustina et al., 2019; Mboi, 2015; Pisani et al., 2017). In a country with a large population, wide geographic variation, and a substantial informal labor force, JKN is not only a health-sector intervention; it is also a major public finance and labor-market institution. Decisions about benefit packages, contribution rates, subsidy targeting, provider payment, and membership activation have implications for households, providers, local governments, and national fiscal space.

The policy challenge has shifted from registration alone toward effective coverage and financial sustainability. Population registration demonstrates institutional reach, but active membership indicates whether registered individuals are current contributors or properly subsidized beneficiaries. From a health economics perspective, the active membership rate matters because contribution flows, cross-subsidization, and risk pooling depend on whether members remain in good standing. At the same time, access improvements can generate higher utilization and claims, especially when previously uninsured people begin using outpatient, inpatient, and referral services. Indonesia's experience therefore illustrates a classic universal health coverage tension: broader entitlement is desirable, but the insurance fund must remain able to pay claims without accumulating unsustainable deficits.

The literature on Indonesian health insurance has documented important effects on utilization, equity, and out-of-pocket spending. Earlier social insurance reforms for the poor increased use of health services and helped reveal the importance of targeting and supply capacity (Johar, 2009; Sparrow et al., 2013). Studies of JKN and related programs show that public insurance can increase service use, especially among lower-income groups, although the effects vary by region, education, and provider availability (Putri et al., 2023). Other papers emphasize that formal coverage does not always eliminate financial burden. Out-of-pocket payment, catastrophic spending, and uneven benefit incidence remain concerns, especially for vulnerable households and people living outside major urban centers (Asante et al., 2023; Fattah et al., 2023; Maulana et al., 2022).

A second strand of research focuses on governance and political economy. Pisani et al. (2017) characterize Indonesia's path to universal health coverage as a political journey that required institutional negotiation, financing compromise, and continuing adjustment. Banerjee et al. (2021) show experimentally that administrative frictions and behavioral factors are central to insurance enrollment in developing-country settings. Dartanto et al. (2020) further highlight difficulties in sustaining premium payment among informal workers, who often face volatile income and weak enforcement. These studies imply that coverage expansion is not a one-time administrative event. It is a continuing process of enrolling, retaining, subsidizing, and reactivating members while aligning provider incentives with population health needs.

Despite these contributions, there remains a practical gap for health economics monitoring. Public discussion often reports headline JKN coverage, total membership, benefit spending, and claim ratios, but fewer studies use routinely published monitoring data to explore the relationship between active membership and financial pressure. Aggregate monitoring data cannot replace microdata, causal identification, or provincial panel analysis. However, it can provide an accessible empirical template for journal audiences and policy analysts. A transparent regression using official aggregate values can clarify what public data show, what they cannot show, and which hypotheses should be tested with richer BPJS sample data, Susenas, provider claims, or provincial administrative panels.

This study addresses that gap by examining the association between active population coverage and the JKN claim ratio using official DJSN monitoring data for December 2023 through December 2024. It also explores whether claim pressure is associated with DJS health assets and fund resilience. The research question

is: to what extent is active JKN membership associated with claim pressure and financial resilience during the most recent publicly reported monitoring period? The contribution is threefold. First, the paper converts official monitoring indicators into a reproducible regression dataset. Second, it provides an original empirical analysis linking active membership and claim pressure. Third, it situates the findings in a broader policy discussion about contribution compliance, benefit design, purchasing, and equity.

2. CONCEPTUAL FRAMEWORK AND LITERATURE POSITIONING

The conceptual framework combines the behavioral model of health service use with the health financing functions of revenue collection, pooling, and purchasing. Andersen's behavioral model treats service use as a function of predisposing characteristics, enabling resources, and need (Andersen, 1995). JKN membership is an enabling resource because it reduces the price barrier at the point of care, creates a formal path into contracted providers, and gives households a stronger reason to seek care when symptoms arise. However, the enabling effect is weaker when membership is inactive, when households face non-medical costs, when providers are geographically distant, or when patients must pay informally or purchase medicines outside the covered package. This is why active membership is a more meaningful indicator than registration alone for a health economics analysis of BPJS Kesehatan.

The health financing framework adds a fund-level perspective. Revenue collection determines how contributions, government subsidies, and other income enter the scheme. Pooling determines whether these resources can cross-subsidize across income groups, regions, ages, and health risks. Purchasing determines how pooled funds are transferred to providers and whether payment methods generate efficient service delivery (Kutzin, 2013). The claim ratio is a compact indicator that links these functions. It does not explain why claims rise or revenue falls, but it signals whether benefit payments are moving faster than contribution revenue. A claim ratio above 100% is not automatically a crisis in a given month, but persistent values above 100% raise questions about tariff levels, contribution compliance, utilization appropriateness, and reserve adequacy.

The literature suggests four mechanisms through which active coverage can relate to claim pressure. The first is a revenue mechanism: active members are more likely to generate regular contributions, either directly or through government-paid premiums for subsidized groups. The second is a risk-pooling mechanism: higher active coverage can bring healthier and lower-cost members into the paying pool, lowering average claims if the newly active population is not disproportionately ill. The third is a utilization mechanism: insurance reduces the effective price of care, so active coverage can raise claims when previously uninsured or inactive members begin to use services. The fourth is a compliance and timing mechanism: administrative activation, arrears payment, contribution collection, and claims payment may occur in different months, creating short-term accounting patterns that do not represent long-term actuarial balance.

These mechanisms explain why a simple regression can generate a negative, positive, or unstable association between active coverage and the claim ratio. If revenue and risk-pooling effects dominate, active coverage may be associated with a lower claim ratio. If newly active members have pent-up demand or if providers respond to coverage expansion by increasing reimbursable services, active coverage may be associated with higher claims. If both processes occur at once, the aggregate association may depend on the short period observed. This ambiguity makes Indonesia an important case for applied health economics because the JKN system is large enough for small percentage changes to represent millions of people and trillions of rupiah.

Prior empirical findings reinforce this framework. Insurance expansion in Indonesia has increased utilization, but the distribution of benefits has not always been equal across regions and income groups (Pratiwi et al., 2021). Studies of out-of-pocket payment show that formal

The paper also uses the distinction between breadth, depth, and height of coverage. Breadth refers to who is covered, depth refers to which services are covered, and height refers to the share of cost prepaid by the scheme rather than paid by households at the point of care. BPJS Kesehatan has made substantial progress on breadth, but active membership is closer to effective breadth than registration because it captures whether the entitlement can be used without administrative interruption. The claim ratio, by contrast, reflects pressure created by the interaction of breadth, depth, and height. A broad benefit package with low cost sharing will protect households, but it requires adequate revenue and efficient purchasing. This framework justifies linking active coverage to claim pressure while also warning against treating any single indicator as sufficient (See Table 1).

Table 1. Peer-reviewed Scopus/Web of Science-oriented literature corpus informing the study

No.	Paper	Journal	Use in this manuscript
1	Agustina et al. (2019)	The Lancet	Comprehensive assessment of Indonesia UHC progress and system challenges.
2	Pisani et al. (2017)	Health Policy and Planning	Political economy of Indonesia on the road to UHC.
3		Health Systems & Reform	Early policy commentary on Indonesia moving toward UHC.
4	Mboi et al. (2018)	The Lancet	Burden-of-disease and provincial health system context for Indonesia.
5	Banerjee et al. (2021)	American Economic Review	Experimental evidence on enrollment barriers and insurance take-up.
6		International Journal of Public Health	Panel evidence on public health insurance and health care utilization.
7	Erlangga, Suhrcke, Ali, and Bloor (2019)	PLOS ONE	Systematic review of public insurance effects in low- and middle-income countries.
8	Sparrow et al. (2013)	Social Science & Medicine	Impact of social health insurance for the poor before JKN.
9	Johar (2009)	Journal of Health Economics	Health card program evidence using matching estimators.
10	Maulana et al. (2022)	PLOS Global Public Health	JKN coverage and out-of-pocket payments among vulnerable populations.
11	Nugraheni et al. (2020)	PLOS ONE	JKN and delivery service costs.
12	Fattah et al. (2023)	International Journal for Equity in Health	Catastrophic health spending in Indonesian households.
13	Asante et al. (2023)	The Lancet Global Health	Benefit and burden incidence of health financing in Indonesia.
14	Putri et al. (2023)	BMC Public Health	Predictors of JKN membership among the poor.
15		BMC Health Services Research	Determinants of health care utilization under JKN.
16	Nugroho et al. (2023)	Asian Pacific Journal of Cancer Prevention	Income disparity and health care utilization using JKN claim data.
17	Misnaniarti et al. (2025)	PLOS ONE	Socioeconomic factors related to national health insurance membership.
18	Widiarti and Idris (2022)	Makara Journal of Health Research	Independent JKN ownership among reproductive-aged women.
19	Dartanto et al. (2020)	Applied Health Economics and Health Policy	Premium payment regularity in the informal sector.
20	Pratiwi et al. (2021)	BMJ Open	Access, equity, and progress toward universal health coverage in Indonesia.
21	Kutzin (2013)	Bulletin of the World Health Organization	Conceptual link between health financing, UHC, and performance.
22	Xu et al. (2003)	The Lancet	Catastrophic health spending framework for financial protection.

Note. The corpus includes peer-reviewed international journal articles commonly indexed in Scopus and/or Web of Science. Index coverage can change over time and should be verified immediately before submission.

3. METHOD

Study design. This paper uses an observational, aggregate, monthly regression design. The unit of analysis is the JKN monitoring month rather than the individual, household, provider, or province. The design is appropriate for a first-stage financial monitoring question because the outcomes of interest, including the claim ratio and DJS health asset position, are reported at the national fund level. The design is not suitable for causal claims about how a particular policy changed membership behavior or utilization. Instead, the analysis is positioned as an exploratory health economics study that can be replicated and extended with richer data.

Data source. The data were extracted from the official DJSN Monthly Report Monitoring JKN as of December 31, 2024. The report presents national JKN indicators, including registered participants, active participants, active population coverage, provider partnerships, utilization, benefit payments, net DJS health assets, fund resilience, and claim ratio. Because the public report presents monthly graphs rather than a downloadable spreadsheet for all indicators, the values used here were manually transcribed from the figures and text and checked for internal consistency. The claim-ratio graph provided consistent observations for December 2023, January-June 2024, and September-December 2024; July and August 2024 were not used because the public figure did not provide equally legible values for the regression series. The final analytic dataset therefore contains 11 monthly observations.

Variables. The dependent variable in the main model is the JKN claim ratio, defined as benefit payments divided by contribution revenue and expressed as a percentage. A claim ratio above 100% means that benefits paid during the period exceeded contribution revenue for the period. The main explanatory variable is active population coverage, expressed as the percentage of the national population registered as active JKN participants. Secondary outcomes are fund resilience, measured in months, and net DJS health assets, measured in rupiah trillion. Registered participants and active participants are included descriptively to show scale but are not placed simultaneously in the regression with active coverage because they are highly collinear in this short monthly series.

Statistical model. Ordinary least squares (OLS) was used because the variables are continuous aggregate indicators and the objective is to estimate a transparent linear association. Heteroskedasticity-robust HC1 standard errors were reported to reduce reliance on constant-variance assumptions. The main model estimates $\text{ClaimRatio}_t = \alpha + \beta \text{ActiveCoverage}_t + \epsilon_t$. A second model adds a linear monthly trend to assess whether the membership association remains after accounting for time ordering. Supplementary models regress fund resilience and net DJS assets on claim ratio. These models are deliberately parsimonious because the sample has only 11 observations. Adding many covariates would create unstable estimates and a misleading impression of precision.

Estimation and interpretation. Coefficients are reported with robust standard errors, z statistics, p values, R-squared values, and sample size. Statistical significance is interpreted cautiously and should not be treated as evidence of causality. With monthly aggregate data, serial correlation, omitted variables, changes in tariff policy, seasonal utilization, macroeconomic conditions, benefit management, and contribution compliance could all influence the claim ratio. The analysis therefore emphasizes direction, magnitude, and consistency with health financing theory rather than hypothesis confirmation. A stronger submission version could be estimated with BPJS sample microdata, provincial JKN coverage series, district facility density, poverty rates, age structure, disease burden, and fixed effects.

Ethics. The study uses public aggregate monitoring data and published literature. It does not include identifiable individuals, patient records, household microdata, or provider-level confidential information. Formal human-subject ethics review would generally not be required for this public-data analysis, although institutional requirements should be checked before journal submission.

3.1. Regression Equations and Robustness Logic

The baseline equation is $ClaimRatio_t = \alpha + \beta ActiveCoverage_t + \epsilon_t$, where t indexes the monitoring month. The coefficient β measures the average monthly association between the active population coverage rate and the claim ratio. Because both variables are percentages, β can be interpreted as a percentage-point change in the claim ratio associated with a one percentage-point change in active coverage. The trend-adjusted equation adds $\gamma Trend_t$ to determine whether the association remains once the ordered movement of the series is represented. This is a minimal robustness check rather than a complete time-series model.

The small sample also affects how the results should be read. A larger dataset could estimate autoregressive models, distributed lags, fixed effects, and interaction terms. In this paper, those strategies would be inappropriate because they would consume degrees of freedom and produce unstable coefficients. The paper therefore follows a conservative rule: report a very simple model, state its limitations, and use the findings to motivate stronger future research. This approach is preferable to adding many controls that create a false sense of rigor. In health economics, transparency about data limitations is especially important because policy conclusions can affect entitlement, contributions, and access.

A practical advantage of the chosen design is replicability. The values are visible in an official monitoring report and the regression can be re-estimated in common software. This creates a teaching and policy-monitoring tool for researchers who do not have immediate access to confidential claims microdata. It also encourages BPJS Kesehatan and DJSN to publish machine-readable monthly series because doing so would substantially improve independent academic monitoring. Better public data would allow researchers to distinguish changes in contribution revenue from changes in service volume, case mix, tariffs, payment delays, and reserves.

The analysis [Table 2](#) and [Table 3](#) also avoids ratio-overlap problems where possible. Registered participants and active participants are not entered with active coverage in the same regression because active coverage is derived from active membership and population size. Including all of these variables together in a small dataset would create multicollinearity and unstable coefficients. Similarly, fund resilience and net assets are treated as supplementary outcomes rather than simultaneous controls because they are partly determined by the same financial flows that shape the claim ratio. The resulting specification is intentionally narrow, but it is easier to audit and less likely to overstate the evidence.

Table 2. Operational definitions and regression variables

Variable	Role	Definition
Claim ratio (%)	Dependent variable in Models 1 and 2	Benefit payments divided by contribution revenue, expressed as a percentage. A value above 100 indicates that benefits exceed contribution revenue.
Active population coverage (%)	Main explanatory variable	Percentage of the population with active JKN membership. Used as the principal indicator of effective membership activation.
Registered participants (million)	Descriptive scale variable	Total JKN participants registered in the system, regardless of active or inactive status.
Active participants (million)	Descriptive scale variable	Total JKN participants classified as active.
Net DJS health assets (Rp trillion)	Supplementary dependent variable	Net assets of the health social security fund.
Fund resilience (months)	Supplementary dependent variable	Reported fund capacity expressed in months of expected health benefit payment.
Month trend	Control in Model 2	Sequential monthly index used to test sensitivity to time ordering.

Note. DJS = Dana Jaminan Sosial; JKN = Jaminan Kesehatan Nasional.

Table 3. Monthly aggregate data used in the exploratory regression

Month	Active coverage (%)	Registered (m)	Active (m)	Net DJS assets (Rp tn)	Fund resilience (months)	Claim ratio (%)
2023-12	76.07	267.30	213.50	56.67	4.23	104.72
2024-01	75.94	267.80	213.20	57.19	3.97	115.01

2024-02	76.22	268.70	214.00	57.93	4.19	111.89
2024-03	76.41	269.50	214.50	55.73	3.98	112.21
2024-04	76.60	270.50	215.00	56.08	3.87	109.76
2024-05	77.15	272.40	216.60	53.63	3.73	108.78
2024-06	76.95	273.50	217.40	55.56	3.82	107.93
2024-09	77.87	277.10	219.96	53.16	3.59	107.52
2024-10	78.13	277.50	220.71	51.45	3.48	107.20
2024-11	78.48	277.90	221.70	52.40	3.57	106.50
2024-12	78.83	278.10	222.67	49.36	3.38	105.90

Note. Values are transcribed from the DJSN Monthly Report Monitoring JKN as of December 31, 2024. July and August 2024 were excluded because a consistent claim-ratio value was not available from the public figure used for this analysis.

4. RESULTS

National monitoring indicators show a program of very large scale. By December 2024, the monitoring report recorded more than 278 million registered JKN participants and more than 222 million active participants. Active population coverage increased across the observed period, from 76.07% in December 2023 to 78.83% in December 2024. This improvement indicates that JKN activation continued to grow even after the program reached near-universal registration. The increase in active coverage is economically meaningful because inactive membership can weaken contribution revenue and risk pooling even when headline enrollment appears high.

The descriptive statistics also show persistent claim pressure. Across the 11-month analytic series, the mean claim ratio was 108.86%, with a minimum of 104.72% and a maximum of 115.01%. In other words, the claim ratio exceeded 100% in every observed month. The mean fund resilience value was 3.80 months, and net DJS health assets declined from Rp56.67 trillion in December 2023 to Rp49.36 trillion in December 2024. These descriptive patterns are consistent with a fund that remained solvent during the period but faced continuous pressure from claims growing faster than contributions.

Table 4 summarizes the analytic variables. The active coverage variable has a small range, as expected in a near-universal system, but even a small shift in active coverage corresponds to millions of people. The registered participant count grew from 267.3 million to 278.1 million, while active participants grew from 213.5 million to 222.67 million. The claim-ratio distribution is narrower than might be expected in a longer panel, but it is sufficiently variable to support a simple exploratory regression. The purpose is not to predict claims for actuarial use, but to examine whether public monitoring indicators show a measurable association between active membership and financial pressure.

Table 4. Descriptive statistics for regression variables

Variable	N	Mean	SD	Min	Median	Max
Active population coverage (%)	11	77.15	1.02	75.94	76.95	78.83
Registered participants (million)	11	272.75	4.28	267.30	272.40	278.10
Active participants (million)	11	217.20	3.50	213.20	216.60	222.67
Net DJS assets (Rp trillion)	11	54.47	2.67	49.36	55.56	57.93
Fund resilience (months)	11	3.80	0.28	3.38	3.82	4.23
Claim ratio (%)	11	108.86	3.10	104.72	107.93	115.01

Note. Monthly observations are based on the values shown in Table 3.

The main regression results are presented in Table 5. Model 1 estimates the bivariate association between active population coverage and the claim ratio. The coefficient on active coverage is -1.844, meaning that a one percentage-point increase in active coverage is associated with a 1.844 percentage-point decrease in the claim ratio. The coefficient is statistically significant at the 5% level using robust standard errors. This result is consistent with the idea that active membership can improve contribution revenue and therefore reduce claim pressure, assuming utilization does not rise proportionally faster than contributions.

Model 2 adds a monthly trend. The active-coverage coefficient remains negative, but it becomes statistically non-significant. This change is important. It suggests that the bivariate relationship in Model 1 partly reflects the common movement of variables over time rather than a stable causal effect of active coverage. In a short monthly series, trends in contribution revenue, utilization, tariff adjustments, payment timing, and seasonal service use can all influence the claim ratio. The correct interpretation is therefore that active coverage is associated with lower claim pressure in the simple model, but the evidence is not strong enough to separate membership effects from broader time dynamics.

Supplementary Models 3 and 4 examine fund resilience and net DJS health assets. The claim-ratio coefficient in the fund-resilience model is small and statistically non-significant. The net-asset model shows a positive coefficient on claim ratio, but this result should not be interpreted causally because the short series combines several moving components. In insurance accounting, one would generally expect sustained high claim pressure to reduce assets over time, but the monthly asset position also depends on revenue timing, investment income, payables, reserves, and reporting periods. The supplementary models therefore serve mainly as sensitivity checks and illustrate the risks of overinterpreting short aggregate series.

Table 5. OLS regression results with HC1 robust standard errors

Model / dependent variable	Term	Coefficient	Robust SE	z	p	R2	N
Model 1: Claim ratio	Intercept	251.116	69.098	3.634	< .001	0.371	11
Model 1: Claim ratio	Active population coverage (%)	-1.844	0.886	-2.082	.037		
Model 2: Claim ratio	Intercept	537.272	368.381	1.458	.145	0.463	11
Model 2: Claim ratio	Active population coverage (%)	-5.647	4.903	-1.152	.249		
Model 2: Claim ratio	Month trend	1.206	1.662	0.726	.468		
Model 3: Fund resilience	Intercept	-0.396	3.602	-0.110	.912	0.182	11
Model 3: Fund resilience	Claim ratio (%)	0.039	0.033	1.185	.236		
Model 4: Net DJS assets	Intercept	-1.823	28.527	-0.064	.949	0.359	11
Model 4: Net DJS assets	Claim ratio (%)	0.517	0.257	2.014	.044		

Note. Model 1: claim ratio regressed on active population coverage. Model 2: claim ratio regressed on active coverage and monthly trend. Model 3: fund resilience regressed on claim ratio. Model 4: net DJS assets regressed on claim ratio. Coefficients are exploratory and not causal.

5. DISCUSSION

The findings support a cautious but policy-relevant message. Active JKN membership is associated with claim pressure in the simplest monitoring model, but this association weakens after a time trend is introduced. For policy, this means that active enrollment is necessary but not sufficient. A stronger active membership base can support revenue collection and risk pooling, but the claim ratio also depends on utilization patterns, provider payment incentives, disease burden, referral behavior, tariffs, and the speed of contribution collection. The health economics problem is therefore not merely how to register more people, but how to transform registration into active, financially sustainable, equitable coverage.

This interpretation aligns with prior Indonesian evidence. Agustina et al. (2019) and Mboi et al. (2018) emphasize that Indonesia's UHC progress occurs within a diverse archipelago where service availability, local capacity, and health needs vary substantially. found that insurance expansion can increase utilization, a desirable outcome from an access perspective but one that raises expenditure if purchasing and prevention systems are weak. Maulana et al. (2022) and Fattah et al. (2023) show that insurance coverage does not automatically eliminate out-of-pocket payment or catastrophic spending, indicating that coverage depth and

provider behavior matter. [Asante et al. \(2023\)](#) further show that the distribution of financing burden and benefits remains a central equity concern.

The result also resonates with studies of enrollment frictions and premium payment. [Banerjee et al. \(2021\)](#) demonstrate that administrative and behavioral constraints can limit insurance take-up even when the policy is available. [Dartanto et al. \(2020\)](#) highlight the challenge of regular contribution payment among informal-sector workers. These findings are especially relevant for BPJS Kesehatan because a large informal economy makes premium compliance difficult. When inactive membership rises, the fund may lose expected contributions while still facing political and ethical pressure to preserve access. Policy responses should combine easier payment systems, reminder mechanisms, reactivation support, and carefully designed incentives, while protecting poor and near-poor households through targeted subsidies.

The persistent claim ratio above 100% in the analytic period points to expenditure-side pressure. High utilization is not inherently negative; indeed, increased use of necessary services is a core goal of UHC. The economic question is whether utilization is appropriate, preventive, and efficiently purchased. If referral and inpatient utilization grow faster than primary care management, chronic disease prevention, and capitation accountability, the fund may pay for avoidable high-cost care. Provider payment systems such as capitation for primary care and case-based groups for hospitals need continual calibration to reduce under-service, over-service, and unnecessary escalation. Stronger claims audit, clinical pathways, and digital monitoring could help ensure that benefit payments improve health outcomes rather than simply increasing volume.

The study's contribution is methodological as well as substantive. It shows that public DJSN monitoring data can be converted into a small but usable regression dataset. This matters for transparency because analysts, lecturers, and students can reproduce the exercise without needing confidential claims files. The limitations of the exercise are equally instructive. With only 11 monthly observations, the regression cannot support complex controls or causal inference. The exercise should be treated as a bridge between descriptive reporting and more rigorous health economics analysis. A submission-ready follow-up could use BPJS sample data, Susenas household surveys, district-level facility capacity, and provincial macro indicators to estimate demand, utilization, out-of-pocket payment, and fund sustainability models.

For journal positioning, the paper is relevant to *Health Economics Insights Journal* because it links health insurance design, public finance, and applied regression. The central insight is that UHC monitoring should distinguish between registered coverage, active coverage, service utilization, and financial resilience. A single headline coverage number can obscure the operational reality of inactive membership and persistent claim pressure. Health economics research can help policymakers identify which levers affect revenue, which levers affect claims, and which groups remain financially vulnerable despite coverage.

5.1. Managerial and Equity Implications

For BPJS Kesehatan management, the first implication is that inactive membership should be treated as a financial risk indicator, not merely an administrative category. A high registration rate can coexist with weak revenue realization when members are inactive or in arrears. Management dashboards should therefore monitor the transition between active, inactive, reactivated, and subsidized status by province, income group, and employment type. Such monitoring would help identify whether claim pressure is caused mainly by benefit growth, contribution weakness, or both. It would also make it easier to evaluate whether reminder systems, digital payment channels, local government interventions, or arrears policies improve active membership.

The second implication concerns purchasing. If utilization growth is concentrated in referral outpatient and inpatient services, fund sustainability will depend on how well primary care prevents avoidable escalation and how well hospitals follow case-based payment rules. Indonesia's purchaser has considerable leverage because JKN is a dominant payer for many providers. That leverage should be used to strengthen quality-adjusted payment, audit high-cost claims, and reward providers that manage chronic conditions effectively. However, cost control should not be implemented as blunt rationing. The equity literature warns that vulnerable households can still face out-of-pocket costs and unmet need even in an insured system. A

balanced purchasing strategy should therefore control inappropriate claims while protecting medically necessary care.

The third implication is fiscal and political. Contribution adjustments, subsidy allocations, and benefit revisions are sensitive because they affect household budgets and government spending. Regression evidence from public aggregate data cannot decide those choices, but it can frame the trade-offs. When the claim ratio remains above 100%, policymakers need to ask whether the problem is underpriced contributions, insufficient subsidy transfers, high-cost disease burden, inefficiency, fraud, delayed premium payment, or a combination of these factors. Each diagnosis implies a different remedy. The paper therefore recommends integrating actuarial analysis, household welfare analysis, and provider payment evaluation before making major changes to contribution rates or benefit packages.

In Table 6 shown equity should remain central. Universal health coverage is not only about protecting the insurance fund; it is about ensuring that people can obtain needed care without financial hardship. Policies that improve fund sustainability by discouraging use among poor, remote, disabled, or chronically ill populations would undermine the purpose of JKN. The more appropriate target is inefficient or low-value utilization, preventable complications, and avoidable administrative leakage. This distinction is crucial for Indonesia because geographic and socioeconomic disparities remain large. Future monitoring should therefore report financial indicators together with access, quality, and financial protection indicators disaggregated by population group.

For universities and research institutes, the study offers a replicable classroom model for applied health economics. Students can reproduce the regression, test alternative specifications, compare aggregate findings with microdata studies, and discuss why statistical significance changes when a time trend is introduced. This pedagogical value is important in Indonesia because health financing decisions increasingly require analysts who understand both econometrics and institutional detail. A strong research agenda should move beyond whether JKN exists toward how well it purchases services, protects households, and sustains the fund across diverse provinces.

Table 6. Policy implications from the regression and literature synthesis

Policy domain	Recommended action	Health economics rationale
Membership activation	Strengthen premium reminders, simplified digital payment, arrears restructuring, and reactivation support for informal workers.	Raises contribution continuity and improves risk pooling without relying only on new registration.
Subsidy targeting	Maintain and update poor and near-poor subsidy lists using social registry and local verification.	Protects households most likely to forgo care or face catastrophic spending.
Primary care purchasing	Link capitation and gatekeeping to chronic disease control, referral quality, and preventive service performance.	Reduces avoidable specialist and inpatient claims while improving population health.
Hospital claims management	Use clinical pathways, claims audit, and case-mix review for high-cost diagnoses and recurrent admissions.	Improves efficiency of INA-CBG purchasing and controls inappropriate expenditure growth.
Data transparency	Publish machine-readable monthly indicator series and provincial dashboards.	Enables independent replication, academic monitoring, and faster policy learning.
Equity monitoring	Track claim use, unmet need, and out-of-pocket payment by income, disability status, sex, geography, and education.	Ensures that financial sustainability efforts do not reduce access for vulnerable populations.

Note. Recommendations should be adapted to current BPJS Kesehatan regulations, Ministry of Health policy, and fiscal constraints.

5.2. Limitations

Several limitations should be stated clearly. First, the study uses aggregate national monthly data rather than individual, household, provider, district, or provincial observations. Aggregate associations may not reflect individual behavior and can be affected by ecological bias. Second, the sample size is very small. The

regression has 11 observations because the public monitoring figure provides a consistent claim-ratio series only for selected months. This makes estimates sensitive to individual observations and limits the number of covariates that can be included. Third, the study does not control for benefit design changes, tariff adjustments, seasonality, provider mix, disease severity, regional distribution, arrears, or macroeconomic conditions. Fourth, the data were transcribed from a public monitoring report rather than obtained as raw machine-readable series. Transcription error is possible despite careful checking.

Fifth, the results are associational. A negative coefficient on active coverage does not prove that membership activation mechanically reduces the claim ratio. It may reflect time trends, contribution timing, changes in utilization, or unobserved administrative actions. Sixth, the supplementary models linking claim ratio to fund resilience and net assets are especially limited because financial reserves depend on many accounting and cash-flow factors. Finally, the paper does not estimate welfare effects, quality of care, or health outcomes. A complete health economics evaluation of BPJS Kesehatan should link coverage, utilization, spending, quality, and health outcomes.

6. CONCLUSION

This original exploratory regression study examined active membership, claim pressure, and financial resilience in Indonesia's BPJS Kesehatan using official JKN monitoring data for 2023-2024. Active population coverage increased during the period, but the claim ratio remained above 100% across all observed months. The bivariate regression found that higher active coverage was associated with a lower claim ratio, but the association weakened after adding a monthly trend. The results suggest that active membership is a key component of JKN sustainability, yet it cannot substitute for expenditure management, contribution compliance, preventive care, and equitable purchasing. For policymakers, the practical message is to monitor active coverage alongside claim ratios, fund resilience, utilization composition, and equity indicators. For researchers, the paper offers a transparent template for extending the analysis using BPJS sample data, household surveys, or provincial panels with stronger causal designs.

Ethical Approval

This study is a systematic literature review based exclusively on published academic sources and did not involve human participants, personal data collection, or experimental procedures. Therefore, formal ethical approval was not required.

Informed Consent Statement

Not applicable because this study did not involve human participants.

Authors' Contributions

Not applicable

Disclosure Statement

The author declares no potential conflict of interest.

Data Availability Statement

No primary dataset was generated for this study. All materials analyzed are available in the published sources cited in the reference list.

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