

Market Structure, Conduct, and Performance of Indonesian Banking Industry

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ABSTRACT

This study examines the sequential relationship between market structure, bank conduct, and financial performance in Indonesia's banking industry using the Structure-Conduct-Performance (SCP) framework. The analysis focuses on the four largest commercial banks – BCA, BRI, Mandiri, and BNI – during 2015–2024, representing a highly concentrated banking market. Using balanced panel data and a two-model fixed-effects regression framework, the study evaluates whether bank size influences lending behavior and profitability. The findings show that bank size has a positive and statistically significant effect on credit distribution, indicating that structural expansion strengthens intermediation capacity. Credit distribution subsequently exerts a positive and significant effect on Return on Assets (ROA), suggesting that effective lending activities contribute positively to profitability. However, the direct effect of bank size on ROA is negative and significant, implying that asset expansion is not necessarily followed by proportional improvements in profitability efficiency. Overall, the results support a sequential but asymmetrical SCP mechanism in Indonesia's concentrated banking industry. Market structure significantly affects bank conduct, while profitability is driven more by effective intermediation and managerial efficiency than by structural dominance alone. Nevertheless, the findings are limited to dominant large banks and may not be generalizable to smaller banking institutions.

ABSTRAK

Penelitian ini menganalisis hubungan berurutan antara struktur pasar, perilaku bank, dan kinerja keuangan pada industri perbankan Indonesia menggunakan kerangka Structure-Conduct-Performance (SCP). Analisis difokuskan pada empat bank komersial terbesar di Indonesia, yaitu BCA, BRI, Mandiri, dan BNI selama periode 2015–2024 yang merepresentasikan pasar perbankan yang terkonsentrasi tinggi. Dengan menggunakan data panel seimbang dan kerangka regresi fixed effects dua model, penelitian ini menguji apakah ukuran bank memengaruhi perilaku penyaluran kredit dan profitabilitas. Hasil penelitian menunjukkan bahwa ukuran bank berpengaruh positif dan signifikan terhadap penyaluran kredit, yang mengindikasikan bahwa ekspansi struktural memperkuat kapasitas intermediasi bank. Penyaluran kredit selanjutnya berpengaruh positif dan signifikan terhadap Return on Assets (ROA), yang menunjukkan bahwa aktivitas kredit yang efektif berkontribusi terhadap peningkatan profitabilitas. Namun, pengaruh langsung ukuran bank terhadap ROA bersifat negatif dan signifikan, yang mengindikasikan bahwa ekspansi aset tidak selalu diikuti oleh peningkatan efisiensi profitabilitas secara proporsional. Secara keseluruhan, hasil penelitian mendukung mekanisme SCP yang bersifat berurutan namun asimetris dalam industri perbankan Indonesia. Profitabilitas bank lebih ditentukan oleh efektivitas intermediasi dan efisiensi manajerial dibandingkan dominasi struktural semata. Namun demikian, temuan penelitian ini terbatas pada bank-bank besar dominan dan belum dapat digeneralisasikan pada bank kecil dan menengah.

Keywords:

Market Structure, Return on Assets, Size, Credit, SCP Model.

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1. INTRODUCTION

The banking industry plays a fundamental role in supporting economic growth, financial stability, and the effective functioning of modern financial systems. As financial intermediaries, banks facilitate the allocation of financial resources by channeling funds from surplus economic units, such as households and investors, to deficit units, including businesses and government institutions. Through this intermediation function, banks contribute to investment financing, liquidity provision, and risk distribution within the economy. In emerging economies such as Indonesia, where financial markets are still developing and capital markets remain relatively limited, commercial banks represent the dominant component of the financial sector. Consequently, the performance and stability of banks are closely linked to broader macroeconomic outcomes, making the determinants of bank performance an important subject of academic inquiry as well as regulatory attention.

One theoretical framework that has been widely employed to analyze the relationship between industry characteristics and firm outcomes is the Structure-Conduct-Performance (SCP) paradigm. Originally introduced by (Mason, 1939) and later formalized by (Bain, 1951), the SCP model proposes that the structural characteristics of a market such as concentration, entry barriers, and firm size influence the strategic behavior of firms, which in turn determines performance outcomes. Within the banking sector, market structure may affect how banks compete, allocate credit, manage risks, and set pricing strategies. Under the classical SCP perspective, industries with higher concentration levels may enable dominant firms to exercise market power, potentially leading to higher profitability due to reduced competitive pressures. However, subsequent developments in industrial organization theory have challenged this deterministic view, suggesting that performance differences among firms may instead reflect internal efficiency rather than market power alone. In particular, the Efficient Structure hypothesis argues that more efficient institutions tend to grow larger and achieve higher profitability because of superior managerial capabilities and resource utilization (Berger & Humphrey, 1997).

Empirical evidence regarding the relationship between structure, conduct, and performance in the banking industry remains mixed. Some studies find that larger banks benefit from economies of scale, diversified funding sources, and stronger market positioning, enabling them to generate higher profitability. Other studies, however, suggest that excessive size may generate operational complexity, increased administrative costs, and coordination challenges that ultimately reduce efficiency and financial returns. More recent post-pandemic banking studies further indicate that digital transformation pressures, fintech competition, and rising technological investment costs have altered traditional competition profitability relationships in the banking sector (Li, Spigt, & Swinkels, 2017; Phan, Narayan, Rahman, &

Hutabarat, 2020). These contrasting findings are particularly relevant in emerging markets where regulatory frameworks, institutional quality, and market maturity differ from those in advanced economies. As a result, the applicability of the traditional SCP mechanism in modern banking systems continues to be an open empirical question.

In the Indonesian context, the banking industry exhibits a relatively high level of structural concentration. Over the past decade, four major commercial banks, Bank Central Asia (BCA), Bank Rakyat Indonesia (BRI), Bank Mandiri, and Bank Negara Indonesia (BNI) have consistently dominated the market in terms of total assets, lending volume, and customer base. Together, these institutions account for a substantial share of the national banking system and play a critical role in supporting financial intermediation and economic activity. Their structural dominance provides advantages such as wider branch networks, stronger capital buffers, and greater access to diversified funding sources. These factors may influence lending strategies, risk management practices, and overall financial performance. At the same time, profitability commonly measured by Return on Assets (ROA)—depends not only on structural scale but also on how effectively banks allocate resources and manage operational efficiency.

Previous studies on Indonesian banking have examined various determinants of bank performance within the Structure-Conduct-Performance (SCP) perspective, although most studies focus only on partial relationships among the SCP components. For example, (Jumono, Abdurrahman, & Mala, 2017) primarily investigated the relationship between market concentration and banking performance, while (Hendra & Hartomo, 2017) focused on market share and bank risk-taking behaviour. Similarly, (Yudaruddin, 2015) and several subsequent studies mainly analysed efficiency and profitability determinants without explicitly incorporating market structure and bank conduct into an integrated SCP framework. More recent studies, such as (Santoso, Suprpto, Zakaria, Kusumaningrum, & Jamil, 2023), have explored banking competition and profitability in Indonesia using the SCP approach; however, the analysis remains concentrated on competition-performance linkages rather than empirically testing the sequential transmission mechanism from structure to conduct and subsequently to performance.

In addition, many previous studies rely on industry-level indicators, such as market concentration ratios and competition indices, to explain profitability, whereas relatively fewer studies employ bank-level indicators to simultaneously capture structural characteristics, bank conduct, and financial performance. Consequently, empirical evidence regarding the integrated SCP mechanism at the firm level in the Indonesian banking industry remains limited. This study therefore addresses the gap by examining the interrelationship between structure, conduct, and performance using bank-level panel data and representative indicators, including bank size, credit allocation, and profitability.

This study seeks to address this gap by revisiting the SCP paradigm within the context of Indonesia's concentrated banking industry. Specifically, bank size, measured by total assets is used as a proxy for

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market structure, reflecting the structural dominance and resource capacity of each bank. Credit distribution is employed as an indicator of bank conduct, representing strategic intermediation behavior in allocating financial resources. Financial performance is measured using Return on Assets (ROA), a widely accepted profitability indicator that captures managerial efficiency in utilizing assets to generate income. By integrating these three core variables, the study provides a simplified yet theoretically grounded framework for examining how structural dominance translates into strategic behavior and financial outcomes among major banks.

The objective of this research is therefore twofold. First, it aims to analyze whether bank size significantly influences lending behavior among Indonesia's largest commercial banks. Second, it seeks to evaluate whether structural scale and lending activity jointly affect bank profitability. By employing panel data regression using audited financial statements from BCA, BRI, Mandiri, and BNI during the period 2015–2024, this study provides updated empirical evidence on the dynamics of structure, conduct, and performance among Indonesia's largest commercial banks. These four banks collectively account for more than 56% of national banking assets and therefore represent the dominant segment of the Indonesian banking industry. Nevertheless, the findings should be interpreted cautiously, as they may not be fully generalizable to medium-sized and small-scale banks that operate under different market structures, competitive pressures, and operational characteristics. The findings are expected to contribute to the academic literature on banking structure and industrial organization while also offering practical insights for regulators and bank managers seeking to strengthen financial performance and intermediation efficiency.

It should be noted that this study focuses exclusively on the four largest commercial banks in Indonesia, which collectively accounted for more than 56 percent of total banking assets by 2024. While this focus allows a clearer examination of structural dominance within an oligopolistic market environment, the findings may not fully capture the operational characteristics of smaller or medium-sized banks that operate under different competitive and regulatory conditions.

2. RESEARCH FRAMEWORK AND HYPOTHESES

The Structure-Conduct-Performance (SCP) paradigm, originally introduced by (Mason, 1939) and later formalized by (Bain, 1951), explains how market structure influences firm behavior and subsequently determines performance outcomes. Within industrial organization theory, structural characteristics such as concentration, entry barriers, and firm size shape the competitive environment in which firms operate. In the banking sector, market structure influences lending strategies, funding allocation, risk management, and profitability. Under the traditional SCP perspective, highly concentrated markets allow dominant institutions to exercise market power, potentially generating superior profitability due to reduced competitive pressure and stronger bargaining positions.

However, subsequent developments in banking and industrial or-

ganization literature suggest that the relationship between structure, conduct, and performance is more dynamic and conditional than initially proposed by the classical SCP framework. The Efficient Structure hypothesis argues that superior performance among large banks may arise not from market power itself, but from managerial efficiency, technological capability, and superior resource allocation. In increasingly digitalized banking systems, competitive advantage is determined not only by structural dominance but also by operational adaptability, technological integration, and strategic efficiency. Consequently, structural concentration alone may no longer guarantee sustained profitability.

Recent post-pandemic banking studies further reinforce this evolving perspective. Following the COVID-19 crisis, banking competition has increasingly been influenced by digital transformation, fintech penetration, regulatory adaptation, and changes in customer behavior. Large banks generally demonstrated stronger balance-sheet resilience during the pandemic because of diversified funding sources and stronger capital buffers. Nevertheless, they simultaneously faced rising compliance costs, accelerated digitalization expenditures, cybersecurity risks, and organizational restructuring pressures. Recent international evidence suggests that large-scale banks may benefit from structural resilience while still experiencing declining profitability persistence when operational efficiency fails to keep pace with organizational expansion (Ahamed, Ho, Mallick, & Matousek, 2021; Li, Spigt, & Swinkels, 2017). In modern banking environments, profitability is increasingly shaped by managerial capability, technological efficiency, and digital adaptation rather than by market concentration alone.

Empirical findings concerning SCP relationships in banking remain mixed across institutional settings and periods. Earlier studies in emerging economies generally support the traditional SCP proposition that larger banks tend to expand lending more aggressively due to broader funding capacity, stronger liquidity positions, and greater strategic flexibility (Yudaruddin, 2015; Jumono, Abdurrahman, & Mala, 2017). These findings imply that structural dominance strengthens banks' intermediation capacity and influences strategic conduct within concentrated banking systems. Similarly, international studies show that large institutions often benefit from economies of scale and funding diversification, enabling stronger lending expansion and market positioning.

However, empirical evidence regarding the direct relationship between market structure and profitability remains inconclusive. Some studies conclude that concentration enhances profitability through market power and reduced competition, whereas others find that profitability is driven more by efficiency, governance quality, and strategic management than by structural dominance itself. (Mirzaei, Moore, & Liu, 2013), for example, argue that the impact of market structure on bank profitability depends on institutional quality and regulatory effectiveness. This suggests that structural concentration does not necessarily produce uniform profitability outcomes across banking systems with different supervisory environments and governance characteristics. In

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other words, the same degree of concentration may generate different performance consequences depending on how efficiently banks manage structural resources and adapt to regulatory and technological changes.

The present study does not explicitly incorporate institutional quality, fintech competition, or digital capability as moderating variables because the analysis focuses on a relatively homogeneous regulatory environment, namely Indonesia's four largest commercial banks operating under the same national banking regulations and supervisory framework during 2015–2024. By limiting the sample to BCA, BRI, Mandiri, and BNI, the study seeks to minimize institutional heterogeneity and isolate the sequential SCP mechanism at the firm level. Moreover, the selected banks operate within relatively similar prudential regulations, capital requirements, and macroeconomic conditions, allowing the analysis to focus more directly on the interrelationship between structure, conduct, and performance. Nevertheless, the moderating role of institutional quality, fintech competition, and digital banking transformation remains important and should be explored in future studies.

In the Indonesian context, the banking industry exhibits a highly concentrated market structure dominated by several large institutions. The four largest commercial banks consistently control more than half of total national banking assets, indicating an oligopolistic market configuration. Such structural concentration provides dominant banks with broader funding access, stronger capital adequacy, extensive branch networks, and greater market influence. These structural advantages are expected to shape strategic conduct, particularly in credit allocation and intermediation activities, which subsequently influence financial performance.

This study operationalizes the SCP framework using three bank-level variables. Market structure is represented by bank size measured by total assets, reflecting structural dominance and resource capacity. Bank conduct is proxied by credit distribution, representing strategic lending behavior and intermediation activity. Financial performance is measured using Return on Assets (ROA), which captures managerial efficiency in utilizing assets to generate profitability. By integrating these variables, the study provides a simplified yet theoretically grounded framework for examining whether profitability among Indonesia's dominant banks is primarily driven by structural power or by effective managerial conduct.

To empirically represent the SCP mechanism, this study employs a sequential two-model panel regression framework. The first sub-structure evaluates the effect of market structure (Size) on bank conduct (Credit), while the second sub-structure examines the effects of market structure and bank conduct on financial performance (ROA). This specification reflects the sequential relationship implied within the SCP paradigm, where structure influences conduct and conduct subsequently relates to performance.

In this framework, Credit represents the conduct dimension within the SCP sequence rather than a moderating variable. The first model

evaluates how market structure is associated with lending behavior, whereas the second model examines how market structure and lending behavior jointly relate to profitability. Accordingly, the sequential specification captures the ordered relationship between structure, conduct, and performance within Indonesia's concentrated banking industry.

Figure 1 presents the sequential SCP regression framework employed in this study. Model 1 (Sub-structure 1) examines the effect of market structure (Size) on bank conduct (Credit), while Model 2 (Sub-structure 2) evaluates the effects of market structure and bank conduct on financial performance (ROA). The framework reflects the sequential logic of the SCP paradigm, where market structure influences bank conduct and lending behavior subsequently relates to financial performance within Indonesia's concentrated banking industry.

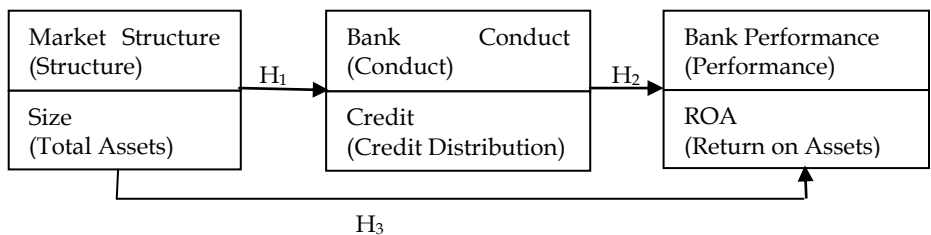


Figure 1
Sequential SCP Regression Framework

Market Structure and Bank Conduct

Within the SCP framework, structural dominance influences the strategic behavior of firms. In banking, larger institutions generally possess broader funding bases, stronger liquidity positions, and greater operational flexibility, enabling them to expand lending activities more aggressively than smaller competitors. Banks with substantial asset capacity are also better positioned to absorb risk and maintain stable intermediation activities during periods of economic uncertainty.

Previous empirical studies generally support the positive relationship between market structure and lending behavior. (Yudaruddin, 2015; Jumono, Abdurrahman, & Mala, 2017) found that banks with greater structural advantages tend to adopt more aggressive credit expansion strategies. Similar evidence is documented in international studies showing that larger banks possess stronger intermediation capabilities due to economies of scale and funding diversification. Recent banking evidence also indicates that structurally dominant banks tend to maintain stronger lending resilience during post-pandemic recovery periods because of superior liquidity management and digital banking capacity. These findings collectively suggest that structural dominance significantly shapes bank conduct, particularly in credit allocation decisions.

Based on the theoretical arguments and empirical findings, the following hypothesis is proposed:

H₁: Market structure positively affects bank conduct.

Bank Conduct and Performance

Within the SCP paradigm, conduct represents managerial decisions regarding resource allocation, lending strategy, pricing behavior, and

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operational policy. In banking, credit allocation constitutes one of the most important strategic activities because lending serves as the primary channel through which banks generate interest income and profitability.

Prior studies consistently show that effective lending and intermediation activities contribute positively to bank profitability. Efficient credit allocation improves asset utilization and income generation, thereby enhancing ROA. However, profitability depends not merely on the quantity of credit expansion but also on managerial discipline, credit quality management, operational efficiency, and technological adaptability. Recent evidence from emerging banking markets also indicates that digital banking capability and technological efficiency increasingly determine profitability persistence among large commercial banks, particularly in highly concentrated financial systems (Phan, Narayan, Rahman, & Hutabarat, 2020; Ozili, 2024).

In this study, credit distribution is employed as the primary proxy for bank conduct because it reflects how banks strategically transform structural resources into productive financial activities. Within concentrated banking systems, effective lending behavior is expected to strengthen profitability through improved intermediation performance. The sequential specification adopted in this study further implies that bank conduct functions as the transmission channel through which structural dominance influences profitability.

Accordingly, the second hypothesis is formulated as follows:

H₂: Bank conduct positively affects bank performance.

Market Structure and Bank Performance

The direct relationship between market structure and performance remains one of the central debates within SCP literature. Traditional SCP theory predicts that dominant firms in concentrated markets achieve superior profitability because market power reduces competitive pressure and increases strategic control over pricing and resource allocation.

However, more recent literature suggests that structural dominance may also generate diseconomies of scale. Large banks frequently face organizational complexity, higher administrative costs, regulatory burdens, technological adjustment costs, and coordination inefficiencies that potentially reduce profitability. Recent post-pandemic banking evidence further suggests that digital transformation expenditures and fintech competition have weakened some traditional market-power advantages previously enjoyed by dominant institutions (Li, Spigt, & Swinkels, 2017; (Ozili, 2024). Consequently, excessive expansion may weaken operational efficiency despite stronger market positioning and broader asset capacity.

In Indonesia's concentrated banking industry, the "Big Four" banks provide an important context for examining whether structural dominance directly improves profitability or instead generates operational burdens that reduce efficiency. This study therefore evaluates whether bank size exerts a direct influence on ROA alongside its sequential relationship with lending behavior within the SCP framework. Based on these competing theoretical perspectives, the following hy-

pothesis is proposed:
H₃: Market structure directly affects bank performance.

3. RESEARCH METHOD
Samples and sampling techniques

This study employs a quantitative explanatory research design to analyze the causal relationships among market structure, bank conduct, and financial performance within the Indonesian banking industry using the Structure–Conduct–Performance (SCP) paradigm originally developed by (Bain, 1951; (Mason, 1939). The research utilizes secondary panel data obtained from audited annual financial statements of Indonesia’s four largest commercial banks, Bank Central Asia (BCA), Bank Rakyat Indonesia (BRI), Bank Mandiri, and Bank Negara Indonesia (BNI) covering the period 2015–2024. These banks are selected using purposive sampling criteria, specifically their consistent dominance in total asset ownership and their substantial contribution to the national concentration ratio (CR4), which exceeds 50 percent during the observation period. This sampling approach aims to capture structural behavior within an oligopolistic banking configuration rather than to represent the entire population of Indonesian commercial banks. The final dataset forms a balanced panel consisting of four cross-sectional units observed over ten years, resulting in 40 observations.

The operationalization of variables follows the SCP theoretical construct and contemporary banking literature. Market structure is proxied by bank size, measured as the natural logarithm of total assets. In industrial organization theory, firm size reflects structural dominance and resource capacity, serving as a proxy for market power (Bain, 1951; Berger & Humphrey, 1997). Within banking studies, asset size is frequently used to represent structural advantage and competitive positioning (Yudaruddin, 2015; Mirzaei, Moore, & Liu, 2013). Bank conduct is represented by credit distribution, measured as the natural logarithm of total loans. Credit allocation reflects intermediation strategy and managerial decision-making in deploying structural resources to generate returns (Jumono, Abdurrahman, & Mala, 2017; (Sufian & Habibullah, 2012). Financial performance is measured using Return on Assets (ROA), calculated as net income divided by total assets. ROA is widely recognized as a robust profitability indicator because it captures asset utilization efficiency and minimizes leverage distortion (Berger & Humphrey, 1997). The operational definitions of variables are summarized in Table 1.

Table 1. Operational Definition of Variables

Variable	Conceptual Definition	Measurement	Formula
Market Structure (SIZE)	Structural dominance and market power reflected by bank resource capacity (Bain, 1951; Yudaruddin, 2018); Mirzaei et al., 2013).	Natural logarithms of total assets	$SIZE_{it} = \ln(TotalAssets_{it})$
Bank Conduct	Strategic inter-	Natural loga-	$CREDIT_{it} = \ln(TotalLoans_{it})$

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(Credit)	mediation behavior reflected in lending activity (Jumono et al., 2017); Sufian & Habibullah, 2012)	rithm of total loans	
Financial Performance (ROA)	Efficiency of asset utilization in generating profit (Berger & Humphrey, 1997)	Net income divided by total assets	$ROA_{it} = \frac{NetIncome_{it}}{TotalAssets_{it}}$

To empirically test the Structure-Conduct-Performance (SCP) mechanism, this study employs panel data regression analysis using a sequential two-model specification. The econometric framework is designed to reflect the causal sequence implied in the SCP paradigm, where market structure influences bank conduct, and bank conduct subsequently affects financial performance. In this framework, Credit reflects the behavioral component linking market structure and financial performance within the SCP sequence.

The first model (Sub-structure 1) examines whether market structure influences bank conduct:

$$CREDIT_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \mu_i + \varepsilon_{it}$$

The second model (Sub-structure 2) evaluates the effects of market structure and bank conduct on financial performance:

$$ROA_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 CREDIT_{it} + \mu_i + \varepsilon_{it}$$

where i denotes bank, t denotes year, μ_i represents unobserved time-invariant bank-specific effects, and ε_{it} is the stochastic error term. The logarithmic specification in the first model allows the interpretation of coefficients as elasticities, while the second model estimates the marginal effects of structural scale and lending behavior on profitability.

The sequential specification enables the analysis of the ordered relationship implied in the SCP framework. The direct relationship is represented by the coefficient of Size on ROA in the second model, while the sequential linkage between market structure, bank conduct, and financial performance is reflected in the relationship Size $\rightarrow$ Credit $\rightarrow$ ROA across the two regression models. In this framework, the first model evaluates how market structure is associated with lending behavior, whereas the second model examines how market structure and lending behavior jointly relate to profitability. Accordingly, the specification reflects the causal ordering proposed in the SCP paradigm, where structure influences conduct and conduct subsequently relates to performance.

Although banking profitability is widely recognized to be influenced by additional bank-specific and macroeconomic variables such as Non-Performing Loans (NPL), Operational Efficiency Ratio (BOPO), Capital Adequacy Ratio (CAR), Loan-to-Deposit Ratio (LDR), inflation, interest rates, and economic growth, this study intentionally adopts a parsimonious specification to isolate the core SCP transmission mecha-

nism. The primary objective is not to construct a comprehensive profitability prediction model, but rather to examine whether structural dominance influences profitability through bank conduct within Indonesia's concentrated banking market.

Furthermore, the selected sample consists of four dominant commercial banks operating under relatively similar prudential regulations, macroeconomic conditions, and supervisory frameworks during the observation period. This relatively homogeneous setting reduces cross-sectional heterogeneity arising from institutional and macroeconomic differences. Nevertheless, omitted-variable bias may still exist, and future studies are encouraged to incorporate additional control variables to provide a more comprehensive explanation of bank profitability dynamics.

The estimation procedure begins with pooled ordinary least squares (OLS) as a baseline model. Panel model selection is subsequently conducted using the Chow test to compare pooled OLS and fixed effects models, and the Hausman test to determine whether fixed or random effects estimators are more appropriate (Gujarati & Porter, 2020). The fixed effects model is selected based on statistical significance and theoretical considerations, as it controls for unobserved heterogeneity across banks that may influence profitability and lending behavior.

To ensure the validity of statistical inference, several diagnostic tests are conducted prior to hypothesis testing. Multicollinearity is assessed using the Variance Inflation Factor (VIF), heteroskedasticity is examined using the Modified Wald test for panel data, serial correlation is tested using the Wooldridge autocorrelation test, and cross-sectional dependence is evaluated using the Pesaran CD test. When violations of classical assumptions are detected, robust standard errors are employed to obtain consistent estimators (Wooldridge, 2010).

Table 2. Diagnostic Test Results

Diagnostic Test	Result	Decision
Chow Test	Prob. < 0.05	Fixed Effects preferred
Hausman Test	Prob. < 0.05	Fixed Effects selected
VIF	< 10	No multicollinearity
Modified Wald Test	Prob. < 0.05	Heteroskedasticity detected
Wooldridge Test	Prob. < 0.05	Mild autocorrelation detected
Pesaran CD Test	Prob. > 0.05	No severe cross-sectional dependence

The diagnostic test results indicate that the fixed-effects model is the most appropriate estimator for both regression specifications. Although heteroskedasticity and mild autocorrelation are detected, robust standard errors are employed to ensure consistent statistical inference. In addition, the VIF values indicate no severe multicollinearity, while the Pesaran CD test suggests that cross-sectional dependence is not statistically problematic within the balanced panel dataset.

Considering potential endogeneity arising from reverse causality between bank size, credit expansion, and profitability, robustness checks are implemented by re-estimating the models using one-period lagged independent variables. This approach is intended to reduce simultaneity bias and strengthen causal interpretation (Arellano & Bond, 1991). Sensitivity analysis is also performed by replacing total

credit with the credit-to-asset ratio to ensure that the findings are not driven solely by balance-sheet scale effects.

Although the balanced panel design enhances internal consistency and comparability, the relatively small sample size limits external generalization. Therefore, the findings should be interpreted as reflecting the behavior of structurally dominant banks within Indonesia's concentrated banking market rather than representing the entire population of Indonesian commercial banks. Nonetheless, the methodological framework provides a theoretically grounded and empirically rigorous approach for examining the sequential applicability of the SCP paradigm in an emerging banking economy.

4. DATA ANALYSIS AND DISCUSSION

The data presented in Table 3 indicate a sustained structural consolidation in Indonesia's banking industry over the 2015–2024 period. The concentration ratio of the four largest commercial banks (CR4) increased from 48.85 percent in 2015 to 56 percent in 2023 and 2024, with a decade average of 54.26 percent. This consistent upward trend suggests that Indonesia's banking system has evolved toward a more concentrated and oligopolistic configuration. According to industrial organization theory, concentration ratios such as CR4 provide a practical measure of market structure and reflect the distribution of market power among dominant firms (Bain, 1951). A CR4 exceeding 50 percent generally indicates moderate-to-high concentration, implying that competitive dynamics are shaped primarily by a limited number of large institutions rather than by dispersed competition.

Table 3. Concentration Ratio Top 4 Banks

Year	Total Assets of the Big Four (Trillion IDR)	Total Assets of Commercial Bank (Trillion Rp.)	CR4 (%)
2015	2,91	5,919	48.85
2016	3,323	6,476	51.32
2017	3,712	7,100	52.28
2018	4,133	7,752	53.31
2019	4,500	8,213	54.79
2020	5,119	8,781	58.30
2021	5,597	10,112	55.35
2022	6,203	11,113	55.81
2023	6,634	11,766	56.38
2024	6,999	12,461	56.17
Total	49,111	89,663	54.26

The structural shift becomes particularly evident after 2016, when the CR4 ratio first surpassed the 50 percent threshold. This transition suggests that more than half of national banking assets have since been controlled by four institutions, reinforcing their structural dominance. The most significant increase occurred in 2020, when CR4 reached 58.30 percent. This spike coincides with the COVID-19 pandemic period, during which financial systems worldwide experienced liquidity pressures and economic contraction. Large banks typically benefit from stronger capital adequacy, diversified funding sources, and greater depositor confidence during systemic crises (Berger & Humphrey, 1997). As a result, dominant institutions are often better positioned to absorb shocks and expand balance sheets relative to smaller competitors. The data therefore suggest that crisis conditions may have accelerated con-

centration in Indonesia, consistent with findings in emerging markets where structural consolidation intensifies during economic downturns (Mirzaei, Moore, & Liu, 2013).

From the perspective of the Structure–Conduct–Performance (SCP) paradigm, increasing concentration implies stronger structural capacity that may influence strategic conduct and profitability (Mason, 1939; Bain, 1951). In concentrated banking systems, dominant firms may possess enhanced pricing power, greater flexibility in credit allocation, and the ability to influence market margins. Prior evidence in Indonesia supports this interpretation, as studies have shown that asset dominance and market concentration tend to shape lending aggressiveness and strategic positioning among large banks (Jumono, Abdurrahman, & Mala, 2017; Yударuddin, 2015). The steady growth of total assets among the “Big Four,” from IDR 2,910 trillion in 2015 to IDR 6,999 trillion in 2024, further illustrates their expanding structural capacity. Although total industry assets also increased during this period, the asset growth of dominant banks outpaced overall industry expansion, thereby driving the rise in concentration.

However, while a rising CR4 confirms strengthening structural dominance, classical SCP theory’s assumption that concentration directly enhances profitability remains empirically contested. Subsequent theoretical developments, particularly the Efficient Structure Hypothesis, argue that superior performance among large firms may reflect internal efficiency rather than market power alone (Berger & Humphrey, 1997). In emerging economies, the relationship between concentration and profitability is often mediated by institutional quality, regulatory frameworks, and managerial capability (Mirzaei, Moore, & Liu, 2013). Therefore, the sustained CR4 level above 54 percent throughout the decade does not automatically imply that dominant banks achieve higher financial returns solely due to structural power.

Overall, the CR4 trend establishes that Indonesia’s banking market during the study period was structurally conducive to testing the SCP framework. The consistent concentration above 50 percent indicates an oligopolistic environment in which structural dominance is likely to shape strategic conduct. At the same time, theoretical debates and mixed empirical findings in the literature suggest that profitability may depend more on operational efficiency and credit management than on concentration per se. This structural evidence therefore provides a critical foundation for the subsequent regression analysis, which empirically evaluates whether market dominance translates into lending expansion and whether such conduct ultimately determines financial performance among Indonesia’s largest commercial banks.

To empirically test the sequential relationships proposed under the Structure–Conduct–Performance (SCP) framework, panel regression analysis was conducted. The estimation results are summarized in Table 4.

Table 4. Summary of Panel Regression Results

Variable	Model 1(LOG(CREDIT))	Model 2 (ROA)
C (Intercept)	−0.7432 (p = 0.0351)	4.9486 (p = 0.1225)
LOG(Assets)	1.0194 *** (p = 0.0000)**	−5.3552 *** (p = 0.0000)**

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LOG(Credit)	—	5.4036 *** (p = 0.0000)**
Cross-section Effect	Fixed Effects	Fixed Effects
R-squared	0.9890	0.6729
Adjusted R-squared	0.9878	0.6248
F-statistic	787.38 ***	13.99 ***
Prob(F-statistic)	0.0000	0.00000019
Durbin–Watson	1.1082	1.6240
Observations	40	40
Cross-sections	4	4
Periods	10	10

Source: Processed data from 2015–2024, computed using EViews 13.

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The results of Model 1 indicate that bank size exerts a positive and statistically significant effect on credit distribution, with an elasticity coefficient of 1.0194 ($p < 0.01$). This finding implies that a 1 percent increase in total assets is associated with an approximately 1.02 percent increase in lending. The near-unitary elasticity suggests that asset expansion among Indonesia's largest banks is closely associated with credit growth. From a theoretical perspective, the result supports the SCP proposition that market structure influences firm conduct (Mason, 1939; Bain, 1951). Larger banks generally possess broader funding bases, stronger capital buffers, and greater strategic flexibility, enabling more extensive lending activities. Therefore, Hypothesis 1, which predicts that market structure positively affects bank conduct, is supported. The finding is also consistent with previous studies in the Indonesian banking sector showing that structural dominance facilitates lending expansion (Jumono, Abdurrahman, & Mala, 2017; Yударuddin, 2015).

The very high R-squared value in Model 1 (0.9890) requires careful interpretation. Such explanatory power largely reflects the structural composition of bank balance sheets, where total loans constitute a major component of total assets. Consequently, movements in total assets tend to co-move mechanically with lending expansion. In addition, both variables exhibit strong upward growth trends during the observation period, reinforcing their statistical association within the fixed-effects specification. Therefore, the near-perfect fit should not be interpreted as evidence of an isolated causal mechanism, but rather as a reflection of intrinsic balance-sheet dynamics and synchronized growth patterns among dominant banks.

Nevertheless, the findings still indicate a strong structural–conduct linkage within Indonesia's concentrated banking environment. Large banks typically benefit from economies of scale in funding, broader operational networks, and greater access to diversified liquidity sources, which may facilitate stronger lending capacity relative to smaller institutions. In the Indonesian context, the four dominant banks possess extensive customer bases and financial infrastructures that support large-scale intermediation activities.

The result also highlights the central role of dominant banks in Indonesia's credit intermediation system. As large institutions expand their asset base, their contribution to national credit supply also increases. This pattern suggests that structural concentration may positively support financial intermediation when dominant banks effectively transform resources into productive lending activities. However, it

also indicates that fluctuations in the balance sheets of large banks may exert disproportionate effects on overall credit dynamics within the banking system. Consequently, understanding the relationship between structural scale and lending behavior remains important for evaluating banking stability and intermediation efficiency in concentrated financial markets.

Model 2 provides a more nuanced assessment of the relationship between market structure, bank conduct, and financial performance. The estimation results indicate that Credit has a positive and highly significant effect on ROA, with a coefficient of 5.4036 ($p < 0.01$). This finding suggests that lending expansion contributes positively to bank profitability, supporting Hypothesis 2. From an intermediation perspective, effective credit allocation enables banks to generate interest income and improve asset utilization efficiency, thereby enhancing financial performance. The result confirms the SCP argument that conduct functions as the operational transmission channel through which structural capacity is converted into profitability.

Economically, the positive Credit coefficient indicates that dominant banks with stronger lending activity tend to achieve higher profitability performance. In Indonesia's banking industry, lending remains the primary source of income generation, particularly among large commercial banks with extensive intermediation capacity. The finding therefore reinforces previous studies suggesting that effective credit expansion and lending management are central determinants of bank profitability (Berger & Humphrey, 1997; Sufian & Habibullah, 2012). Moreover, the result implies that profitability among large banks is influenced not merely by asset ownership, but by how efficiently those assets are transformed into productive lending activities.

In contrast, the direct effect of SIZE on ROA is negative and statistically significant (-5.3552 , $p < 0.01$), indicating that greater market scale does not necessarily translate into higher profitability. Hypothesis 3 is therefore not supported. This finding challenges the traditional SCP prediction that concentration enhances profitability through market power advantages.

However, the magnitude of the coefficient should be interpreted cautiously. Since Size is measured using the natural logarithm of total assets while ROA is expressed as a percentage ratio, the coefficient does not imply that profitability mechanically declines by 5.3 percentage points for every increase in bank size. Rather, the result reflects the relative marginal effect of asset expansion on profitability within the fixed-effects specification. The coefficient magnitude may also reflect the relatively small balanced panel sample and the strong correlation between asset growth and lending expansion among dominant banks.

Therefore, the negative coefficient is interpreted not as evidence of absolute profitability deterioration, but rather as an indication that increases in structural scale are not proportionally followed by improvements in profitability efficiency. This interpretation is consistent with the diseconomies-of-scale argument in banking literature, where excessively large institutions may experience declining efficiency due to increasing organizational complexity, coordination costs, regulatory bur-

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dens, and portfolio diversification toward lower-yield assets. In highly regulated banking systems, large institutions frequently allocate a substantial proportion of their portfolios to safer but less profitable assets in order to maintain liquidity and regulatory stability. While such strategies strengthen resilience, they may simultaneously suppress profitability ratios such as ROA.

From a theoretical perspective, the rejection of the direct structure–performance linkage indicates that Indonesia’s banking market may no longer conform strictly to the classical SCP model. Rather, the findings align more closely with the Efficient Structure hypothesis, which argues that superior performance arises primarily from internal efficiency rather than from market power alone (Berger & DeYoung, 1997; Berger & Humphrey, 1997). In this context, structural expansion provides capacity for growth but does not automatically generate higher profitability unless accompanied by effective managerial discipline, operational efficiency, and productive resource allocation.

The results also support the existence of a sequential SCP relationship. Size significantly influences Credit in Model 1, while Credit significantly affects ROA in Model 2. This pattern indicates that market structure is closely associated with profitability through lending behavior and intermediation activities. The positive relationship between Size and Credit, combined with the positive effect of Credit on ROA, suggests that structural expansion enhances financial performance primarily by strengthening banks’ intermediation capacity rather than through direct market power effects alone. Accordingly, the findings reinforce the sequential logic of the SCP framework, in which structure shapes conduct and conduct subsequently relates to performance.

The adjusted R-squared value of 0.6248 indicates that approximately 62 percent of the variation in ROA is explained by Size and Credit variables. This moderate explanatory power suggests that other determinants commonly discussed in banking literature, such as operational efficiency, asset quality, liquidity management, capital adequacy, and macroeconomic conditions, also influence profitability dynamics. Nevertheless, the model remains appropriate for evaluating the core sequential mechanism proposed under the SCP framework.

Furthermore, the Durbin–Watson statistic of 1.6240 indicates mild serial correlation, although the fixed-effects specification helps mitigate bias arising from unobserved time-invariant heterogeneity across banks. Overall, the findings demonstrate that the SCP mechanism operates sequentially but asymmetrically in Indonesia’s concentrated banking market. Structure significantly determines conduct, and conduct significantly enhances performance; however, structural scale does not directly improve profitability and may even reduce profitability efficiency when asset expansion is not accompanied by proportional improvements in managerial effectiveness and operational efficiency. The findings therefore underscore the growing importance of managerial efficiency and strategic credit allocation in determining financial performance within a mature oligopolistic banking environment.

5. CONCLUSION, IMPLICATIONS, RECOMMENDATIONS, AND LIMITATIONS

The results of this study found evidence that market structure, as represented by bank size, significantly influences bank behavior through loan expansion. Credit distribution subsequently exerts a positive effect on profitability, confirming the important role of intermediation activities in generating financial performance. However, the direct effect of bank size on ROA is negative, suggesting that structural dominance alone does not automatically produce superior profitability.

The results imply that profitability among Indonesia's dominant banks is driven more by effective intermediation and managerial efficiency than by market concentration itself. In this respect, the study supports the sequential logic of the SCP framework while simultaneously indicating that the direct structure-performance relationship predicted by the classical SCP paradigm may weaken in mature and highly concentrated banking systems.

From a practical perspective, the findings provide implications that are particularly relevant to Indonesia's "Big Four" banking structure. Since the four largest banks control more than half of national banking assets, fluctuations in their lending behavior and operational efficiency may exert disproportionate effects on national credit intermediation and financial stability. The findings therefore suggest that asset expansion among dominant banks should be accompanied by proportional improvements in operational integration, digital efficiency, and productive credit allocation in order to avoid declining profitability efficiency associated with excessive organizational scale.

For regulators, the study suggests that concentration monitoring alone may be insufficient to evaluate banking performance dynamics within highly concentrated financial systems. In the Indonesian context, where the "Big Four" banks dominate credit distribution and liquidity allocation, supervisory attention should increasingly focus on how structural expansion affects intermediation quality, operational efficiency, and systemic credit concentration. This issue becomes particularly relevant in the post-pandemic and digital banking era, where large-scale institutions face increasing technological investment pressures and operational complexity despite maintaining strong market dominance.

Nevertheless, this study has several limitations that should be acknowledged carefully. First, the analysis focuses exclusively on four dominant commercial banks, which means that the findings primarily reflect the behavior of large systemic institutions operating within an oligopolistic market structure. Consequently, the results cannot be generalized to small and medium-sized banks that operate under different competitive conditions, funding structures, and operational characteristics. Second, the relatively small balanced panel dataset may increase coefficient sensitivity to bank-specific characteristics and balance-sheet dynamics. As a result, the negative relationship between Size and ROA should be interpreted cautiously because it may partly reflect the influence of institution-specific efficiency patterns or differences in strategic asset allocation among individual banks. Although the fixed-effects

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specification helps control for unobserved heterogeneity, the possibility that the estimated coefficient is influenced by bank-specific conditions cannot be fully eliminated. Third, the study intentionally adopts a parsimonious SCP specification focusing on Size, Credit, and ROA in order to isolate the sequential transmission mechanism between structure, conduct, and performance. Consequently, several important determinants commonly used in banking profitability literature, such as Non-Performing Loans (NPL), operational efficiency (BOPO), Capital Adequacy Ratio (CAR), liquidity conditions, and macroeconomic variables, are not explicitly incorporated into the regression model.

Future studies are therefore encouraged to incorporate broader bank classifications, larger panel datasets, dynamic estimation techniques, and additional bank-specific or macroeconomic control variables in order to provide a more comprehensive understanding of profitability dynamics and SCP mechanisms within Indonesia's evolving banking industry.

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