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Contribution of National Health Insurance Patient Revenue to Financial Performance of Private-Profit Hospitals from 2017 to 2022

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Abstract

This study investigated the relationship between National Health Insurance (NHI) patient revenue and profit-private hospital financial performance in Indonesia. As the NHI provider, *Badan Penyelenggara Jaminan Sosial* (BPJS) Healthcare Security's influence on hospital revenues has raised concerns about its impact on financial sustainability. This study used financial performance indicators to develop a financial performance index—Return on Assets (ROA), Return on Equity (ROE), Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) Margin, Current Ratio, and Net Profit Margin (NPM)—to assess the financial impact of BPJS Healthcare Security revenue. A partial model approach of multiple linear regression was employed using secondary data from seven private-profit hospitals listed on the Indonesian Stock Exchange from 2017 to 2022. The findings indicated a negative correlation between BPJS Healthcare Security patient revenue and the hospital financial performance index. Specifically, higher patient revenue correlated with lower performance across key financial indicators, including ROA, ROE, EBITDA Margin, Current Ratio, and NPM. It was essential for hospitals but not necessarily to improve their financial health performance. Hospitals need to optimize their revenue mix and explore alternative financial strategies to enhance performance.

Keywords: BPJS Healthcare Security, hospital financial performance, National Health Insurance, Private-Profit Hospital, Universal Health Coverage

Introduction

The impact of the coronavirus disease 2019 (COVID-19) pandemic, both nationally and internationally, demonstrates the importance of the country's strengthening of the health system by accelerating efforts for Universal Health Coverage (UHC).¹ According to the World Health Organization (WHO), UHC is a policy principle aimed at providing equal access to affordable and quality health services for the entire population of a country.² The goal of UHC is to provide all individuals with access to essential, adequate, and timely health services without causing financial difficulties.³⁻⁵ The Indonesian Government established the Social Security Administrative Body/*Badan Penyelenggara Jaminan Sosial* (BPJS) under Law Number 24 of 2011 and BPJS Healthcare Security to specifically manage social security in health.⁶ The National Health Insurance (NHI) program administered by BPJS Healthcare Security based on Presidential Regulation Number 12 of 2013 Article 6 Paragraph 1 requires all Indonesians to participate in the UHC target by 2019.⁷

BPJS Healthcare Security ensures that participants receive basic health benefits and protection.⁸ A total of 95.75% of the Indonesian population has registered as BPJS Healthcare Security participants, with a total of 606.7 million patients visiting and using the healthcare facilities by the end of 2023.⁹ The average daily usage of participants who benefited from BPJS Healthcare Security healthcare services provided by hospitals, clinics, and others during the year 2023 is 1.6 million people per day, indicating Indonesia's steady efforts in expanding the coverage of health insurance.⁹ More than 2,300 hospitals in Indonesia (1,700 of them are private hospitals) receive patients funded by NHI.⁷ Generally, NHI pays for primary health care through capitation. In contrast, hospital care is paid based on diagnostic codes.¹⁰ The combination of low premiums and extensive coverage has resulted in annual deficits since the start of the program. The accumulated deficit reached IDR 51 trillion (USD 3.7 billion) by the end of 2019.⁷

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The implementation of NHI in hospitals greatly impacts the hospital's income, contributing to higher hospital revenue as more patients use these services.¹¹ For example, a public hospital in South Sulawesi has more than doubled its hospital income from 2014 to 2022.¹¹ Hospitals must continue to exist, develop, and be able to provide quality health services at affordable prices for the community.¹² The ability of hospitals to develop can be evaluated through their financial performance. Hospital financial performance can be measured by various indicators, such as profitability, liquidity, or combined size (combining several indicators).¹³

Several studies above examine the impact of health insurance on hospital financial performance, but there is no consensus on the relationship. Many empirical studies analyze the relationship between health insurance patients income and economic performance, resulting in valuable, reference-worthy research conclusions. However, regarding the content and perspective of the research, existing studies still show the following shortcomings.

First, although most of the literature shows the positive impact of health insurance on economic performance, researchers in various research contexts also highlighted a negative or unrelated relationship between the two. These contradictory relationships hinder the direct application of current research findings in the development of the health system. Therefore, further exploration is needed to better understand the impact of health insurance patients income on the financial performance of private hospitals.

With the rapid evolution of the health system, the relationship between health insurance and financial performance has become one of the trending topics in the field of public health. In particular, it has a significant impact on the sustainable progress of the health system of a country or region, the well-being of its people, and the economy as a whole. Therefore, exploring the relationship between health insurance patients income and financial performance has significant practical contributions to building and improving national social healthcare services.

The financial reports of several hospitals whose shares are listed on the Indonesia Stock Exchange¹⁴ show that there has been a decline in cash flow throughout a certain period, along with the accumulation of deficits in NHI funds. Even this decline in cash flow in several hospitals has touched negative numbers. This condition indicates that the hospital does not have sufficient cash availability to finance its operational activities or is known as experiencing liquidity difficulties.

This study aimed to examine the contribution of NHI patient revenue to the financial performance of private hospitals. There are at least two main aspects that are rarely studied in the context of national social healthcare services in Indonesia. First, a comprehensive analysis of the financial condition of hospitals related to the NHI program. Second, the quality of hospital services and their relationship to financial performance should be evaluated, especially in the context of the implementation of the NHI program, which aims to improve access to and quality of health services in Indonesia. This study provided a deeper understanding of the factors influencing the financial performance of hospitals under the influence of the NHI program but also provided new insights into how financial performance was related to the quality of services provided to NHI program participants.

Method

The general objective of this study was to determine the impact of implementing the NHI program on the financial performance of private hospitals as measured by liquidity and profitability ratios. These financial ratios will be calculated throughout the implementation period of the NHI program by BPJS Healthcare Security for six years running from 2017 to 2022. This study also wanted to see whether each financial ratio was related to each other. Furthermore, this study also examined the implementation of the NHI program related to the financial performance of each type of hospital based on its characteristics, including business models that have sources of income from NHI and non-NHI patient participants. Based on these considerations, a research framework was made (Figure 1).

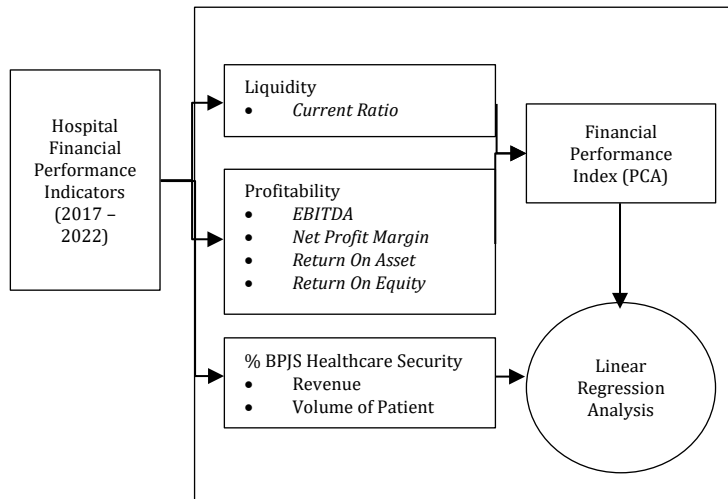


Figure 1. Research Framework

The formulation of the research model to see the relationship between the implementation of the NHI program and the financial performance of private hospitals can be explained as follows:

<p>General Model</p> $Y_1 = a + b_1 X_1 + e$ <p>Y_1 = Financial Performance a = constant b_1 = coefficient X_1 = BPJS Healthcare Security Patients Contribution to Revenue</p>	<p>Partial Model</p> $Y_{1t} = a + b_{1t} X_{1t} + e$ <p>Y_{1t} = Return On Asset; Return On Equity; EBITDA Margin; Net Profit Margin; Current Ratio a = constant b_{1t} = coefficient X_{1t} = BPJS Healthcare Security Patients Contribution to Revenue</p>
<p>Partial Hospital Model</p> $Y_{ij} = a + b_1 X_1 + e$ <p>Y_{ij} = Return On Asset; Return On Equity, EBITDA Margin; Current Ratio; Net Profit Margin, at: Hospital A, B, C a = constant b_3 = coefficient X_1 = BPJS Healthcare Security Patients Contribution to Revenue</p>	<p>$Y_{kl} = a + b_2 X_2 + e$</p> <p>Y_{kl} = Return On Asset; Return On Equity, EBITDA Margin; Current Ratio; Net Profit Margin, at: Hospital A, B, C a = constant b_2 = coefficient X_2 = BPJS Healthcare Security Patients Contribution to Total Number of Patients</p>

The use of Return on Assets (ROA), Return on Equity (ROE), Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) Margin, Current Ratio, and Net Profit Margin (NPM), and as representations of each liquidity ratio and profitability in modeling as an assessment of hospital financial performance was carried out, considering that these ratios were the most widely used in several previous studies.^{13,15,16} It was expected that through modeling the four aspects of financial performance assessment, it could be seen how the relationship between the implementation of the NHI program was based on a combination of income sources for each type of hospital ownership.

Based on each financial annual report (including Balance Sheet and Income Statement), this study concentrated on seven publicly listed private-profit hospitals in the Indonesia Stock Exchange that were linked and had already become BPJS Healthcare Security providers for six years, from 2017 to the end of 2022. The observation period of six years was chosen not only to capture the period of COVID-19 and non-COVID-19 but also to gather more data on private-profit hospitals as before 2017, and fewer financial annual reports could be achieved.

The data were extracted from the Indonesia Stock Exchange's official website.¹⁴ This study only selected private instead of public or government hospitals because of the need to purify the hospitals' self-financing capability apart from government or municipal budget support. These hospitals can be found in several Indonesian cities/districts, although the data used for this research only focused on their consolidated financial statements since most of them were not issued based on the hospital unit level. These publicly traded companies' reasonably accessible financial disclosures serve as the foundation for sampling hospitals (Hospital C, Hospital H, Hospital M, Hospital P, Hospital S, Hospital O, and Hospital J) within their purview.

Results

Impact of BPJS Healthcare Security Revenue Contribution on Financial Performance Index

The impact of BPJS Healthcare Security revenue contribution on the financial performance index of hospitals is highlighted in Table 1, presenting the results of a regression model analysis. The table shows a coefficient of -0.837, which indicates the significant negative relationship between BPJS Healthcare Security revenue contribution and hospital financial performance index, developed from the combination of ROA, ROE, EBITDA Margin, Current Ratio, and NPM ratios. Increased BPJS Healthcare Security revenue tended to lower these metrics, suggesting that heavy reliance on BPJS Healthcare Security may strain hospital finances. These results highlighted the need for hospitals to diversify revenue sources to ensure financial stability.

Table 1. Regression Model Revenue Contribution and Financial Performance Index

Variables	Coefficient	t-statistic	Prob.	Results
BPJS Healthcare Security	-0.837	-7.436	<0.001	Significant (p-value <0.001)
Constant (C)	0.752	10.504	<0.001	Significant (p-value <0.001)
R-squared	69.67%			
Adjusted R-squared	66.64%			
F-statistic	22.971			
Prob (F-statistic)	<0.001			

The regression test results of Model 1 showed a significant negative correlation between BPJS Healthcare Security's revenue contribution to the financial performance index, with a coefficient of -0.837 and a t-statistic of -7.436, as well as significant probability (p-value <0.001). These results suggested that increasing BPJS Healthcare Security revenue negatively affected hospital financial performance. Furthermore, the constant (C) was also significant, with a factor of 0.752 and a t-statistic of 10.504 (p-value <0.001). The R-squared rate of 69.67% and the adjusted R-squared of 66.64% indicated that this model effectively explained most variations in hospital financial performance. Significant F-statistic (p-value <0.001) also affirmed model compatibility in explaining the relationship between independent and dependent variables.

$$\text{Financial Performance Index} = 0.752 - 0.837 \text{ BPJS Healthcare Security Patients Revenue Contribution}$$

The General Model by Separating High and Low Financial Performance Indicators

In Principal Component Analysis (PCA), hospital financial performance indicators were grouped by loading factor values. First, financial performance indicators with loading factors values above 0.50, including ROE, EBITDA Margin, and NPM. Second, financial performance indicators, such as ROA and Current Ratio, with loading factor values below 0.50. This distinction allowed for a more precise analysis of each indicator's impact on hospital financial performance, aiding in better decision-making and strategy development. Table 2 examines the impact of the income contribution of BPJS Healthcare Security on the three financial performance indicators of the company's ROE, EBITDA Margin, and NPM by separating the indicator of high financial performance, as well as companies that have lower financial performance indicators such as ROA and Current Ratio.

From the regression results in Table 2, the BPJS Healthcare Security variable has a coefficient of -0.771 with a t-statistic of -3.825 and a probability of 0.003, indicating a negative correlation between BPJS Healthcare Security patients income and high financial performance indicators like ROE, EBITDA Margin, and NPM. These results suggested that increased BPJS Healthcare Security patients revenue tended to reduce these performance metrics. The constant variable (C) in the model showed a coefficient of 0.407 with a t-statistic of 9.229 and a probability of <0.001, suggesting that this variable was statistically significant towards high financial performance.

In terms of goodness-of-fit, an Adjusted R-squared score of 55.3% indicated that the model could explain about 55.3% variation of the observed high financial performance indicators (ROE, EBITDA Margin, and NPM). An F-statistic of 14.634 with a probability of 0.003 indicated that the overall model was statistically significant. These results indicated that BPJS Healthcare Security patients income significantly impacted financial performance, suggesting that companies should manage BPJS Healthcare Security patients contributions to improve ROE, EBITDA Margin, and NPM.

Table 2. Regression Model of High and Low Loading Factors

Variable*	Coefficient	t-Statistic	Prob.	Results
BPJS Healthcare Security	-0.771	-3.825	0.003	Significant
Constant (C)	0.407	9.229	<0.001	Significant
R-squared	59.4%			
Adjusted R-squared	55.3%			
F-statistic	14.634			
Prob (F-statistic)	0.003			
Variable**	Coefficient	t-Statistic	Prob.	Results
BPJS Healthcare Security	-0.799	4.321	0.002	Significant
Constant (C)	1.164	9.431	<0.001	Significant
R-squared				
Adjusted R-squared	63.8%			
F-statistic	60.2%			
Prob (F-statistic)	17.645			

*ROE, EBITDA Margin, NPM

**ROA, Current Ratio

Table 2 also shows that BPJS Healthcare Security patients income significantly affects low-performance indicators ROA and Current Ratio. Regression analysis reveals that the greater the revenue contribution from BPJS Healthcare Security, the lower the ROA and Current Ratio values of the company. The BPJS Healthcare Security variable had a coefficient of -0.799 with a t-statistic of 4.321 and a probability of 0.002. The negative coefficient (-0.799) indicated a negative correlation between the contribution of BPJS Healthcare Security patients income and the two indicators of performance, meaning higher BPJS Healthcare Security patients revenue leads to lower ROA and Current Ratio values. The analysis results also showed that the constant variable coefficient (C) was 1.164 with a t-statistic of 9.431 and a probability of 0.000, indicating strong statistical significance to the three performance indicators.

An adjusted R-squared value of 63.8% suggested that the model can explain most of the variations of the two dependent variables (ROA and Current Ratio). An F-statistic of 60.2% with a probability of 17.645% confirms the model's statistical significance. Overall, the analysis suggested that BPJS Healthcare Security patients income significantly impacted financial performance, with a negative relationship to ROA and Current Ratio. The statistical significance of these results suggested that these negative impacts were not coincidental and had consistency throughout the sample analyzed. Thus, this model provides an understanding that the management of revenues from BPJS Healthcare Security is crucial. The findings highlighted the need for effective strategies in managing BPJS Healthcare Security patients revenue to improve or maintain corporate financial performance.

Partial Model Revenue Contribution and Financial Performance Indicators

The partial model examining the impact of BPJS Healthcare Security revenue contribution on financial performance indicators provided detailed insights into how BPJS Healthcare Security patients income affected various aspects of a hospital's financial health. The model used regression analysis to identify the relationship between BPJS Healthcare Security patients revenue contribution and each financial performance indicator (ROA, ROE, EBITDA Margin, Current Ratio, and NPM).

Table 3 presents the results of the partial model analyzing the impact of revenue contribution from BPJS Healthcare Security on various financial performance indicators: ROA, ROE, EBITDA Margin, Current Ratio, and NPM. Table 3 details the coefficients, t-statistics, and probability values for each indicator. For ROA, the constant term was 0.169 with a t-statistic of 6.899 and a probability of <0.001, indicating strong significance. The revenue contribution had a negative coefficient of -0.202 with a t-statistic of -3.253 and a probability of 0.008, showing a significant negative impact on ROA. For ROE, the constant term was 0.148 with a t-statistic of 7.643 and a probability of <0.001, indicating strong significance. The revenue contribution had a negative coefficient of -0.169 with a t-statistic of -3.433 and a probability of 0.006, indicating a significant negative impact on ROE. For the EBITDA Margin, the constant term was 0.337 with a t-statistic of 9.761 and a probability of <0.001, showing strong significance.

The revenue contribution had a negative coefficient of -0.345 with a t-statistic of -3.930 and a probability of 0.002, indicating a significant negative impact on the EBITDA Margin. For the Current Ratio, the constant term was 6.051 with

a t-statistic of 9.163 and a probability of <0.001, indicating strong significance. The revenue contribution had a negative coefficient of -6.844 with a t-statistic of -4.079 and a probability of 0.002, indicating a significant negative impact on the Current Ratio. For NPM, the constant term was 0.255 with a t-statistic of 9.188 and a probability of <0.001, indicating strong significance. The revenue contribution had a negative coefficient of -0.266 with a t-statistic of -3.773 and a probability of 0.003, indicating a significant negative impact on NPM. Overall, the results demonstrated that an increase in BPJS Healthcare Security patients revenue contribution significantly and negatively affected all the analyzed financial performance indicators, suggesting that higher BPJS Healthcare Security patients revenue can deteriorate the financial health of hospitals.

Table 3. Partial Model of Revenue Contribution and Return on Assets, Return On Equity, EBITDA Margin, Current Ratio, and Net Profit Margin

Dependent	Independent	Coeff.	t-stat	Prob.
ROA	(Constant)	0.169	6.899	<0.001
	BPJS Healthcare Security revenue contribution	-0.202	-3.253	0.008
ROE	(Constant)	0.148	7.643	<0.001
	BPJS Healthcare Security revenue contribution	-0.169	-3.433	0.006
EBITDA Margin	(Constant)	0.337	9.761	<0.001
	BPJS Healthcare Security revenue contribution	-0.345	-3.930	0.002
Current Ratio	(Constant)	6.051	9.163	<0.001
	BPJS Healthcare Security revenue contribution	-6.844	-4.079	0.002
NPM	(Constant)	0.255	9.188	<0.001
	BPJS Healthcare Security revenue contribution	-0.266	-3.773	0.003

Notes: ROA = Return on Assets, BPJS = *Badan Penyelenggara Jaminan Sosial*/Social Security Administrative Body, ROE = Return on Equity, NPM = Net Profit Margin.

Development of Partial Regression Model 1 Contribution of Income and Financial Performance

Partial Regression Model 1 analyzed how revenue sources, including BPJS Healthcare Security contributions, affect financial metrics like ROA, ROE, EBITDA Margin, Current Ratio, and NPM. By measuring these effects through regression analysis, the model helps organizations understand the impact of different revenue streams on financial performance, aiding in optimizing revenue strategies and enhancing profitability and operational efficiency.

Table 4. Partial Regression Model 1 Contribution of Income and Financial Performance

Dependent	Independent	Hospital M		Hospital P	
		Coeff.	Prob.	Coeff.	Prob.
ROA	(Constant)	0.170	0.006	0.055	0.155
	BPJS Healthcare Security revenue contribution	0.065	0.824	-0.029	0.647
ROE	(Constant)	0.144	0.006	0.170	0.006
	BPJS Healthcare Security revenue contribution	0.087	0.725	-0.037	0.486
EBITDA MARGIN	(Constant)	0.346	0.001	0.174	0.025
	BPJS Healthcare Security revenue contribution	-0.030	0.924	-0.095	0.354
CURRENT RATIO	(Constant)	8.863	0.001	3.755	0.018
	BPJS Healthcare Security revenue contribution	-28.710	0.032	-3.105	0.155
NPM	(Constant)	0.261	0.002	0.132	0.035
	BPJS Healthcare Security revenue contribution	-0.017	0.962	-0.078	0.371

Notes: ROA = Return on Assets, BPJS = *Badan Penyelenggara Jaminan Sosial*/Social Security Administrative Body, ROE = Return on Equity, NPM = Net Profit Margin.

Table 4 shows the results of Partial Regression Model 1, analyzing the impact of revenue contributions, including BPJS Healthcare Security, on financial performance metrics for Hospital P and Hospital M. These two hospitals had the most completed data in terms of BPJS Healthcare Security patients revenue contribution among the sample. The findings showed that the coefficients associated with revenue contribution generally showed non-significant p-values, indicating that revenue contributions generally did not significantly affect ROA, ROE, EBITDA Margin, Current Ratio, and NPM in either group. However, the current ratio in Hospital M exhibits a marginally significant negative association with revenue contribution, suggesting a potential challenge in maintaining liquidity. These results suggested that while BPJS Healthcare Security patients and other income sources influence financial metrics, other factors may have a more significant impact on financial performance. Further investigation is needed to better understand these dynamics and improve financial health and operational efficiency in healthcare organizations.

Development of Partial Regression Model 2 Contribution of Income and Total Patient Volume

Partial Regression Model 2 analyzed how BPJS Healthcare Security patients income and patient volume impact key financial metrics like ROA, ROE, EBITDA Margin, Current Ratio, and NPM. This analysis helped healthcare providers understand the effects of revenue and patient volume on financial performance, guiding strategies for better revenue management, patient care, and operational efficiency to improve financial sustainability and service effectiveness. Table 5 presents the results from Partial Regression Model 2, investigating the correlation of BPJS Healthcare Security contribution based on total patient volume on financial performance metrics across three hospitals: M, C, and H. These three hospitals had the most completed data in terms of BPJS Healthcare Security contribution based on total patient volume among the sample. In Hospital M, the constant coefficient for ROA was 0.494, with a p-value of 0.265, indicating non-significance. The combined coefficient for revenue contribution and total patient volume was -0.569, with a p-value of 0.428, which was also non-significant. Similar non-significant results were observed in Hospitals C and H. Across all hospitals, the constant coefficients were 0.176 (Hospital M), -0.165 (Hospital C), and 0.176 (Hospital H), all with non-significant p-values. The coefficients for revenue contribution and total patient volume were also non-significant, indicating no significant impact on ROE.

Table 5. Partial Regression Model 2 Revenue Contribution and Total Patient Volume

Dependent	Independent	Hospital M		Hospital C		Hospital H	
		Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
ROA	(Constant)	0.494	0.265	-1.035	0.777	0.494	0.265
	BPJS Healthcare Security contribution based on total patient volume	-0.569	0.428	1.565	0.778	-0.569	0.428
ROE	(Constant)	0.176	0.491	-0.165	0.134	0.176	0.491
	BPJS Healthcare Security contribution based on total patient volume	-0.155	0.713	0.223	0.170	-0.155	0.713
EBITDA MARGIN	(Constant)	0.330	0.000	-1.216	0.256	0.247	0.509
	BPJS Healthcare Security contribution based on total patient volume	0.045	0.653	1.567	0.322	0.030	0.961
CURRENT RATIO	(Constant)	8.745	0.000	-55.394	0.088	-0.005	0.998
	BPJS Healthcare Security contribution based on total patient volume	-10.460	0.003*	94.546	0.064*	2.073	0.578
NPM	(Constant)	0.244	0.002	-1.349	0.218	0.109	0.749
	BPJS Healthcare Security contribution based on total patient volume	0.055	0.620	1.756	0.277	0.004	0.995

Notes: ROA = Return on Assets, BPJS = *Badan Penyelenggara Jaminan Sosial*/Social Security Administrative Body, ROE = Return on Equity, NPM = Net Profit Margin.

Hospital M showed a significant constant coefficient of 0.330 for the EBITDA Margin with a p-value of <0.001 , suggesting a baseline level. The coefficient for revenue contribution and total patient volume was 0.045, with a non-significant p-value of 0.653. Similar non-significant results were found in Hospitals C and H. Hospitals M and C displayed significant constant coefficients (8.745 and -55.394, respectively), indicating varying baseline Current Ratios. Notably, Hospital M showed a significant negative coefficient of -10.460 for revenue contribution and total patient volume (p-value = 0.003), suggesting a negative impact on the Current Ratio. Hospitals C and H exhibited non-significant coefficients for this relationship. Hospital M and H demonstrated significant constant coefficients (0.244 and 0.109, respectively) for NPM. The coefficients for revenue contribution and total patient volume were non-significant across all groups, indicating no significant impact on NPM.

The findings suggested that revenue contribution and patient volume did not significantly affect ROA, ROE, EBITDA Margin, or NPM in the analyzed hospitals. However, increased revenue and patient volume negatively impacted the Current Ratio in MIKA, indicating potential liquidity issues. These results highlighted the complexity of financial performance in healthcare, suggesting a need for further investigation into operational efficiencies and financial management practices.

Discussion

Although NHI implementation in hospitals greatly impacts the hospital's income, the model analysis revealed a significant negative impact on the hospital financial performance index from BPJS Healthcare Security patients. This condition implied that the increase in revenue from BPJS Healthcare Security patients did not positively correlate to hospital financial performance. The coefficient of determination indicated that BPJS Healthcare Security patients' revenue accounted for a substantial portion of the variability in hospital financial performance. However, residual variables suggested that other factors beyond the model's scope influence hospital financial performance.

Utilizing a model that identified high and low loading factors also yielded results consistent with a negative and significant impact on the contribution of BPJS Healthcare Security earnings to the hospital financial performance index. Even if the contribution of BPJS Healthcare Security patients was largely a significant factor in explaining variations, there were a significant number of variables that the aforementioned factor cannot explain. Further analysis is needed to fully understand other factors affecting hospital financial performance.

The partial model delineated the impact of BPJS Healthcare Security patients' revenue contribution on various financial performance indicators. The overall model probability indicated a significant influence, with a probability value of less than 5%. In general, the contribution from BPJS Healthcare Security patients showed a significant negative effect on several hospital financial performance indicators, including ROA, ROE, EBITDA Margin, Current Ratio, and NPM. The largest coefficients influencing revenue contribution from BPJS Healthcare Security patients were the Current Ratio, EBITDA Margin, NPM, ROA, and ROE, in descending order of magnitude.

The findings highlighted the complexity of the relationship between financial performance, service quality, and patient revenue contribution of hospitals that serve participants in the NHI Program. This condition emphasized the need for a holistic and integrated approach in hospital management, where financial, operational, and service factors are interrelated and influence each other. To gain a deeper understanding of the factors that influence financial performance, further research can be conducted by involving further analysis of the relationship between NHI patient contributions, financial performance, and service quality, as well as other factors that may influence these dynamics assuming the availability of more complete, accurate and accountable data.

The analysis revealed that revenue contributions from BPJS Healthcare Security patients significantly impacted hospital financial performance. These results suggested that increases in revenue from BPJS Healthcare Security patients did not improve financial performance but rather led to a decline. In brief, the increase in BPJS Healthcare Security patients does not directly contribute positively to hospital financial performance.

The development of the partial model in Model 1 highlighted that among two hospitals with data on BPJS revenue, only Hospital M had a significant negative relationship between BPJS Healthcare Security patient contributions and the Current Ratio, indicating potential liquidity issues. However, for other hospitals, there was no significant relationship between BPJS Healthcare Security patient contributions and the Current Ratio, possibly due to other influential factors or data limitations. This result highlighted the complexity of analyzing hospital financial performance and the need for detailed and accurate data.

The development of partial hospital models in Model 2 indicated that out of the three observed hospitals, only two

of them, Hospital M and C, showed a significant relationship between the contribution of BPJS Healthcare Security participants to the total patient volume and the Current Ratio. Hospital M exhibited a significant relationship with a negative regression coefficient. This result signified that when the contribution of NHI participants to the total patient volume increases, Hospital M's Current Ratio tends to decrease. The decrease in the Current Ratio may indicate liquidity issues or financial pressure in managing additional patients from NHI participants.

Hospital C also showed a significant relationship with the Current Ratio but with a positive regression coefficient. This means that when the contribution of NHI participants to the total patient volume increases, Hospital C's Current Ratio tends to increase. This rise in the Current Ratio may indicate improved liquidity or efficiency in managing additional patients from NHI participants. In contrast, another hospital shows no significant relationship, suggesting other factors may be more influential in its financial performance.

The practical implications of this study's findings have significant impacts on hospital management and health policy. First, hospital managers may need to consider the diverse financial conditions. Second, in facing external situations, hospital management must increase flexibility and readiness in responding to changing circumstances that affect financial performance. Third, the finding that the income from BPJS Healthcare Security patient contribution has a negative impact on financial performance shows the importance of evaluation and adjustment in resource management and patient payment policies. Fourth, this study also encourages stakeholders in health policy to pay attention to the financial implications of the national health insurance program and to continue to improve policies that support the sustainability of hospital financial performance.

Meanwhile, the theoretical implications of the findings of this study cover several important aspects in the context of hospital management and health studies. First, the findings highlight the complexity of the relationship between financial performance and patient income contribution in the context of public hospitals serving participants in the National Health Insurance Program. Furthermore, these findings also provide insights into how external conditions can impact hospital financial performance.

Conclusion

Several recommendations can be considered to improve the financial performance of the hospital, especially in the context of services to BPJS Healthcare Security patients. First, hospitals need to conduct an in-depth evaluation of the BPJS Healthcare Security patient admission strategy to ensure that the increase in patient contributions does not have a negative impact on financial performance. This strategy can include proposing adjustments to the BPJS Healthcare Security tariff policy to the government, capacity management, and patient admission strategies to minimize its negative impacts, although the latter is contrary to the concept of UHC. Hospitals also need to develop sustainable business models to ensure that they can continue to operate efficiently and generate sufficient profits to cover operational costs and increase their health service capacity, including diversifying revenue sources, collaborating with other parties, and developing innovations in health services. By implementing these recommendations, it is hoped that hospitals can improve their performance in providing quality and sustainable health services, especially for NHI participants and the entire Indonesian community.

Abbreviations

UHC: Universal Health Coverage; BPJS: *Badan Penyelenggara Jaminan Sosial*/Social Security Administrative Body; NHI: National Health Insurance; ROA: Return on Assets; ROE: Return on Equity; EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization; NPM: Net Profit Margin; PCA: Principal Component Analysis.

Ethics Approval and Consent to Participate

This study is unlikely to face ethical issues related to recruitment, gender issues, privacy and confidentiality, subject safety, conflict of interest, vulnerable populations, and security monitoring because this study is a study using financial report data with the unit of analysis being a private hospital unit whose data source is publicly accessible based on ethical approval No.: Ket- 579/UN2.F10.D11/PPM.00.02/2021 released by The Research and Community Engagement Ethical Committee of Faculty of Public Health Universitas Indonesia.

Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Availability of Data and Materials

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

Authors' Contribution

FI designed and performed the experiments, derived the models, analyzed the data, and wrote the manuscript. ACS and MN were involved in planning and supervising the work. FI and RH worked out almost all of the technical details and performed the numerical calculations for the suggested experiment.

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