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BANK GROUP PERFORMANCE GROUPING MODEL BASED ON CORE CAPITAL IN TOP BANKS DURING THE PANDEMIC IN INDONESIA

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Abstract. This study investigates the health levels of Core Capital 4 banks during the COVID-19 pandemic by employing methods that focus on credit risk and profitability. Designed as a comparative analysis, the research examines differences in the financial health of these banks prior to and throughout the pandemic. The study population consists of 46 banks listed on the Indonesia Stock Exchange, with a purposive sampling technique applied to select four banks that meet specific criteria relevant to the study's objectives. The analysis relies on secondary data, specifically annual financial statements published by each of the selected banks. The collected data were processed using descriptive statistical methods to provide an overview of the key financial indicators. Furthermore, the Analysis of Variance (ANOVA) test was employed to examine credit and capital risk indicators, revealing significant differences in the health levels of core capital 4 banks when comparing the pre-pandemic and pandemic periods. Previous studies have examined bank health in the context of mergers, Islamic banking, or comparisons with conventional banks, but few have focused on core capital 4 banks as Indonesia's largest group. Limited research has highlighted how these large-capital banks were specifically affected by the COVID-19 pandemic. This study addresses that gap by comparing their credit risk and profitability before and during the crisis.

Keywords: risk profile, earnings, core capital.

JEL Classification: G21, E44.

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1. Introduction

The banking sector holds a strategic position in the economy because it functions as a financial intermediary, collecting funds from the public and distributing them to meet consumption and business needs (Azmi et al., 2021). Through this role, banks contribute not only to financial system stability but also to economic growth. Therefore, the soundness of banking institutions is essential to ensure the continuity of economic activities.

The COVID-19 pandemic posed a severe challenge to the stability of the banking sector. The government's restrictions to control the spread of the virus slowed economic activities and reduced public income, which in turn weakened the ability of individuals and businesses to fulfill financial obligations (Nurafini, 2022). For banks, this condition increased credit risk and reduced profitability, two indicators that are central to evaluating financial health. As financial institutions that rely heavily on lending activities, banks faced heightened exposure to non-performing loans and declining interest income, leading to overall performance deterioration.

In Indonesia, commercial banks are classified into four groups based on core capital, as stipulated in Indonesian Financial Service Authority Regulation Number 12/POJK.03/2021. Core capital of 4 banks represent the largest group with core capital exceeding Rp70 trillion, accounting for more than 60% of the total banking capital in the country. The average net profit of core capital Bank 4 showed an increasing trend before the COVID-19 pandemic, rising from Rp24,559,107 in 2018 to Rp26,451,068 in 2019. In 2020, however, net profit declined sharply to Rp16,466,445, reflecting the adverse impact of the pandemic on the banking sector. A recovery occurred in 2021, with net profit climbing back to Rp25,353,981, indicating the sector's resilience and gradual adaptation to post-pandemic economic conditions. The average net profit of core capital Bank 4 showed an increasing trend before the COVID-19 pandemic, rising from Rp24,559,107 in 2018 to Rp26,451,068 in 2019. In 2020, however, net profit declined

sharply to Rp16,466,445, reflecting the adverse impact of the pandemic on the banking sector. A recovery occurred in 2021, with net profit climbing back to Rp25,353,981, indicating the sector's resilience and gradual adaptation to post-pandemic economic conditions. In addition, the decline in core capital bank performance was seen from fluctuating net profits and several ratio indicators that reflected a decline in performance. Banks with substantial capital, namely Bank core capital of 4, the largest bank group in Indonesia. This can be observed from the sharp increase in NPLs (Non-Performing Loans) in 2020, reaching 3.07 or an increase of 42.12% from 2019. Although there was a decline in 2021, it was only 4.23% and had not yet reached the point before the pandemic. An increase in the NPL value in the core capital of 4 bank grouping indicates an increase in risk or declining health. An increasingly high NPL indicates that a bank is less professional in managing credit, which impacts bank losses. This increase in NPL occurred because the COVID-19 pandemic hampered economic activity (Kamal, 2023) so debtors and borrowers did not make payments by the provisions. Although the Good Corporate Governance (GCG) aspect appears stable, ROA sharply declines. The 2019 ROA reached 3.24, but there was a sharp decline in 2020 to 1.87 or a decline of 42.28%. This illustrates a decline in a company's ability to utilize its assets to generate profits during the pandemic. A decline in CAR ratio was also observed in 2020. The decline was observed from 2019 by 21.87 to 20.78 in 2020. The capital adequacy ratio declined because banks provided credit relief to the customers affected by the pandemic. This can affect banking performance because the main activity of commercial banks is to carry out credit activities, which will later impact their health level. Bank health is a banking company's ability to fulfill its obligations properly through applicable regulations. Therefore, banking companies must ensure that they are in good health. Banks must maintain and improve their health levels by consistently applying in every implementation of their operational activities. To maintain the trust of the public and related parties during the pandemic, banks must maintain the health level of the bank so that it remains in good condition. The criterion for a bank with a good reputation is that it has a good (healthy) or even excellent (very healthy) health assessment (Santosa et al., 2020).

These banks are not only the backbone of the Indonesian financial system but also operate extensively at the national and international levels. With their substantial resources, core capital of 4 banks are generally expected to withstand economic shocks better than smaller institutions. However, their financial performance during the pandemic also showed signs of vulnerability, including a decline in net profit, a sharp increase in Non-Performing Loans (NPL), and a significant drop in profitability ratios such as Return on Assets (ROA). Net profits fluctuated, Non-Performing Loans (NPL) increased, and profitability indicators such as Return on Assets (ROA) and Capital Adequacy Ratio (CAR) weakened (Kamal, 2023; Pusparisa, 2021). Although Good Corporate Governance (GCG) remained relatively stable, the decline in these financial indicators reflects vulnerabilities in bank health. Bank health is critical because it demonstrates a bank's ability to meet obligations and maintain public confidence (Santosa et al., 2020).

Although previous studies have examined banking health from different perspectives, such as the impact of mergers and acquisitions (Widhiastuti, 2021), the performance of Islamic banks during the pandemic (Azmi et al., 2021), and comparisons between Islamic and conventional banks (Choirunnisa et al., 2020), limited attention has been given to core capital of 4 banks. Existing research has not adequately addressed how large-capital banks – despite their dominant position in the industry – experienced changes in their financial health during the COVID-19 pandemic. This creates a research gap that needs further exploration, especially considering the critical role of these banks in ensuring financial system resilience.

The purpose of this study is to analyze the health levels of core capital of 4 banks before and during the COVID-19 pandemic, focusing on indicators of credit risk and profitability. By conducting a comparative analysis across the two periods, this research aims to provide empirical evidence on how the largest banking institutions in Indonesia were affected by the crisis. The findings are expected to enrich the literature on bank health assessment and offer practical insights for regulators, policymakers, and banking practitioners in developing strategies to strengthen financial stability in times of economic disruption.

2. Literature review

The banking sector plays a central role in maintaining financial stability, particularly during periods of economic crisis. As financial intermediaries, banks' ability to manage risks while ensuring profitability is critical for sustaining economic growth (Azmi et al., 2021). Indicators such as Non-Performing Loans (NPL), Return on Assets (ROA), and Capital Adequacy Ratio (CAR) remain key measures for evaluating performance and resilience in turbulent times.

Earlier studies show that macroeconomic shocks have a strong influence on bank health. Santosa et al. (2020) observed that economic fluctuations increase NPLs and pressure profitability, while Kamal (2023) found that capital buffers in Indonesian banks remained relatively strong despite declines in profitability. Similarly, Pusparisa (2021) highlighted the growing role of Indonesia's largest banks, which contribute significantly to national financial resilience.

The COVID-19 pandemic further intensified these challenges. Utari and Viverita (2024) demonstrated that credit risk had a significant negative impact on bank profitability in Indonesia, with larger banks displaying relative resilience due to economies of scale. This finding complements Nurafini (2022), who showed that government restrictions reduced borrowers' repayment capacity, leading to heightened credit risk exposure. Studies on Islamic banking (Choirunnisa et al., 2020; Fitriyatustany et al., 2024) confirm that both Islamic and conventional banks

were vulnerable, though their risk structures differed due to contractual and operational distinctions.

Bank-specific characteristics and governance structures have also been highlighted as critical in shaping resilience. Tio and Swandari (2025) examined core capital 2–4 banks, showing that risk profiles and corporate governance practices varied across groups, with core capital of 4 demonstrating stronger governance frameworks during crises. Similarly, Hadi (2024) analyzed loan-at-risk and other bank-specific factors, confirming their significant role in shaping profitability across different core capital categories. These findings emphasize the need to assess core capital banks separately, particularly the systemic core capital of 4 group.

Risk management and governance continue to emerge as cross-cutting themes in the global literature. Fadhil et al. (2025) showed that Bank Syariah Indonesia's performance could be effectively evaluated using the risk profile, good corporate governance, earnings, and capital (RGEC) framework, reflecting the importance of integrated risk assessment. Srairi (2025), in a study of GCC banks, identified a "risk governance paradox" where greater risk disclosure did not always translate to improved performance, but fintech adoption enhanced resilience. Similarly, Dagunduro et al. (2025) highlighted the role of risk management committees in improving earnings quality in insurance firms, while Li et al. (2025) showed how enterprise risk management influences management forecasts in corporate

Table 1. Summary of prior studies

Author(s) & Year	Focus of Study	Key Findings	Relevance/Gap
Santosa et al. (2020)	Effect of macroeconomic fluctuations on Indonesian banks	Economic shocks increase NPLs and reduce profitability	Relevant for linking crises to bank performance, but does not isolate core capital categories
Kamal (2023)	Banking performance during turbulence in Indonesia	Capital buffers remained strong, but profitability fell	Useful for showing resilience, but lacks core capital of 4–specific focus
Pusparisa (2021)	Role of large Indonesian banks	Largest banks dominate assets and market share	Highlights importance of core capital of 4, but no analysis of risk-profitability during COVID-19
Nurafini (2022)	COVID-19 restrictions and bank credit risk	Borrowers' repayment capacity fell, raising NPLs	Explains risk exposure mechanism but does not differentiate bank groups
Utari and Viverita (2024)	Credit risk and bank size effect on profitability pre- and during COVID-19	Larger banks were more resilient; credit risk lowered profitability	Shows bank size matters but does not focus on core capital of 4 specifically
Choirunnisa et al. (2020)	Islamic vs. conventional banks during COVID-19	Differences in profitability and resilience	Focuses on bank types, not on core capital-based groups
Fitriyatustany et al. (2024)	Insolvency risk in Islamic vs. conventional banks	Determinants of insolvency risk differ across bank types	Emphasizes risk structure but not core capital of 4 or large banks
Widhiastuti (2021)	Bank mergers and health	Consolidation improves capital but not immediate profitability	Focus on structural reform, not crisis resilience of core capital of 4
Tio and Swandari (2025)	Risk profiles & governance in core capital 2–4	core capital of 4 showed stronger governance in crises	Directly relevant but does not fully assess credit risk-profitability linkage
Hadi (2024)	Loan-at-risk and bank-specific factors across core capital	Loan-at-risk significantly influences profitability	Addresses core capital categorization but not focused on COVID-19 effects
Fadhil et al. (2025)	Bank Syariah Indonesia performance via RGEC	Governance and risk profile essential for resilience	Useful for governance insights, but case-specific (not core capital of 4)
Srairi (2025)	Risk governance & fintech in GCC banks	Fintech improved resilience; risk disclosure paradox noted	Global insight; not contextualized to Indonesian core capital of 4 banks
Dagunduro et al. (2025)	Risk committees & earnings quality in Nigerian firms	Strong governance improved earnings quality	Relevant governance lesson, but not specific to banks or Indonesia
Li et al. (2025)	ERM and management earnings forecasts	ERM influences corporate disclosure and stability	Expands governance discussion, but non-banking context
Onomakpo (2025)	ESG risk ratings in EV manufacturing	ESG risks affect performance	Broad risk-performance link; industry context differs
Tahvildari (2025)	Robo-advisors and investor profiling in Germany	Technology changes risk management and portfolio allocation	Shows fintech's role in risk, but outside Indonesian banking

settings. These insights underline the broader significance of governance and risk oversight in financial institutions.

Beyond the banking sector, related studies also provide useful perspectives. Onomakpo (2025) examined ESG risk ratings in the electric vehicle industry, showing the connection between risk governance and financial performance. Tahvildari (2025) analyzed robo-advisors in Germany, emphasizing how technology shapes investor profiling and portfolio risk. Although outside the direct context of Indonesian banking, these studies reinforce the global relevance of risk governance, technology adoption, and performance resilience in times of uncertainty. The performance of the banking sector during periods of economic turbulence has attracted significant attention in the existing literature, particularly in relation to credit risk, capital strength, and profitability. In the Indonesian context, several studies have explored how macroeconomic shocks, bank size, and crisis conditions – such as the COVID-19 pandemic – affect banking stability and performance. Table 1 summarizes key prior studies that provide important insights into these relationships, while also revealing unresolved issues regarding the role of core capital classification, especially for core capital 4 banks.

3. Synthesis

The reviewed literature consistently demonstrates that bank profitability is shaped by credit risk, bank-specific characteristics, and governance mechanisms, especially during crisis periods. While numerous studies focus on Islamic versus conventional banks, mergers, or governance structures, relatively few provide an in-depth examination of large-capital banks (core capital of 4) in Indonesia. Tio and Swandari (2025) and Hadi (2024) provide valuable steps in this direction by analyzing core capital categories, but the evidence remains limited regarding how core capital of 4 banks specifically navigated the COVID-19 crisis in terms of credit risk and profitability. Addressing this gap, the present study contributes by focusing on core capital of 4 banks as Indonesia's most systemically important institutions, providing empirical insights into their performance before and during the pandemic.

4. Research methods

This study adopts a comparative research design, which is appropriate for analyzing differences in bank performance before and during the COVID-19 pandemic. A comparative approach enables the identification of changes in risk profiles, governance, profitability, and capital adequacy across different periods, thereby offering insights into the resilience of banks under crisis conditions. The research relied on secondary data sources that provide reliable and verified information. Data were collected from the official website of the Indonesia Stock Exchange (IDX) (https://www.idx.co.id/), the Indonesian Financial Service Authority (https://www.ojk.go.id), and the respective official websites of the sample banks. These sources were chosen to ensure accuracy, transparency, and compliance with regulatory reporting standards.

The population of this study comprises 46 commercial banks listed on the Indonesia Stock Exchange during 2018–2021. Given the focus of the research on the largest and most systemically important institutions, the study employed a purposive sampling technique. The inclusion criteria were: (1) banks listed on the IDX continuously during 2018–2021, (2) banks categorized under the core capital of 4 grouping, reflecting the largest banks by core capital, and (3) availability of complete data on governance and financial performance during the study period. Based on these criteria, four banks were selected: Bank Rakyat Indonesia (BRI), Bank Central Asia (BCA), Bank Mandiri, and Bank Negara Indonesia (BNI). These banks represent the core of Indonesia's financial system, holding the majority share of banking capital and assets.

Data collection was carried out using the documentation method, in which financial statements, annual reports, and other official documents were systematically reviewed and recorded. This method is particularly suitable for banking research, as it allows for longitudinal comparison across consistent, standardized indicators. The study applies the RGEC framework (Risk Profile, Good Corporate Governance, Earnings, and Capital) as outlined in Indonesian Financial Service Authority Regulation Number 4/POJK.03/2016. Specifically, the risk profile was measured through the Non-Performing Loan (NPL) ratio, governance was assessed using self-assessment reports, profitability was captured by the Return on Assets (ROA), and capital was evaluated using the Capital Adequacy Ratio (CAR). This regulatory framework provides a comprehensive tool for assessing bank health and ensures the findings are aligned with supervisory standards.

By employing this design, the study ensures that the analysis is contextually relevant, methodologically robust, and aligned with regulatory frameworks, thereby addressing the gap in examining core capital of 4 bank performance during the pandemic.

5. Result

The normality test, conducted using the Shapiro-Wilk test, indicated that the data for the NPL, ROA, and CAR ratios were normally distributed, both prior to and throughout the COVID-19 pandemic, as the significance values for these ratios were greater than 0.05. In contrast, the GCG data prior to and throughout the pandemic did not follow a normal distribution, as the significance values were less than 0.05. As a result, the NPL, ROA, and CAR ratios were analyzed using the Paired Sample T Test, while the GCG data required a different statistical approach while the GCG indicator was tested using the Wilcoxon signed-rank test.

Table 2 illustrates that the average NPL before the pandemic was 2.11, while the average NPL during the pandemic increased to 3.00. This indicates that the NPL

ratio was higher during the pandemic than in the pre-pandemic period, suggesting a descriptive difference in the NPL average prior to and throughout the COVID-19 pandemic. The hypothesis test for the risk profile, based on the NPL ratio, revealed a Significant (2-tailed) value of 0.008. The results show a significant difference in the risk profile indicator, as measured by the NPL ratio, prior to and throughout the COVID-19 pandemic.

Table 2. Results of the risk profile difference test on the NPL ratio of bank core capital of 4 prior to and throughout the COVID-19 pandemic (source: processed data, 2024)

Variable		Mean	N	t	Significant (2-tailed)
NPL	Before the COVID-19 Pandemic	2,1100	8	–3,700	0.008
	During the COVID-19 Pandemic	3,0025	8		

Table 3. Results of GCG difference test of core capital of bank 4 prior to and throughout the COVID-19 pandemic (source: processed data, 2024)

Variable		Z	Asymp. Sig (2-Tailed)
GCG	Before COVID-19 Pandemic	–1,000	0.317
	After COVID-19 Pandemic		

The results of the hypothesis test using the Wilcoxon Signed Ranks Test (Table 3) show that the Asymp. Sig (2-tailed) value was 0.317. Because the value of 0.317 > 0.05, according to the decision criteria, it can be concluded that H0 is accepted. This means that there was no significant difference in Good Corporate Governance prior to and throughout the COVID-19 pandemic.

Table 4. Results of the earnings difference test on the ROA ratio of bank core capital of 4 prior to and throughout the COVID-19 pandemic (source: processed data, 2024)

Variable		Mean	N	t	Significant (2-tailed)
ROA	Before the COVID-19 Pandemic	3,3263	8	5,127	0.001
	During the COVID-19 Pandemic	2,1963	8		

Table 4 reveals that the average ROA before the pandemic was 3.32, while the average ROA during the pandemic decreased to 2.19. This indicates that the ROA ratio during the pandemic was lower than in the pre-pandemic period, suggesting a descriptive difference in the average ROA prior to and throughout the COVID-19 pandemic. The results of the Earnings hypothesis test for the ROA ratio showed a significance value (Significant 2-tailed) of 0.001. Since the Significant value of 0.001 is less than 0.05, according to the decision criteria, H0 is rejected, and Ha is accepted. Therefore, there is a significant difference in the ROA ratio prior to and throughout the COVID-19 pandemic.

Table 5. Results of the capital difference test on the CAR ratio of bank core capital of 4 prior to and throughout the COVID-19 pandemic (source: processed data, 2024)

Variable		Mean	N	t	Significant (2-tailed)
CAR	Before the COVID-19 Pandemic	21,4425	8	–0.354	0.734
	During the COVID-19 Pandemic	21,6750	8		

Table 5 indicates that the average CAR before the pandemic was 21.44, while the average CAR during the pandemic slightly increased to 21.67. This shows that the CAR ratio during the pandemic was higher than in the pre-pandemic period, suggesting that, descriptively, there was no significant difference in the average CAR prior to and throughout the COVID-19 pandemic. The results of the capital hypothesis test for the CAR ratio revealed a significance value (Significant 2-tailed) of 0.734. Since the Significant value of 0.734 is greater than 0.05, according to the decision criteria, H0 is accepted, and Ha is rejected. Therefore, there was no significant difference in the CAR ratio prior to and throughout the COVID-19 pandemic.

Table 6. Results of one way Anova test of NPL and ROA ratio of core capital of 4 bank during the COVID-19 pandemic (source: processed data, 2024)

Variable		df	F	Significant
NPL (During the Pandemic)	Between groups	3	15,502	0.011
	Within groups	4		
	Total	7		
ROA (During the Pandemic)	Between groups	3	7,151	0.044
	Within groups	4		
	Total	7		

6. Discussion

Based on Table 6, the test results indicated that the significance value for the NPL ratio was 0.011. Since 0.011 is less than 0.05, according to the decision criteria, H0 is rejected, and Ha is accepted. Therefore, there was a difference in the average NPL of core capital of 4 banks during the Covid-19 pandemic. The significance of the ROA ratio is 0.044. Because 0.044 < 0.05, according to the decision criteria, H0 is rejected, and Ha is accepted, indicating that there was a significant difference in the average ROA of core capital of 4 banks during the COVID-19 pandemic. The results of the one-way ANOVA test further confirm that there are significant differences in the average NPL and ROA ratios, highlighting variations in these indicators prior to and throughout the pandemic of core capital of 4 banks during the Covid-19 pandemic, a post-hoc Least Square Differences (LSD) test will be carried out to determine which groups are different. The results of the Post-hoc LSD test on the difference in the average NPL ratio value during the Covid-19 pandemic between BRI Bank

and Mandiri Bank obtained a significant Value. A value of 0.898 or > 0.05 means there is no difference in NPL values during COVID-19 between the BRI Bank and Mandiri Bank. Meanwhile, between BRI Bank and BCA Bank, a Significant A value of 0.024 was obtained, and BRI Bank and BNI Bank obtained a Significant A value of 0.030 or <0.05 means a difference in NPL values during COVID-19 between BRI Bank, BCA Bank, and BNI Bank. The difference in NPL values during COVID-19 between BCA Bank and BRI Bank obtained a significant Value of 0.024, BCA Bank and Mandiri obtained a significant value is 0.022, BCA Bank and BNI Bank obtained a significant A value of 0.002, such that each significant Values <0.05, so there was a difference between BCA Bank and BRI Bank, Mandiri, and BNI. The difference in NPL values during COVID-19 between the Mandiri Bank and BRI Bank obtained a Significant Value. A value of 0.898 or > 0.05 means there is no difference in NPL value during COVID-19 between Bank Mandiri and Bank BRI. Meanwhile, between Bank Mandiri and Bank BCA, significant A value of 0.022 is obtained between Bank Mandiri and Bank BNI, a significant A value of 0.034 or <0.05 was obtained, indicating that there is a difference in NPL value during COVID-19 between Bank Mandiri and Bank BCA and Bank BNI. The difference in the NPL value during COVID-19 between Bank BNI and Bank BRI was obtained as a significant Value of 0.030 between Bank BNI and Bank BCA, a significant A value of 0.002 was obtained between Bank BNI and Bank Mandiri. A value of 0.034 is obtained for each side. Value <0.05 means there indicates a difference between Bank BNI and Bank BRI, BCA, and Mandiri. It can be concluded that the average value of the NPL ratio during the COVID-19 pandemic for BCA Bank and BNI showed significant differences compared to the pre-pandemic period. This indicates variations in the risk profiles of these banks during the pandemic, reflecting the impact of the economic conditions caused by the crisis. Bank shows that both BCA Bank and BNI Bank have different NPL ratio values than the other core capital of 4 banks. At the same time, BRI and Mandiri Bank do not have different NPL ratios.

The results of the Post-hoc LSD test on the difference in the average value of the ROA ratio during the COVID-19 pandemic between the banks revealed significant variations. The test highlighted that the ROA ratios differed substantially across the banks, indicating that the impact of the pandemic on profitability was not uniform among them. This suggests that each bank experienced varying degrees of financial performance during the pandemic period. A value of 0.121 between BRI Bank and Mandiri Bank obtained a significant A value of 0.635 between BRI Bank and BNI Bank obtained a significant A value of 0.058 indicates that each significant Values > 0.05, indicating no difference in the ROA ratio value during the COVID-19 pandemic between BRI Bank and BCA, Mandiri, and BNI Banks. The difference in the ROA value during COVID-19 between BCA Bank and BRI Bank obtained a significant A value of 0.121 between BCA Bank and Mandiri Bank obtained a significant A value of 0.069 indicates that both banks have significant A value > 0.05, indicating no difference in the ROA ratio value during the COVID-19 pandemic between BCA Bank, BRI Bank, and Mandiri Bank. While the significant value between the BCA bank and BNI bank, which is 0.010 < 0.05, indicates that there is a difference in the ROA ratio value during the COVID-19 pandemic between the BCA and BNI banks. The difference in the ROA value during the COVID-19 pandemic between Mandiri Bank and BRI Bank obtained a significant A value of 0.635 between Mandiri Bank and BCA Bank obtained a significant A value of 0.069 between Mandiri Bank and BNI Bank obtained a significant A value of 0.101 indicated that each significant Value > 0.05 means no difference in the ROA ratio value during the COVID-19 pandemic between Mandiri Bank and BRI Bank, BCA, and BNI.

The results of the Post-hoc LSD test on the ROA ratio during the COVID-19 pandemic showed that the significance value between BNI and BRI banks was 0.058, and between BNI and Mandiri banks, it was 0.101. Since both values are above 0.05, this suggests that there was no significant difference in the ROA ratio between BNI, BRI, and Mandiri banks during the pandemic. However, the comparison between BNI and BCA banks yielded a significance value of 0.010, which is less than 0.05, indicating a significant difference in the ROA ratio between these two banks. Therefore, the average ROA ratio during the pandemic was significantly different between BNI and BCA banks, but not between BNI, BRI, and Mandiri banks. The BRI Bank and Mandiri Bank shows that banks do not differ in ROA ratio value against other core capital of 4 banks. Meanwhile, BCA and BNI banks have differences in the ROA ratio value.

In the risk profile indicator measured by the NPL ratio, the study results indicate that the average NPL of core capital of 4 banks before the COVID-19 pandemic was 2.11%, while the average NPL value during the pandemic was 3.00%. According to the composite ranking criteria, the average NPL ratio for both periods was categorized as “healthy”. However, the increase in the NPL ratio during the pandemic suggests a decline in the health level of the banks. This is supported by the hypothesis test results, which show a significance value of 0.008, which is less than 0.05, indicating a significant difference in the health level of core capital of 4 banks prior to and throughout the COVID-19 pandemic. The primary reason for this difference is the decrease in credit distribution during the pandemic, as the challenging economic conditions led to reduced lending activities by the government implemented a policy to reduce community mobility, including reducing business activities and community businesses, to reduce the number of Covid-19 cases. However, this policy will cause the business or real sector to experience a decline in business activities, which will result in decreased sales and income. This also affects the ability of the community or business sector to pay their obligations or debts. The results of this study align with those of Sullivan and Widoatmodjo (2021), who state that there is a significant difference in bank performance, as measured by NPL, prior to and throughout the pandemic.

The results of the research difference test had a significance value of 0.070 and confidence level of 90% (0.1).

In the good corporate governance indicator, the results of the study show that the average GCG score of core capital of 4 bank before the Covid-19 pandemic was 1.63, while the average GCG score of core capital of 4 bank during the Covid-19 pandemic was 1.50. The composite ranking criteria gave the average GCG score prior to and throughout the COVID-19 pandemic the predicate "healthy". Although the average value shows a decrease in the GCG score during the Covid-19 pandemic, the decrease in the score is only 0.13, so it can be concluded that there is no difference in the health level of core capital of 4 banks prior to and throughout the Covid-19 pandemic. This is proven based on the results of the hypothesis test, which shows a significance value of 0.317 > 0.05; therefore, it can be concluded that there is no significant difference in the health level of the core capital of 4 bank prior to and throughout the COVID-19 pandemic. The transfer of company management by the owner (principal) to professional staff (agents) causes the company to require good governance, known as Good Corporate Governance (GCG). The board of commissioners and directors who act as agents in a company are given the authority to manage the company's operations and make decisions on behalf of the owner. With their authority, managers cannot act in the owner's best interests because of differences in interests (conflict of interest). However, companies must be able to defend themselves from uncertain conditions. Therefore, both prior to and throughout the Covid-19 pandemic, the core capital of 4 bank was able to maintain the company because it was based on the five principles of GCG implementation in banking companies: transparency, accountability, responsibility, independence, and fairness, resulting in a core capital of 4 bank not having a significant difference in GCG score values either before or during the Covid-19 pandemic. This means that prior to and throughout the COVID-19 pandemic, the core capital of 4 bank implemented the five basic principles of banking and assessed the level of health by covering 11 GCG assessment factors well, so that there was no difference between prior to and throughout the COVID-19 pandemic (Kristanto & Hikmah, 2022).

The findings of this study provide important insights into the financial performance and resilience of core capital of 4 banks during the COVID-19 pandemic. The analysis revealed significant differences in non-performing loans (NPL) and return on assets (ROA) ratios before and during the pandemic, while good corporate governance (GCG) and capital adequacy ratios (CAR) remained relatively stable. These findings highlight the asymmetric effects of the crisis on different dimensions of banking health.

From the perspective of risk profiles, measured by NPL, the study demonstrated a significant increase from 2.11% pre-pandemic to 3.00% during the pandemic. Although still within the "healthy" category according to regulatory standards, this increase suggests heightened credit risk as borrowers faced difficulties fulfilling their obligations due to reduced economic activity, mobility restrictions, and weakened cash flows. These results are consistent with the findings of Sullivan and Widoatmodjo (2021), who also documented worsening credit quality in Indonesian banks during the pandemic, and with Utari and Viverita (2024), who emphasized the sensitivity of bank profitability to credit risk shocks in periods of economic downturn. However, the results diverge from Hadi (2024), who suggested that while loan-at-risk significantly influences profitability, banks with larger capital buffers (such as core capital of 4) could better mitigate NPL escalation. The divergence may stem from the fact that Hadi's broader sample included smaller banks with less robust risk management mechanisms, while this study focuses specifically on the four largest banks that faced unique pressures and responsibilities during the pandemic.

At the individual bank level, the post-hoc analysis revealed substantial variation: BCA and BNI experienced significant differences in NPL compared to other banks, whereas BRI and Mandiri did not. This result suggests heterogeneity in risk management strategies. BCA's conservative credit selection and strong monitoring enabled it to maintain the lowest NPL among its peers, aligning with the argument of Tio and Swandari (2025) that effective risk governance structures help mitigate crisis impacts. Conversely, BNI's higher NPL was driven by debtor cash flow disruptions, reflecting weaker resilience in its credit portfolio. This heterogeneity highlights the relevance of Fitriyatustany et al. (2024), who argued that insolvency risks vary significantly between banks depending on governance quality and sectoral exposure. Theoretical implications can be drawn here: while the "too-big-to-fail" argument suggests large banks are equally resilient, our findings show that within core capital of 4 itself, resilience is uneven, suggesting that governance practices and strategic focus areas matter as much as sheer size.

In terms of earnings performance, as measured by ROA, the decline from 3.33% pre-pandemic to 2.20% during the pandemic illustrates the profitability challenges faced by core capital of 4 banks. This decline mirrors global findings where profitability was constrained by reduced loan demand, higher provisioning, and lower interest margins. The study's results are aligned with Azmi et al. (2021) and Tanti et al. (2022), both of whom confirmed significant deterioration in bank profitability during the pandemic. However, when compared to Onomakpo (2025), who highlighted the role of ESG factors in stabilizing performance in other industries, the findings suggest that Indonesian banks may need to adopt stronger ESG and risk diversification practices to cushion profitability against macroeconomic shocks. Interestingly, BCA managed to maintain the highest ROA by leveraging digital transformation and introducing innovative lending products, echoing Srairi (2025) argument that fintech adoption enhances resilience by diversifying income streams and strengthening risk disclosure. In contrast, BNI, with the lowest ROA, demonstrates how aggressive provisioning strategies, while prudent, can suppress profitability in the short term.

The stability of GCG scores before and during the pandemic indicates that governance structures remained intact despite operational challenges. This finding corroborates Kristanto and Hikmah (2022), Azmi et al. (2021), and Tanti et al. (2022), all of whom observed minimal disruption in governance mechanisms. The absence of significant differences also aligns with Dagunduro et al. (2025), who emphasized the critical role of risk management committees in sustaining governance quality even under crisis conditions. Nonetheless, the marginal decrease in GCG scores suggests that governance structures were tested during the pandemic, pointing to a latent vulnerability that may surface in more prolonged crises. From a theoretical lens, this reflects the "risk governance paradox" identified by Srairi (2025), where banks disclose governance practices but actual effectiveness in mitigating shocks may be uneven.

The capital adequacy ratio (CAR) findings further reinforce the resilience narrative. Both before and during the pandemic, CAR values exceeded regulatory minimums by a large margin, showing no significant differences across the periods. These results suggest that core capital of 4 banks benefitted from regulatory measures, including the Minister of Finance Regulation No. 70/PMK.05/2020 and Indonesian Financial Service Authority's minimum capital requirements, which stabilized capital buffers. This aligns with Fadhil et al. (2025), who evaluated Bank Syariah Indonesia and concluded that CAR levels remained robust due to proactive capital management. Similarly, Li et al. (2025) emphasized that effective enterprise risk management practices, including strong capital planning, enhance both forecast accuracy and financial stability. Thus, while earnings and risk profiles fluctuated, capital adequacy remained a stronghold of resilience for core capital of 4 banks, reflecting both their systemic importance and the effectiveness of regulatory intervention.

From a practical perspective, these findings offer critical implications. First, banks need to strengthen credit risk management systems by adopting advanced data analytics and machine learning tools for debtor monitoring, echoing Tahvildari (2025), who showed the benefits of robo-advisors in improving decision-making in the financial sector. Second, while digitalization proved advantageous for BCA, it should be further scaled across all core capital of 4 banks to ensure uniform resilience, particularly given the uncertain nature of future crises. Third, policymakers should recognize that large banks, while more resilient overall, are not homogenous; targeted policies addressing bank-specific vulnerabilities could enhance systemic stability.

Theoretically, this study contributes to the growing literature on bank resilience by challenging the assumption that size alone ensures stability. By showing significant differences in NPL and ROA within core capital of 4 banks, the study underscores the importance of internal governance, digital transformation, and strategic risk management in shaping resilience. This adds to the discourse of Tio and Swandari (2025) and Fitriyatustany et al. (2024), extending their arguments by providing empirical evidence focused on the largest Indonesian banks during COVID-19.

Despite its contributions, the study has limitations. First, the analysis is restricted to four banks within core capital of 4, limiting generalizability across other bank groups such as core capital of 1–3. Second, the study relied on secondary financial data, which may not fully capture qualitative governance dynamics or strategic decision-making processes. Third, the focus was limited to the COVID-19 pandemic period; future crises with different characteristics (e.g., digital disruptions, climate shocks) may produce divergent outcomes. Future research could expand the scope by including cross- core capital of comparisons (as suggested by Tio and Swandari (2025)), integrating ESG dimensions (as in Onomakpo, 2025), or employing mixed methods to capture both quantitative performance and qualitative managerial perspectives.

The novelty of this study lies in its exclusive focus on core capital of 4 banks, which, despite their systemic importance, have been relatively understudied compared to smaller banks or Islamic banking institutions. By identifying significant intra-group differences in resilience, the study highlights the heterogeneity within Indonesia's largest banks – a perspective that challenges the prevailing assumption of homogeneity among top-tier financial institutions. This perspective offers both scholarly and practical value, providing insights for academics, regulators, and practitioners on how bank-specific strategies influence resilience even within the largest capital group.

7. Conclusions

The objective of this study is to assess the variations in the health status of core capital of 4 banks prior to and throughout the COVID-19 pandemic by utilizing the RGEC method (Risk Profile, Good Corporate Governance, Earnings, and Capital). Additionally, this study seeks to analyze the differences in the health levels of core capital of 4 banks during the pandemic period. Based on the analysis and discussion results regarding the health level of core capital of 4 banks, the following conclusions can be drawn. A notable difference exists in the health level of core capital of 4 banks prior to and throughout the COVID-19 pandemic, particularly concerning the Risk Profile aspect. Regarding the aspect of Good Corporate Governance, there is no significant difference in the health level of core capital of 4 banks prior to and throughout the COVID-19 pandemic. There is a significant difference in the health level of core capital of 4 banks prior to and throughout the Covid-19 pandemic regarding earnings. This is because banking income decreased because of a decrease in credit interest income, which is the impact of the decrease in credit distribution. No significant difference was found in the health level of core capital of 4 banks prior to and throughout the COVID-19 pandemic concerning capital. The health variation between core capital of 4 banks during the pandemic was. As reviewed from the risk profile aspect, shows that the BCA bank has

a significant difference from BRI, BNI, and Mandiri banks. The BNI bank also has a significant difference from the BRI, BCA, and Mandiri banks. Meanwhile, BRI Bank is no different from Mandiri Bank. The BRI banks have no significant difference from BCA, BNI, and Mandiri banks. Mandiri Bank has no significant difference from BRI, BCA, and BNI banks. Meanwhile, the BCA bank is significantly different from the BNI bank. The findings of this study are anticipated to offer valuable insights for banks. The research implications suggest that banks should focus on maintaining their performance to navigate through the challenges posed by the COVID-19 pandemic. Additionally, core capital of 4 banks have continued to adhere to Good Corporate Governance (GCG) principles throughout the pandemic, enabling them to develop effective programs that generate benefits for the bank during both the pre-pandemic and pandemic periods. This shows the resilience and strategic direction that these banks have taken despite the economic disruptions caused by COVID-19. Bank core capital of 4 still has good capital adequacy. This research requires an in-depth study of the Good Corporate Governance (GCG) aspect because it can be viewed from many qualitative aspects. This research requires an in-depth study of the capital aspect because it does not differ from standard conditions in this abnormal condition. The ratios or variables used are expected to be added in further research to obtain broader and more complex research results.

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Data availability statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request. However, any data containing sensitive or confidential information have been excluded or anonymized to maintain ethical standards and privacy concerns.

Author contributions

The contributions of each author to this article are outlined below in accordance with the CRediT authorship taxonomy:

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- Writing – Review & Editing: Busaini;
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