

**THE IMPACTS OF CAPITAL ADEQUACY, OPERATIONAL
EFFICIENCY, EXCHANGE RATE, AND MARKET INDEX ON
BANK PERFORMANCE IN INDONESIA BETWEEN 2020-2024
WITH GOVERNMENT BOND YIELD AS THE MODERATOR
FOR INTERNAL BANKING INDICATORS**



THESIS

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A THESIS

**Submitted in a partial fulfillment of the requirements for the degree of
Bachelor of Business Administration**

CERTIFICATE OF APPROVAL

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Topic: : The impacts of capital adequacy, operational efficiency, exchange rate, and market index on bank performance in Indonesia between 2020-2024 with government bond yield as the moderator for internal banking indicators

We hereby declare that this Thesis is from student's own work, has been read and presented to the IPMI Institute Board of Examiners, and has been accepted as part of the requirements needed to obtain a Bachelor of Business Administration Degree and has been found to be satisfactory.

Jakarta, 21 July 2026

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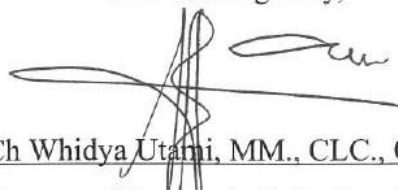


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NON-PLAGIARISM DECLARATION FORM

This Thesis is a presentation of my original research work. Wherever contribution of others is involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions.

Also, this work is being submitted in partial fulfillment of the requirements for the Bachelor of Business Administration degree and has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Jakarta, 21 July.....2026



Kamal Arifin Adnan

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Abstract

The Indonesian banking sector experienced significant changes during the 2020-2024 period due to the COVID-19 pandemic, the subsequent economic recovery, and changing financial-market conditions. For publicly listed banks, stock returns provide an important market-based measure of performance. Therefore, understanding the factors that influence bank stock returns has become increasingly important. This study examines the effects of Capital Adequacy Ratio (CAR), Operational Efficiency Ratio (BOPO), Exchange Rate, and Market Index on the Stock Returns of publicly listed banks in Indonesia. In addition, it investigates whether Government Bond Yield moderates the relationships between the bank-specific indicators, namely CAR and BOPO, and Stock Returns. This study employed a quantitative research approach using panel-data regression analysis. The sample consisted of 34 banking companies continuously listed on the Indonesia Stock Exchange during the 2020-2024 period, resulting in 170 balanced panel observations. Bank-specific data were obtained from the annual reports of the sampled banks, while market and macro-financial data were collected from Investing.com. The Common Effect Model (CEM) was selected as the final estimation model, and the moderated regression model produced an adjusted R-squared of 0.1147. The results indicate that CAR and the Market Index have positive and significant effects on Stock Returns, whereas BOPO exhibits a positive and significant relationship with Stock Returns, contrary to the initial theoretical expectation. In contrast, the Exchange Rate does not have a statistically significant effect on Stock Returns. Furthermore, Government Bond Yield significantly weakens the positive relationships between CAR and Stock Returns and between BOPO and Stock Returns. These findings suggest that investors evaluate publicly listed banks by considering both bank-specific financial conditions and broader financial-market conditions, while Government Bond Yield influences how internal banking indicators are reflected in Stock Returns.

Keywords: Indonesian Banks; Stock Returns; Internal Banking Indicators; External Market Conditions; Government Bond Yield

CHAPTER 1

INTRODUCTION

1.1. Background

Between 2020 and 2024, the operational environment of the Indonesian banking sector was shaped by the pandemic shock and the subsequent phase of economic recovery. The economic downturn in 2020 disrupted activity across multiple sectors and created significant challenges for businesses, households, and financial institutions. Although economic conditions improved in the following years, the recovery process continued to take place amid global uncertainty and evolving financial-market conditions. Bank Indonesia (2024a) noted that recovery optimism was increasingly challenged by the lingering effects of the pandemic, slowing global growth, and rising geopolitical and economic fragmentation. As financial intermediaries, banks were required to operate within a changing economic environment while maintaining stability and supporting the recovery process.

The COVID-19 pandemic in 2020 created unprecedented challenges for Indonesia's banking sector as declining economic activity and heightened uncertainty weakened the intermediation function of banks. Bank Indonesia (2021) reported that the domestic economic downturn at the time reduced lending activity and financing demand, while the banking sector adopted more prudent lending practices amid elevated risks. Despite the slowdown in intermediation, the banking system remained resilient because bank liquidity and capital conditions were maintained at adequate levels throughout the pandemic. To preserve financial-system stability and support the national economic recovery, Bank Indonesia implemented accommodative monetary and macroprudential policies, including policy-rate reductions, liquidity injections, and regulatory relaxation aimed at encouraging bank lending and financing to the real sector. These measures enabled the banking sector to maintain stability while operating under extraordinary economic conditions and laid the foundation for the gradual recovery that followed.

Economic conditions began to improve after 2021 as consumption, production, and trade activities gradually recovered. Credit distribution expanded alongside the recovery, reflecting improved demand for financing across sectors. However, supervisory data indicate that changes in funding dynamics accompanied this expansion. *Otoritas Jasa Keuangan (OJK) (2024)* reported continued growth in both credit distribution and third-party funds during 2024. Credit outstanding increased from Rp 7,186.9 trillion in January to Rp 7,942.9 trillion in December, while third-party funds increased from Rp 8,457.9 trillion to Rp 8,837.2 trillion over the same period, reflecting ongoing expansion in banking intermediation activities. During the same period Bank Indonesia (2024b) recorded fluctuations in the Rupiah exchange rate, which were influenced by global interest-rate movements and changes in commodity prices, contributing to variability in market conditions faced by banks.

Indicators published by Bank Indonesia and OJK show that both domestic and external factors influenced financial conditions in the banking sector throughout the 2020-2024 period. Bank Indonesia (2024a) reported that Indonesia's financial system faced global economic slowdown, growth divergence, continuing scarring effects from the pandemic, and geopolitical-economic fragmentation. The same report also noted that high global interest rates and strong US dollar pressure affected exchange-rate conditions, while bank intermediation remained solid, supported by adequate liquidity. In parallel, supervisory data released by OJK (2024) showed continued credit expansion and changes in third-party fund development across banks. Within this macro-financial environment, supervisory reporting and prior studies have employed various indicators to describe banking conditions and performance.

Previous studies on Indonesian banking have commonly measured bank performance using accounting-based indicators derived from financial statements. One frequently used indicator is Return on Assets (ROA), which measures profitability relative to total assets. Andrianto and Sadikin (2017) used ROA as a profitability indicator in their study of Indonesian banking companies listed on the

Indonesia Stock Exchange. Supervisory statistics published by OJK (2024) also routinely reported ROA as part of the banking sector's financial performance indicators.

Other studies have focused on interest-based performance indicators derived from intermediation activities, such as Net Interest Margin (NIM). Dwitanto et al. (2023) analyzed Indonesian listed banks and examined NIM in relation to credit risk, liquidity risk, capital, and the moderating role of the central bank interest rate. Dwitanto et al. (2023) noted that NIM reflected the difference between interest income earned on loans and interest expenses paid on deposits and other funding sources, which implied that changes in lending and deposit rates are important factors influencing banks' interest margins. This relationship is consistent with Bank Indonesia's (2024a) report, which mentioned increases in both lending and deposit rates, with deposit rates responding more strongly to monetary policy.

While accounting-based indicators such as ROA and NIM are frequently documented in financial statements, publicly listed banks are also evaluated through capital-market performance. In the context of Indonesian banking, Sari et al. (2024) explained that stock prices were important to investors because they reflected issuer performance and were influenced by both company-specific factors, such as financial performance, and broader macroeconomic conditions. Sari et al. (2024) also used banking companies listed on the Indonesia Stock Exchange (IDX), which showed the relevance of market-based valuation for analysing listed banks.

Having adequate capital is another important internal condition for banks because it shows their ability to absorb potential losses and maintain financial stability. According to OJK Regulation No. 11/POJK.03/2016 Concerning Minimum Capital Requirement for Commercial Banks, banks are required to maintain minimum capital according to their risk profile, with the minimum level calculated using ATMR that covers credit risk, operational risk, and market risk. Banking statistics published by OJK (2024) reported the adequacy of a bank with

the Capital Adequacy Ratio (CAR), which compares the bank's capital with its risk-weighted assets.

In banking studies, CAR is commonly treated as an internal indicator of banks' capital conditions. For example, Mariam et al. (2021) included CAR as an internal banking variable in their study of NIM determinants in Indonesian banks during the 2009-2018 period, defining it as a measure of capital adequacy relative to risk-weighted assets. Similarly, Safitri et al. (2024) used CAR as an indicator of capital adequacy in conventional commercial banks in Indonesia, which explained that stronger capital adequacy reflected a bank's ability to absorb risks and support financial stability.

In addition to capital strength, banks also need to maintain efficient operations so that the income generated from banking activities is not excessively absorbed by operating costs. In Indonesian banking statistics, this efficiency aspect is reflected through an Operational Efficiency Ratio known as *Biaya Operasional terhadap Pendapatan Operasional* (BOPO). This is relevant because operational cost control affects how well banks can sustain their financial performance, especially during periods of changing economic and market conditions. OJK (2024) identified BOPO as the ratio of operating expenses to operating income and reported it as part of Indonesian banking performance statistics.

In empirical studies, BOPO ratios have been used to examine the operational efficiency in Indonesian banking. Mariam et al. (2021) included BOPO in their study of NIM determinants in Indonesian banks during the 2009-2018 period and explained that BOPO reflects banks' ability to control operating expenses relative to operating income. Their findings showed that BOPO had a negative and significant relationship with NIM, which indicates that higher operational cost pressure was associated with weaker interest-margin performance.

Beyond internal banking conditions such as capital adequacy and operational efficiency, banks are also affected by external indicators that form part of the

macroeconomic environment in which they operate. One such indicator is the exchange rate, which reflects the value of the domestic currency relative to foreign currencies. According to Bank Indonesia (2024b), Rupiah movements in 2024 were influenced by global financial-market uncertainty, expectations regarding United States monetary policy, higher United States Treasury yields, broad United States dollar appreciation, and capital-flow pressures affecting emerging-market economies.

Bank Indonesia (2024a) also reported that Indonesia's financial system faced high global interest-rate pressure and strong United States dollar pressure, while banking intermediation remained supported by adequate liquidity. This shows that exchange-rate movements are relevant to banking analysis because they reflect external financial pressures that may influence banking activities and market conditions. In the study done by Mariam et al.' (2021), the exchange rate was also included as a macroeconomic variable in analyzing the determinants of NIM and found that exchange-rate movements had a negative and significant effect on NIM.

In addition to exchange-rate movements, broader market conditions are reflected in stock-market indicators such as the IDX Composite Index (IHSG). According to the Indonesia Stock Exchange (n.d.), the IHSG measures the stock-price performance of listed companies on the Main Board and Development Board of the Indonesia Stock Exchange. A study done by Dewi et al. (2023) identified the IHSG as a market-wide indicator of Indonesian capital-market activity because it provided information on stock-price trends and reflected the performance of listed issuers. Dewi et al. (2023) also noted that IHSG movements may be influenced by domestic macroeconomic factors, such as exchange rates, interest rates, and inflation, as well as external factors, which include global stock indices, world oil prices, world gold prices, and global market sentiment.

These external market conditions were also reflected in international assessments of Indonesia's post-pandemic macro-financial environment. The World Bank (2023) reported that tighter global financial conditions increased

capital outflows from emerging markets and placed pressure on Indonesia's external financing position, foreign reserves, and the rupiah. Additionally, the International Monetary Fund (2024) assessed Indonesia's financial system as broadly resilient, supported by strong capital and liquidity buffers, while noting the relevance of foreign-exchange exposures and liquidity analysis for financial-sector risk assessment.

1.2. Problem Statement

Publicly listed banks in Indonesia operated within changing financial conditions during the 2020-2024 period. Banking statistics published by OJK (2024) showed developments in credit, deposits, liquidity-related indicators, and internal banking ratios, while Bank Indonesia (2024b) reported that global financial uncertainty, exchange-rate pressures, and capital-flow movements affected Indonesia's macro-financial environment. During this period, publicly listed banking shares also experienced market valuation changes, which indicates that banks were assessed not only through financial-statement indicators but also through capital-market performance. Previous studies examined related aspects of Indonesian banking and stock-market performance, but the focus and variable combinations remain different from this study. Sari et al. (2024) analyzed the relationship between banking performance and stock prices, with interest-rate policy serving as a moderating variable. Similarly, Chiang et al. (2024) investigated stock returns of KBMI IV banks using NPL, LDR, ROA, NIM, and market return as explanatory variables, while GDP growth was incorporated as the moderating variable.

Other studies concentrated on banking operations rather than stock-market outcomes. Mariam et al. (2021) examined the determinants of NIM using variables such as loan growth, BOPO, CAR, inflation, and exchange rate, whereas Safitri et al. (2024) analyzed the effects of CAR, NPL, and bank size on NIM in conventional commercial banks. Although these studies provided evidence on profitability and operational performance, they did not directly assess stock returns as a measure of market-based performance. As such, the reviewed literature did not specifically

examine how adequate capital, operational efficiency, exchange-rate movements, and market index conditions jointly influence stock returns of publicly listed Indonesian banks during the 2020-2024 period, particularly when government bond yield is considered as a moderating variable.

Government bond yields represent an important component of the financial environment, reflecting changes in investor expectations and broader economic conditions. Previous studies examined the determinants of government bond yields in Indonesia from a macroeconomic perspective. Fatmawatie et al. (2024) found that Indonesian government bond yields were influenced by interest rates, exchange rates, foreign exchange reserves, the IDX Composite Index, world oil prices, and the US bank central rate, also known as the Fed Rate, while inflation did not show a significant effect across observed maturities. Qisthina et al. (2022) also found that government bond yields were significantly affected by bond prices, the BI rate, and exchange-rate movements, while inflation was not statistically significant. Similarly, Adiwibowo and Sihombing (2020) examined determinants such as exchange rates, inflation, CDS spreads, bid-ask spreads, overnight rates, central bank rates, and oil prices, showing that government bond yields respond to both domestic financial indicators and external market-related factors.

Although these studies provided important insights into the determinants of Indonesian government bond yields, they did not examine how yield conditions relate to the stock-return performance of publicly listed banks or how yields moderate the relationship between internal banking indicators and stock returns. Therefore, this study focuses on the effects of adequate capital, efficient operations, exchange rate, and market index on the stock-return performance of publicly listed banks in Indonesia, with government bond yield positioned as a moderating variable for internal banking indicators.

1.3. Research Questions

This study seeks to answer the following research questions:

1. How does adequate capital, measured by the CAR, affect bank performance as measured by stock returns?
2. How do efficient operations, measured by BOPO, affect bank performance as measured by stock returns?
3. How does the exchange rate affect bank performance as measured by stock returns?
4. How does the market index affect bank performance as measured by stock returns?
5. How does government bond yield moderate the relationship between the internal banking indicators and bank performance as measured by stock returns?

1.4. Research Objectives

The objectives of this research are as follows:

1. To examine the effect of adequate capital, measured by CAR, on bank performance as measured by stock returns.
2. To examine the effect of efficient operations, measured by BOPO, on bank performance as measured by stock returns.
3. To examine the effect of the exchange rate on bank performance as measured by stock returns.
4. To examine the effect of the market index on bank performance as measured by stock returns.
5. To examine how government bond yield moderates the relationship between internal banking indicators and bank performance as measured by stock returns.

1.5. Significance of the Study

This study provides academic significance by extending the discussion of banking performance in Indonesia from accounting-based measures toward market-based performance. By using stock returns as the dependent variable to measure

bank performance, this study shows how investors and the capital market responded to differences in bank-specific conditions and external financial developments. This approach is relevant because publicly listed banks are not only evaluated through financial-statement indicators, but also through how their shares perform in the market. Building on studies that examine banking performance, stock prices, and stock returns in Indonesia, this study contributes by connecting internal banking indicators, macro-financial variables, and market performance within the context of Indonesian listed banks during the 2020-2024 period.

The study also provides practical significance for investors, bank management, and other market participants. For investors, the findings may help identify whether internal banking indicators such as capital adequacy and operational efficiency are associated with differences in stock returns among listed banks. For bank management, the findings may provide insight into how financial strength and operating efficiency are reflected in market performance. By also considering external variables such as exchange-rate movements and market index conditions, this study helps show how bank-specific factors and broader financial conditions may jointly affect the stock-market performance of Indonesian publicly listed banks.

In addition, this study contributes to policy and market discussions by incorporating government bond yields as part of the broader financial environment that may shape stock-market dynamics. Government bond yields are relevant because they represent returns required by investors in the government securities market and respond to changes in economic and financial conditions. Previous studies, such as Qisthina et al. (2022) and Fatmawatie et al. (2024), showed that Indonesian government bond yields are influenced by macro-financial variables, including interest rates and exchange-rate movements. Rather than analyzing government bond yields only as a direct financial-market indicator, this study utilizes yield conditions as a moderating factor that may influence how adequate capital and efficient operations are reflected in stock returns. By doing so, the study provides additional context for understanding how changes in the financial

environment may strengthen or weaken the relationship between internal banking indicators and stock-market performance, while exchange rate and market index are considered as external market factors.

1.6. Scope and Limitations

This study focuses on publicly listed banks in Indonesia during the 2020-2024 period. The analysis examines bank performance as measured by stock returns, using banks that were continuously listed on the Indonesia Stock Exchange and had complete financial and market data throughout the observation period. The internal bank-specific variables included in the study are CAR and BOPO, while the external financial variables consist of the exchange rate and the IHSG. Government bond yield is incorporated as a moderating variable to represent broader market-based financial conditions that may influence the relationship between internal banking indicators and stock returns. Therefore, the moderating analysis is limited to the internal banking indicators, while the exchange rate and IHSG are treated as direct external financial variables. The 2020-2024 period is selected to capture banking and market conditions during the pandemic shock and the subsequent recovery period.

The scope of the study is limited to secondary data obtained from publicly available sources. Bank-level financial data are obtained from the annual reports of each listed bank, while market and macro-financial data are collected from institutional and market-data sources such as Bank Indonesia, OJK, the Indonesia Stock Exchange, and Investing.com. Banks that were not continuously listed during the 2020-2024 period are excluded to ensure data consistency, since several banks were listed only after the beginning of the observation period and do not provide complete stock-market data for the full research period. The study also does not include financial indicators outside the specified research model, such as non-performing loans, loan-to-deposit ratio, return on assets, or net interest margin, because these variables fall beyond the defined scope of the analysis. In addition, the study does not examine bank-level strategies, managerial decisions, corporate

governance practices, or other qualitative factors, as the analysis is restricted to standardized financial and market indicators.

This study is also subject to limitations related to data characteristics and measurement. Stock returns, exchange-rate changes, market-index movements, and government bond yields are based on publicly available market data and reflect observed market conditions rather than internal bank-specific decisions. Since daily market data are aggregated into annual measures, the analysis may not fully capture short-term fluctuations or temporary market reactions within each year. Furthermore, the moderating role of government bond yield is limited to internal banking indicators and is assessed using market-level yield information, without accounting for differences in each bank's direct exposure to government securities. These limitations define the empirical boundaries of the study and indicate that the findings should be interpreted within the context of publicly listed Indonesian banks during the selected period.

1.7. Definitions of Key Terms

Bank Performance

Bank performance refers to the outcomes used to evaluate the condition and performance of banking institutions. In this study, bank performance is measured using stock returns as a market-based indicator, reflecting changes in bank share prices and investor valuation of publicly listed banks. This approach is consistent with studies that use stock-market measures to evaluate banking performance in the capital market (Chiang et al., 2024).

Stock Returns

Stock returns measure the percentage change in a bank's share price over a given period. In this study, stock returns are used to capture the market-based performance of publicly listed banks, as share-price movements reflect changes in market valuation and investor responses to firm-specific and broader financial conditions (Chiang et al., 2024).

Capital Adequacy Ratio (CAR)

Adequate capital in this study is measured using the Capital Adequacy Ratio (CAR), which represents the ratio of a bank's capital to its risk-weighted assets. It indicates the adequacy of bank capital in absorbing potential losses and supporting financial stability. OJK Regulation No. 11/POJK.03/2016 requires commercial banks to maintain minimum capital according to their risk profile, with the requirement calculated based on risk-weighted assets covering credit, market, and operational risks.

Operational Efficiency Ratio (BOPO)

Operational efficiency is measured using BOPO, which refers to the ratio of operating expenses to operating income. OJK (2024) reports BOPO as part of banking performance indicators, where higher BOPO values indicate higher operating expenses relative to operating income.

Exchange Rate

The exchange rate represents the value of the Indonesian rupiah relative to foreign currencies. In this study, the exchange rate is used as an external financial indicator because rupiah movements reflect changes in the macro-financial environment, including global financial uncertainty, capital-flow pressures, and international monetary conditions (Bank Indonesia, 2024b).

Market Index / IDX Composite Index (IHSG)

The IDX Composite Index, also known as *Indeks Harga Saham Gabungan* (IHSG), represents the movement of stock prices in the Indonesian capital market and reflects the performance of listed issuers. In this study, IHSG is used as a market-wide indicator to capture general stock-market conditions that may influence the stock returns of publicly listed banks (Dewi et al., 2023).

Government Bond Yield

Government bond yield refers to the return earned by investors from holding government debt securities and is commonly expressed as a percentage of the

bond's market price (Bank Indonesia, 2024a). It reflects market expectations regarding interest rates, inflation, and overall economic conditions. In this study, government bond yield is used as a moderating variable because it represents broader financial-market conditions that may influence how internal banking indicators are reflected in stock returns.

1.8. Research Outline

This research consists of five chapters that analyse the impact of adequate capital, efficient operations, exchange rate, and market index on bank performance in Indonesia during 2020-2024, with government bond yield used as a moderating variable for internal banking indicators. Each chapter contains several sub-chapters, and the systematic outline of the writing is as follows:

1. Chapter 1: Introduction

The first chapter provides the foundation for the study by explaining the banking and economic conditions relevant to the research period. It introduces the background that motivates the study, presents the problem statement supported by gaps in previous research, and outlines the research objectives and research questions. The chapter also discusses the significance of the study, the scope and limitations, and provides the definitions of key terms used throughout the analysis. It concludes by offering an outline of the thesis structure.

2. Chapter 2: Literature Review

The second chapter explains the relevant theoretical foundations and concepts used in the research. It begins by outlining the concept of a bank and its main functions. It then describes the dependent variable, bank performance as measured by stock returns. The chapter continues with the independent variables, consisting of CAR, BOPO, exchange rate, and market index, and presents the moderating variable, government bond yield. The chapter concludes with a review of previous studies related to these variables and the development of the research framework and hypotheses.

3. Chapter 3: Research Methodology

The third chapter describes the methodological approach used in the study. It explains the research design, the operational definitions of variables, and the measurement of each indicator included in the model. The population and sampling technique for publicly listed banks are presented, along with the data sources and data-collection procedure. The chapter also outlines the analytical method used to examine the relationships among variables within the research model.

4. Chapter 4: Findings, Analysis and Discussion

The fourth chapter presents the results of the study and analyzes the relationships between CAR, BOPO, exchange rate, market index, and bank performance, with the government bond yield serving as a moderating variable. It evaluates the outcomes of hypothesis testing and interprets the findings based on financial and market conditions observed during the study period. The chapter also discusses the analytical results in relation to the theoretical and empirical literature.

5. Chapter 5: Conclusion and Recommendations

The final chapter summarizes the key results of the research and presents recommendations based on the findings. It highlights the implications for banking institutions and market participants, and identifies areas that may serve as the basis for future research.

CHAPTER 2

LITERATURE REVIEW

2.1. Theoretical Basis

2.1.1. Bank

2.1.1.1. Definition and Purpose of Banks

According to Indonesian law, specifically Indonesian Law No. 10 of 1998 Concerning Amendments to Law No. 7 of 1992 Concerning Banking, a bank is a business entity that collects funds from the public in the form of deposits and distributes them to the public in the form of credit and other forms in order to improve the standard of living of society. This definition establishes banks as intermediary institutions whose main function is to mobilize public funds and channel them back into the economy through credit and other financial services. The law also positions Indonesian banking as part of national development by supporting equitable development, economic growth, and national stability through activities that improve public welfare.

Otoritas Jasa Keuangan (OJK), as the authority responsible for regulating and supervising financial-service activities in Indonesia, provides the institutional framework for banking supervision. Under Indonesian Law No. 21 of 2011 Concerning *Otoritas Jasa Keuangan*, particularly Article 6, OJK carries out the regulation and supervision of financial-service activities in the banking sector, capital market sector, and non-bank financial-services sector. This supervisory role covers prudential aspects of banking operations, which are intended to support a sound and stable financial-services sector. Therefore, OJK's role complements the legal definition of banks by establishing the regulatory oversight under which banking intermediation activities are conducted.

Academic literature also describes banks as financial intermediaries that mobilize savings and allocate funds to borrowers

across the economy. Mishkin and Eakins (2018) explained that banks and other financial intermediaries reduce transaction costs, provide liquidity services, and help address problems caused by asymmetric information, such as adverse selection and moral hazard. These functions allow banks to support lending activities, monitor borrowers, and improve the allocation of funds within the financial system.

2.1.1.2. Functions of Banks

Based on established regulatory and academic literature, the main functions of banks can be explained as follows:

1. Fund Intermediation

According to Indonesian Law No. 10 of 1998, banks collect funds from the public in the form of deposits and distribute them back to the public in the form of credit and other forms. This establishes intermediation as a central banking function, in which banks connect parties with surplus funds to parties that require financing. Mishkin and Eakins (2018) support this view by explaining that financial intermediaries reduce transaction costs and make it possible for funds to be channelled indirectly to productive investment opportunities.

2. Payment-System Facilitation

According to Bank Indonesia (n.d.-a), banks support payment-system activities by enabling the transfer and settlement of funds. The payment system consists of regulations, institutions, and mechanisms used to transfer funds and settle obligations arising from economic activity, with payment processing involving authorisation, clearing, and settlement. Bank Indonesia (n.d.-a) also provides settlement infrastructure through BI-RTGS, the National Clearing System (SKNBI), and BI-SSSS to support efficient and secure payment transactions. More specifically, the

BI-RTGS system facilitates electronic fund transfers with immediate settlement for individual transactions and supports settlement finality, risk reduction, and fast, safe, and reliable interbank transfers (Bank Indonesia, n.d.-b).

3. Liquidity

Banks perform a liquidity function by accepting deposits that can be withdrawn by customers while using collected funds for lending and other financial assets. Mishkin and Eakins (2018) explained that depository institutions accept deposits and make loans, showing how banks connect short-term funding sources with longer-term financing activities. In the Indonesian regulatory context, liquidity is also treated as a prudential requirement, as OJK Regulation No. 42/POJK.03/2015 requires commercial banks to meet the Liquidity Coverage Ratio to support their ability to withstand liquidity pressure.

4. Credit Allocation and Monitoring

Credit allocation is an important function of banks because lending allows collected funds to be distributed to borrowers who require financing. It is outlined in Indonesian Law No. 10 of 1998 that banks collect funds from the public and distribute them in the form of credit and other forms, which establishes lending as part of the basic banking function. Mishkin and Eakins (2018) provided the economic explanation for this role by explaining that lending involves asymmetric-information problems, including adverse selection and moral hazard. To reduce these risks, financial institutions conduct screening and monitoring so that loans can be directed to borrowers with stronger repayment capacity and managed throughout the credit period.

5. Financial Services

Indonesian Law No. 10 of 1998 stated that commercial banks may conduct activities such as transferring funds, receiving payments, providing custody-related services, and conducting foreign-exchange activities in accordance with applicable regulations. It is further elaborated by Mishkin and Eakins (2018) that banking institutions can operate as broader financial-service organizations, particularly as financial-sector development allows banks to engage in activities beyond traditional lending and deposit-taking.

2.1.1.3. Types of Banks

In Indonesia, the banking system consists of several types of banks that operate under specific legal classifications and regulatory frameworks, as described below:

1. Commercial Banks

According to Indonesian Law No. 10 of 1998, commercial banks are banks that conduct business activities conventionally and/or based on sharia principles and provide services in payment traffic. Commercial banks are therefore allowed to collect funds from the public, distribute funds through credit and other financing activities, and provide banking services related to payments and financial transactions. In practical terms, commercial banks form the main institutional segment of the Indonesian banking system, as reflected in OJK banking statistics that report commercial banks by ownership, asset group, core capital group, and office network (OJK, 2024).

2. Rural Banks

Indonesian Law No. 10 of 1998 outlines that rural banks, known as *Bank Perkreditan Rakyat* (BPR) collect funds and provide credit but are restricted from participating in payment-

system activities and foreign-exchange transactions. Rural banks collect funds from the public and distribute funds through credit, but they do not provide services in payment traffic. In OJK Banking Statistics (2024), BPRs are reported separately from commercial banks, including data on the number of BPRs, office networks, deposits, and credit, which reflects their distinct position within the Indonesian banking system.

3. Sharia Banks

As defined by Indonesian Law No. 21 of 2008 Concerning Sharia Banking, sharia banks are banks that conduct business activities based on sharia principles. Based on this law, sharia banks consist of *Bank Umum Syariah* and *Bank Pembiayaan Rakyat Syariah* (BPRS). *Bank Umum Syariah* provides services in payment traffic, while BPRS does not provide payment-traffic services. The law also regulates sharia banking activities, including fund collection and financing through contracts such as *mudharabah*, *musyarakah*, *murabahah*, *salam*, *istishna'*, *qardh*, *ijarah*, and *hawalah*. Additionally, the law requires the establishment of a Sharia Supervisory Board to provide advice and supervision so that bank activities remain consistent with sharia principles.

2.1.2. Bank Performance

2.1.2.1. Definition of Bank Performance

Bank performance refers to the outcomes used to evaluate the condition and effectiveness of banking institutions. In banking research, performance is commonly measured using financial indicators that reflect profitability, efficiency, risk, and market valuation. Athanasoglou et al. (2008) examined bank profitability in their study through bank-specific, industry-specific, and macroeconomic determinants. This reflects the use of profitability as one dimension of

bank performance. For publicly listed banks, performance can also be viewed from a market-based perspective because share-price movements reflect how investors respond to bank-specific conditions and broader financial developments. Chiang et al. (2024) examined Indonesian bank stock returns in relation to financial performance and market return, indicating that stock returns can be used to capture how banking conditions are reflected in capital-market performance. Therefore, bank performance can be defined as the market-based performance of publicly listed banks, which can be measured through stock returns.

2.1.2.2. Stock Returns

Hartono (2017) explained that return is an important measure in investment analysis because it reflects the result obtained from holding an investment. In the context of stocks, returns refer to the gain or loss received by investors from changes in stock prices over a certain period. For publicly listed companies, stock returns are commonly calculated from changes in share prices and therefore reflect movements in market valuation over time.

From a market-information perspective, stock-price movements are related to how investors respond to available information. Fama (1970) explained that in an efficient market, security prices reflect available information, meaning that new information can be incorporated into prices through market trading. In the banking context, Wong (2012) explained that bank performance information disclosed through financial ratios can be relevant to investors when valuing bank shares. Therefore, stock returns can be used as a market-based indicator because they reflect changes in investor valuation of a bank in response to firm-specific information and broader market conditions.

2.1.2.3. Valuation and Dividend Theory

Valuation theory explains why stock prices and stock returns can be used as market-based indicators by linking market value to expected future cash flows. According to John Burr Williams (1938), investment value is defined as the present worth of future dividends for stocks, or future coupons and principal for bonds. Under this view, the value of a stock depends on the cash flows expected by investors and the rate used to discount those cash flows to the present.

Williams (1938) formalized this principle by expressing stock value as the discounted sum of expected future dividends, which can be written as:

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t} \quad (2.1)$$

where P_0 represents the current stock price, D_t denotes the expected dividend in period t , and k_e is the required rate of return. This formulation shows that valuation depends on both expected future dividends and the discount rate applied by investors. Because valuation is forward-looking, changes in stock prices and stock returns occur when investors revise their expectations regarding future dividends or the required rate of return used in valuation. Based on this valuation logic, stock prices may change when investors revise their expectations regarding future dividends or the required rate of return, which can then be reflected in stock returns.

Building on the dividend valuation approach, Gordon (1959) examined the relationship between stock prices, dividends, earnings, and expected dividend growth. The constant-growth dividend discount model, commonly known as the Gordon Growth Model, assumes that dividends grow at a constant rate over time. Under this assumption, the model can be expressed as follows:

$$P_0 = \frac{D_1}{k_e - g} \quad (2.2)$$

where P_0 represents the current stock price, D_1 is the expected dividend in the next period, k_e is the required rate of return, and g is the constant growth rate of dividends. This formula operationalizes the present-value concept by linking stock value to expected dividends, growth expectations, and the required return.

Mishkin and Eakins (2018) emphasized that the Gordon Growth Model is valid only when the required rate of return exceeds the dividend growth rate ($k_e > g$). Under this framework, stock value is influenced by expected dividend growth and the required rate of return, such that increases in expected growth or decreases in the required return raise intrinsic value, while lower growth expectations or higher required returns reduce stock value. These changes in valuation can be reflected in stock price movements and stock returns.

2.1.3. Capital Adequacy Ratio (CAR)

Capital Adequacy Ratio, or CAR, refers to the adequacy of a bank's capital in relation to its risk-weighted assets. In Indonesia, capital adequacy is regulated through OJK Regulation No. 11/POJK.03/2016, which requires commercial banks to maintain minimum capital according to their risk profile. The regulation links capital adequacy with risk-weighted assets, including exposures related to credit risk, market risk, and operational risk. CAR is also reported in OJK (2024) as one of the main indicators used to describe the capital condition of commercial banks.

From a banking-theory perspective, capital adequacy is important because bank capital functions as a buffer against unexpected losses. Mishkin and Eakins (2018) explained that capital requirements help reduce excessive risk-taking by financial institutions, since banks with higher equity capital have more to lose if they fail. Capital also acts as a cushion when adverse shocks

occur, reducing the likelihood of bank failure and supporting the safety and soundness of financial institutions.

Empirical studies on Indonesian banking have also used CAR to describe differences in banks' internal capital conditions. Safitri et al. (2024) examined CAR as one of the determinants of Net Interest Margin in conventional commercial banks and found that CAR had a positive but statistically insignificant effect. In a capital-market context, Wong (2012) examined CAR as one of the bank operating performance ratios used to assess the value relevance of Indonesian listed banks. Therefore, CAR is relevant because it represents internal capital strength that may be considered in assessing the market performance of publicly listed banks.

2.1.4. Operational Efficiency Ratio (BOPO)

Biaya Operasional terhadap Pendapatan Operasional (BOPO) is reported by OJK (2024) as a banking performance indicator and represents the ratio of operating expenses to operating income. BOPO provides a measure of a bank's operational efficiency by showing how much operating income is absorbed by operating expenses. Wong (2012) explained that BOPO is calculated by dividing total operating expenses by total operating income. In banking reports, operating expenses generally include personnel expenses, administrative and general expenses, information technology expenses, depreciation, and other operating expenses, while operating income mainly consists of interest income, fee- and commission-based income, trading income, foreign-exchange income, and other operating income reported in commercial banks' financial statements. Therefore, a higher BOPO indicates that a larger portion of operating income is used to cover operating expenses, which suggests lower operational efficiency, while a lower BOPO reflects more efficient cost management.

Operational efficiency is important in banking because operating expenses directly affect the income that banks are able to retain from their

activities. In a study done by Mariam et al. (2021), BOPO reflected the efficiency of bank management in controlling operating costs, where a lower BOPO indicated more efficient operations. They also found that BOPO had a negative and significant effect on Net Interest Margin, which indicates that higher operating expenses relative to operating income are associated with lower interest margins. This indicates that BOPO is relevant for assessing internal banking conditions because cost efficiency is closely related to a bank's ability to sustain income generation.

2.1.5. Exchange Rate

Mishkin and Eakins (2018) explained that an exchange rate can be understood as the price of domestic-currency assets in terms of foreign-currency assets, and that exchange-rate movements are influenced by asset-market considerations, including relative expected returns. In the Indonesian context, Bank Indonesia (2024b) reported that rupiah movements in 2024 were influenced by global financial-market uncertainty, expectations regarding United States monetary policy, higher United States Treasury yields, broad USD appreciation, and capital-flow pressures affecting emerging-market economies.

According to the International Monetary Fund (2024), banks may hold foreign-currency assets and liabilities that expose them to foreign-exchange risk, making the management of foreign-exchange liquidity and funding positions an important aspect of prudential oversight. Changes in exchange rates can alter the domestic-currency value of these foreign-currency exposures, which may affect banks' balance-sheet positions and liquidity conditions. In the Indonesian context, foreign-exchange liquidity positions are supervised through monitoring tools that take into account the significance of foreign exchange to each bank's financial position.

From a broader macro-financial perspective, exchange-rate dynamics are also related to investor behaviour and capital-flow conditions in emerging

markets. The IMF (2023) reported that emerging-market portfolio flows in 2023 were affected by global risk appetite, monetary-policy tightening, higher yields in advanced economies, and investor differentiation between countries with stronger and weaker fundamentals. Similarly, the World Bank (2023) observed that worsening global financing conditions placed renewed pressure on Indonesia's external financing position, foreign-currency reserves, and the rupiah, while higher-for-longer interest rates in advanced economies increased pressure on emerging-market portfolio flows and exchange rates. This makes exchange-rate movements relevant because they represent an external financial condition that may influence investor sentiment and bank stock valuation.

2.1.6. IDX Composite (IHSG)

The IDX Composite, also known as the *Indeks Harga Saham Gabungan* (IHSG), is a stock-market index that measures the stock-price performance of listed companies on the Main Board and Development Board of the Indonesia Stock Exchange. As a composite index, the IHSG reflects aggregate stock-price movements across listed companies and is commonly used to describe general market conditions in the Indonesian capital market (IDX, n.d.).

The IHSG is commonly used to observe broader market-wide developments. Based on a study by Dewi et al. (2023), this is because the index provides information on stock-price trends and reflects the performance of listed issuers in the Indonesian capital market. Dewi et al. (2023) also noted that movements in the index may be influenced by internal macroeconomic factors, such as exchange rates, interest rates, and inflation, as well as external factors, including global stock indices, world oil prices, world gold prices, and global market sentiment.

In banking research, market index movements are also relevant because listed bank stocks may respond to broader market conditions. A study by Chiang et al. (2024) examined stock returns of Indonesian KBMI IV banks and included market return, measured using the IDX Composite Index, as one of

the explanatory variables. The study found that market return had a positive and significant effect on bank stock returns, which indicate that movements in the broader stock market are related to the performance of listed banking shares.

2.1.7. Government Bond Yield

According to Qisthina et al. (2022), government bond yield represents the return earned by investors from holding government bonds and serves as an important indicator in assessing bond market conditions. As such, it is a key consideration in investment decisions because it reflects the income that investors may receive over a certain period. Qisthina et al. (2022) examined Indonesian government bond yields in relation to bond prices, the BI rate, inflation, and exchange-rate movements. It was found that inflation was the only variable that did not statistically affect government bond yield significantly.

Other studies also showed that Indonesian government bond yields are related to broader macroeconomic and financial-market conditions. Fatmawatie et al. (2024) found that Indonesian government bond yields are influenced by interest rates, exchange rates, foreign exchange reserves, the IDX Composite Index, world oil prices, and the Fed interest rate, while inflation did not have a significant impact across the observed maturities. Similarly, Adiwiwono and Sihombing (2020) found that Indonesian government bond yields respond to domestic and international financial conditions, including exchange rates, policy rates, credit risk, and global oil prices.

2.2. List of Previous Studies

Avianto et al. (2022) analyzed the impact of capital structure on the valuation of digital banks in Indonesia. The study focused on seven digital banks listed on the Indonesia Stock Exchange using data from 2021 to 2022. Firm valuation was measured using price-to-book value (PBV), while capital structure was represented by the debt-to-equity ratio (DER). Using panel-data regression with a fixed-effect

model, the study examined whether differences in leverage were associated with differences in digital bank valuation. The findings showed a negative relationship between DER and PBV, indicating that higher leverage was associated with lower valuation among the observed digital banks. This suggests that capital structure is relevant in market-based valuation because higher debt levels may be viewed by investors as increasing financial risk.

Chiang et al. (2024) examined the effect of financial performance and market return on banking stock returns in Indonesia, with gross domestic product (GDP) growth incorporated as a moderating variable. The study focused on four KBMI IV banks listed on the Indonesia Stock Exchange using quarterly financial-statement and market data from 2007 Q1 to 2021 Q4. Using panel-data regression analysis, the authors evaluated the effects of NPL, LDR, ROA, NIM, and market return on stock returns. Based on the regression results, market return and LDR had positive and significant effects on stock returns, while NPL had a negative and significant effect. In contrast, ROA and NIM were found to have no significant effect. The study also found that GDP growth moderated the relationships between several explanatory variables and bank stock returns. These findings suggest that, in the study's sample, bank stock returns were more closely associated with market return and credit-related indicators than with profitability measures such as ROA and NIM.

Dwitanto et al. (2023) examined the determinants of NIM in Indonesian commercial banks, with the central bank interest rate used as a moderating variable. The study used quarterly data from listed Indonesian banks during the 2017 Q1 to 2021 Q4 period, resulting in 380 firm-quarter observations. NIM was used as the dependent variable, while credit risk was measured by NPL, liquidity risk was measured by the LDR, and capital adequacy was used as a proxy for banks' risk-averse behaviour. Using panel-data regression with the random-effects model, the study found that credit risk had a negative and significant effect on NIM, indicating that higher non-performing loans were associated with lower interest margins. Capital adequacy had a positive and significant effect on NIM, while liquidity risk

did not show a statistically significant direct effect. The study further found that the central bank interest rate moderated the relationships between NIM and credit risk, liquidity risk, and capital adequacy.

Elyasiani et al. (2020) examined the relationship between interest-rate conditions and bank equity performance by analysing how movements in the term structure of interest rates affected bank stock returns. The study used weekly data for 360 publicly listed banks from the United States, the United Kingdom, Europe, and Japan. The United States and United Kingdom data covered the period from December 1997 to June 2016, while the Europe and Japan data covered the period from February 2003 to June 2016. Bank performance was measured using equity returns, while interest-rate conditions were represented by the level, slope, and curvature of the yield curve using the Nelson-Siegel framework. To capture time-varying relationships between bank stock returns and yield-curve components, the authors applied a diagonal dynamic conditional correlation multivariate GARCH model. The empirical results showed that shocks to the long-term level factor and short-term slope factor had statistically significant effects on bank equity returns, while the effect of yield-curve curvature was less consistent. The study also found that systemically important and larger banks had stronger sensitivity to interest-rate movements than medium and small banks, and that bank equity returns became more sensitive to yield-curve movements during crisis and post-crisis periods.

Fatmawatie et al. (2024) examined the determinants of Indonesian government bond yields by analysing monthly data from November 2014 to December 2022. The study focused on government bonds with 5-, 10-, and 15-year maturities and applied GARCH(1,1) and GARCH-M(1,1) models to estimate the effects of domestic and global macroeconomic variables on bond yields. The variables included Indonesian interest rates, inflation, foreign exchange reserves, the exchange rate, the IHSG, world oil prices, and the Fed interest rate. The findings showed that Indonesian interest rates significantly affected 10- and 15-year bond yields, while inflation had no significant effect across all maturities. Foreign exchange reserves had a negative effect on yields across all maturities, while the

exchange rate had a positive effect across all maturities. The IHSG had a negative effect on long-term bond yields, world oil prices significantly affected 5- and 10-year yields, and the Fed interest rate had a positive effect on the 15-year yield.

Kim and In (2007) investigated the relationship between stock-price changes and long-term government bond yields in the G7 countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) using wavelet analysis. The study employed monthly data on stock price indices, 10-year government bond yields, and consumer price indices obtained from the IMF's International Financial Statistics. The sample periods differed by country depending on data availability, beginning between the late 1950s and early 1970s and extending to the early 2000s. Using wavelet correlation analysis, the authors decomposed the data into different investment horizons to examine whether the stock–bond relationship changed across short-, medium-, and long-term frequencies. The results indicated substantial cross-country differences in the relationship between stock prices and bond yields. For Canada, France, Germany, Italy, the United Kingdom, and the United States, the correlations between stock-price changes and bond yields were generally weak, unstable, or statistically insignificant across many frequencies, suggesting no consistent long-run relationship between the two markets. In contrast, Japan exhibited a more pronounced and persistent positive relationship across several time scales.

Mariam et al. (2021) analyzed the determinants of NIM in Indonesian banks over the 2009 – 2018 period. The study used panel-data regression with the random-effects model and examined 109 banks across BUKU I to BUKU IV categories, resulting in 1,090 observations. The explanatory variables included loan growth, unemployment, operational efficiency measured by BOPO, CAR, inflation, and the exchange rate. The findings showed that BOPO had a negative and significant effect on NIM, indicating that higher operating expenses relative to operating income were associated with lower interest margins. CAR was found to have a positive but statistically insignificant effect, suggesting that differences in capital adequacy did not significantly influence NIM during the observed period. Inflation also had a

positive but insignificant effect, while the exchange rate had a negative and significant effect on NIM. These findings indicate that internal efficiency and exchange-rate movements were more strongly associated with bank interest margins than capital adequacy and inflation in the study's sample.

Nurfadillah et al. (2023) investigated the effects of capital, liquidity risk, credit risk, and interest-rate policy on the profitability of Indonesian conventional commercial banks, with interest-rate policy also applied as a moderating variable. The study used monthly panel data from 31 banks during the 2017–2021 period and grouped the banks into small, medium, and large categories based on core capital. Using Structural Equation Modeling with SmartPLS, the study found that capital had a significant negative effect on profitability for small and medium banks, while it had a significant positive effect for large banks. Liquidity risk had a significant negative effect on profitability only among large banks, while credit risk had a negative and significant effect on profitability for small and large banks. Interest-rate policy had a positive and significant effect on profitability for small and medium banks, but its effect was negative for large banks. The study also found that interest-rate policy moderated the relationships between capital and profitability and between credit risk and profitability only among small banks.

Oktaviani et al. (2019) examined the effect of internal banking ratios on the profitability of banks listed on the Indonesia Stock Exchange during the 2012 – 2017 period. The study used secondary data from annual financial reports and selected 30 banking companies through purposive sampling. Profitability was measured using ROA, while the independent variables consisted of CAR, BOPO, LDR, NIM, and firm size. Using multiple linear regression with SmartPLS, the study found that BOPO had a negative and significant effect on ROA, which indicates that higher operating expenses relative to operating income were associated with lower profitability. NIM had a positive and significant effect on ROA, showing that stronger net interest income contributed to bank profitability. Meanwhile, CAR, LDR, and firm size did not have significant effects on ROA.

Safitri et al. (2024) examined the factors influencing NIM in Indonesian conventional commercial banks by analyzing annual financial-statement data covering the period from 2018 to 2022. The study focused on three key explanatory variables, namely CAR, NPL, and bank size, to assess their impact on banks' ability to generate interest income relative to their earning assets. Using secondary data and panel-data regression analysis conducted with EViews 12, the researchers selected the fixed-effect model as the most appropriate estimation approach. The findings revealed that CAR had a positive but statistically insignificant effect on NIM, suggesting that differences in capital adequacy among the sampled banks did not significantly affect their interest margins during the study period. In contrast, NPL was found to have a negative and statistically significant effect on NIM, indicating that banks with higher levels of problem loans tended to experience lower interest margins, likely reflecting the adverse impact of credit risk on banking performance. The results also showed that bank size had a negative and significant effect on NIM, implying that larger banks in the sample generally recorded lower interest margins than smaller banks.

Sari et al. (2024) examined the effect of banking performance on stock prices by investigating whether profitability, measured by ROA, influences the market value of banking firms listed on the Indonesia Stock Exchange. Using data from 41 banking companies during the 2017 – 2021 period, resulting in 205 firm-year observations selected through purposive sampling, the study employed panel-data regression analysis and moderated regression analysis (MRA) to assess both the direct effect of ROA on stock prices and the moderating role of interest-rate policy. The findings showed that ROA had a positive and statistically significant effect on stock prices, indicating that more profitable banks tended to achieve higher market valuations because investors viewed strong profitability as a positive signal of financial performance and future prospects. The study also found that interest-rate policy significantly moderated the relationship between ROA and stock prices, suggesting that the extent to which profitability is reflected in stock prices depends on prevailing interest-rate conditions.

Suwito (2020) examined the effects of BI Rate, inflation, and the IHSG on the stock returns of banking-sector companies listed on the Indonesia Stock Exchange. The study used monthly observations from 2007 to 2011 for 12 banking stocks and applied multiple linear regression to evaluate the partial and simultaneous effects of the selected monetary and market variables. The findings showed that BI Rate and inflation did not have significant partial effects on most banking stock returns, while IHSG had a positive and significant effect on several banking stocks and was the most influential variable compared with BI Rate and inflation. The study also found that BI Rate, inflation, and IHSG simultaneously affected 9 of the 12 banking stock returns observed.

Table 2.1. Summary of Previous Studies

Title	Author	Variable	Method	Result
The Impact of Capital Structure on Digital Bank Valuation in Indonesia	Avianto et al. (2022)	Price-to-book value (PBV), debt-to-equity ratio (DER)	Panel-data regression with a fixed-effect model using seven digital banks listed on the Indonesia Stock Exchange during 2021 – 2022	DER had a negative relationship with PBV, indicating that higher leverage was associated with lower valuation among the observed digital banks.
The Effect of Financial Performance and Market Return on Stock Return with GDP Growth as a Moderating Variable	Chiang et al. (2024)	Stock return, NPL, LDR, ROA, NIM, market return, GDP growth	Panel-data regression using quarterly data from four KBMI IV banks in Indonesia during Q1 2007 – Q4 2021	Market return and LDR had positive and significant effects on stock returns, while NPL had a negative and significant effect. ROA and NIM were not significant. GDP

				growth moderated the relationships between several explanatory variables and bank stock returns.
Determinants of Net Interest Margin in Indonesian Banking Industry: The Moderating Role of Central Bank Interest Rate	Dwitanto et al. (2023)	NIM, credit risk (NPL), liquidity risk (LDR), CAR, US central bank interest rate	Panel-data regression using the random-effects model with quarterly data from listed Indonesian banks during 2017 Q1–2021 Q4, resulting in 380 firm-quarter observations	Credit risk had a negative and significant effect on NIM, capital adequacy had a positive and significant effect, and liquidity risk did not show a significant direct effect. The central bank interest rate moderated the relationships between NIM and credit risk, liquidity risk, and capital adequacy.
Banks' Equity Performance and the Term Structure of Interest Rates	Elyasiani et al. (2020)	Bank equity returns, yield-curve level, yield-curve slope, yield-curve curvature	Diagonal Dynamic Conditional Correlation Multivariate GARCH (DCC-MGARCH) using weekly data from publicly listed	Shocks to the long-term level factor and short-term slope factor had statistically significant effects on bank equity returns, while the effect

			banks in the United States, United Kingdom, Europe, and Japan	of yield-curve curvature was less consistent. Larger and systemically important banks showed stronger sensitivity to interest-rate movements, especially during crisis and post-crisis periods.
Macroeconomic Factors and Government Bond Yield in Indonesia	Fatmawatie et al. (2024)	Government bond yields for 5-, 10-, and 15-year maturities, interest rate, inflation, foreign exchange reserves, exchange rate, IHSG, world oil prices, Fed interest rate	GARCH(1,1) and GARCH-M(1,1) models using monthly data from November 2014 to December 2022	Indonesian interest rates significantly affected 10- and 15-year yields, while inflation had no significant effect across all maturities. Foreign exchange reserves had a negative effect and the exchange rate had a positive effect across all maturities. IHSG negatively affected long-term bond yields, world oil prices affected 5- and 10-year

				yields, and the Fed interest rate affected the 15-year yield.
On the Relationship Between Changes in Stock Prices and Bond Yields in the G7 Countries: Wavelet Analysis	Kim and In (2007)	Stock-price changes, long-term government bond yields, consumer price index	Wavelet correlation analysis using monthly data from G7 countries, with sample periods varying by country from the late 1950s or later to the early 2000s	The relationship between stock-price changes and government bond yields differed across countries and time scales. Most G7 countries did not show a consistent stock–bond relationship, while Japan showed a more persistent positive relationship across several frequencies.
Determinant of Net Interest Margin Banking in Indonesia During the Period 2009 – 2018	Mariam et al. (2021)	NIM, loan growth, unemployment, BOPO, CAR, inflation, exchange rate	Panel-data regression using the random-effects model with 109 banks from BUKU I to BUKU IV during 2009 – 2018	Loan growth and unemployment had positive and significant effects on NIM. BOPO and the exchange rate had negative and significant effects on NIM, while CAR and inflation did not show significant

				effects.
Moderation of Interest Rate Policy Towards Banking Profitability	Nurfadillah et al. (2023)	Profitability, capital, liquidity risk, credit risk, interest-rate policy	Structural Equation Modeling using SmartPLS with monthly data from 31 conventional banks during 2017–2021, grouped into small, medium, and large banks	Capital had a negative significant effect on profitability for small and medium banks, but a positive significant effect for large banks. Liquidity risk negatively affected profitability only among large banks, while credit risk negatively affected profitability for small and large banks. Interest-rate policy had a positive significant effect for small and medium banks but a negative effect for large banks, and moderated the effects of capital and credit risk only among small banks.
Analysis the Effect of CAR, BOPO, LDR,	Oktaviani et al. (2019)	ROA, CAR, BOPO, LDR, NIM, firm size	Multiple linear regression using SmartPLS with	BOPO had a negative and significant effect

NIM and Firm Size on Profitability of Banks Listed on IDX Period 2012 – 2017			30 banking companies listed on the Indonesia Stock Exchange during 2012 – 2017	on ROA, while NIM had a positive and significant effect on ROA. CAR, LDR, and firm size did not have significant effects on ROA.
Determinants of Net Interest Margin in Conventional Commercial Banking: A Fixed Effect Model	Safitri et al. (2024)	NIM, CAR, NPL, bank size	Fixed-effect panel regression using annual financial-statement data from 2018–2022, processed with EViews 12	CAR had a positive but statistically insignificant effect on NIM. NPL had a negative and significant effect on NIM, while bank size also had a negative and significant effect.
Interest Rate Policy Moderate the Performance Impact on Banking Stock Price in Indonesia	Sari et al. (2024)	Stock price, ROA, interest-rate policy	Panel-data regression and moderated regression analysis using 41 listed banking companies during 2017–2021	ROA had a positive and significant effect on banking stock prices, indicating that higher profitability was associated with higher market valuation. Interest-rate policy significantly moderated the relationship

				between ROA and stock prices.
Influence Analysis of BI Rate, Inflation and IHSG on Stock Return of Banking Sector Listed on Indonesian Stock Exchange	Suwito (2020)	Banking stock returns, BI Rate, inflation, IHSG	Multiple linear regression using monthly observations from 12 banking stocks listed on the Indonesia Stock Exchange during 2007 – 2011	BI Rate and inflation did not have significant partial effects on most banking stock returns, while IHSG had a positive and significant effect on several banking stocks and was the most influential variable compared with BI Rate and inflation. BI Rate, inflation, and IHSG simultaneously affected 9 of the 12 observed banking stock returns.

This study has three major differences from earlier research. First, although several previous studies have examined banking stock returns, stock prices, equity returns, or market valuation, many studies on Indonesian banking performance still rely on accounting-based measures such as ROA and NIM. This study specifically measures bank performance using stock returns as a market-based indicator, allowing the analysis to focus on how investors value publicly listed banks through share-price movements. Second, the independent variables consist of CAR, BOPO, exchange rate, and market index (IHSG), which are examined jointly to represent both internal banking conditions and external market factors that may influence bank stock returns. Third, while prior studies have used moderators such as GDP

growth, interest-rate policy, or central bank rates, this study employs the Indonesian 10-year government bond yield as the moderating variable. Unlike Dwitanto et al. (2023), which used the BI Rate as the policy-based moderator, the 10-year bond yield reflects market-based conditions.

2.3. Hypothesis Development

2.3.1. The Effect of Capital Adequacy on Stock Returns

In this study, CAR is used as an indicator of how capital adequacy may influence bank stock returns. According to the valuation framework of Williams (1938) and Gordon (1959), stock returns are influenced by expectations of future cash flows and the level of risk perceived by investors, which affects the required rate of return. A higher CAR indicates stronger capital buffers and a greater ability to absorb potential losses, thereby reducing the likelihood of financial distress. This condition may lower perceived risk and increase investor confidence in the sustainability of bank performance. Therefore, the hypothesis is formulated as follows:

H1: Capital Adequacy has a positive effect on Stock Returns.

2.3.2. The Effect of Operational Efficiency on Stock Returns

In this study, BOPO is used as an indicator of operational efficiency that may affect bank stock returns. From the valuation perspective developed by Williams (1938) and Gordon (1959), stock valuation is influenced by expected future cash flows, growth expectations, and the required return perceived by investors. A higher BOPO indicates lower operational efficiency because a larger proportion of operating income is absorbed by operating expenses. Previous studies also support the negative role of BOPO in banking performance, as Mariam et al. (2021) found that BOPO had a negative and significant effect on NIM, while Oktaviani et al. (2019) found that BOPO had a negative and significant effect on ROA. Therefore, the hypothesis is as follows:

H2: Operational Efficiency has a negative effect on Stock Returns.

2.3.3. The Effect of the Exchange Rate on Stock Returns

In this study, the exchange rate is considered an external macro-financial variable that may influence bank stock returns. Within the valuation framework of Williams (1938) and Gordon (1959), higher perceived risk can increase investors' required rate of return, thereby placing pressure on stock valuation and stock returns. Since the exchange rate in this study is measured using USD/IDR movements, an increase in the exchange rate reflects rupiah depreciation against the United States dollar. Rupiah depreciation may increase uncertainty in the financial market and affect banks with foreign-currency assets, liabilities, or transactions by changing the domestic-currency value of foreign-currency exposures. Therefore, the hypothesis is as follows:

H3: The Exchange Rate has a negative effect on Stock Returns.

2.3.4. The Effect of the Market Index on Stock Returns

In this study, the market index is examined as an external variable that may affect bank stock returns. Under the valuation framework proposed by Williams (1938) and Gordon (1959), stock returns are influenced not only by firm-specific expectations but also by broader market conditions that affect growth expectations, risk perception, and required returns. An improving market index generally means stronger market sentiment, better economic expectations, and greater investor willingness to hold equity assets. In such conditions, bank stocks are more likely to experience positive valuation adjustments because they are traded within the same capital-market environment. Previous studies also support this relationship, as Chiang et al. (2024) found that market return had a positive and significant effect on bank stock returns, while Suwito (2020) found that IHSG had a positive and significant effect on several banking stock returns. Therefore, the hypothesis is as follows:

H4: The Market Index has a positive effect on Stock Returns.

2.3.5. The Moderating Effect of Government Bond Yield on the Relationship between CAR and Stock Returns

In this study, government bond yield is incorporated as a moderating variable that may influence how CAR affects bank stock returns. Within the valuation framework proposed by Williams (1938) and Gordon (1959), stock valuation is influenced by expected future cash flows and the required rate of return applied by investors. A higher CAR indicates stronger capital adequacy and may reduce perceived bank risk. However, when government bond yields increase, investors face higher returns from relatively safer fixed-income instruments, while the required return on equity may also rise. Because of this, higher bond yields may increase the attractiveness of alternative investments and place pressure on equity valuation. Therefore, the hypothesis is as follows: H5: Government Bond Yield has a negative moderating effect on the relationship between CAR and Stock Returns.

2.3.6. The Moderating Effect of Government Bond Yield on the Relationship between BOPO and Stock Returns

In this study, government bond yield is used as a moderating variable that may influence how BOPO affects bank stock returns. Within the valuation framework of Williams (1938) and Gordon (1959), higher government bond yields may increase the required rate of return demanded by investors, thereby intensifying attention to a firm's ability to generate stable future cash flows. BOPO reflects the proportion of operating income absorbed by operating expenses, which means a higher BOPO indicates lower operational efficiency. When government bond yields rise, banks with higher operating costs relative to operating income may face greater difficulty meeting investor return expectations because inefficiency can weaken expected earnings and increase perceived risk. Therefore, the hypothesis is as follows: H6: Government Bond Yield has a negative moderating effect on the relationship between BOPO and Stock Returns.

2.4. Theoretical Framework

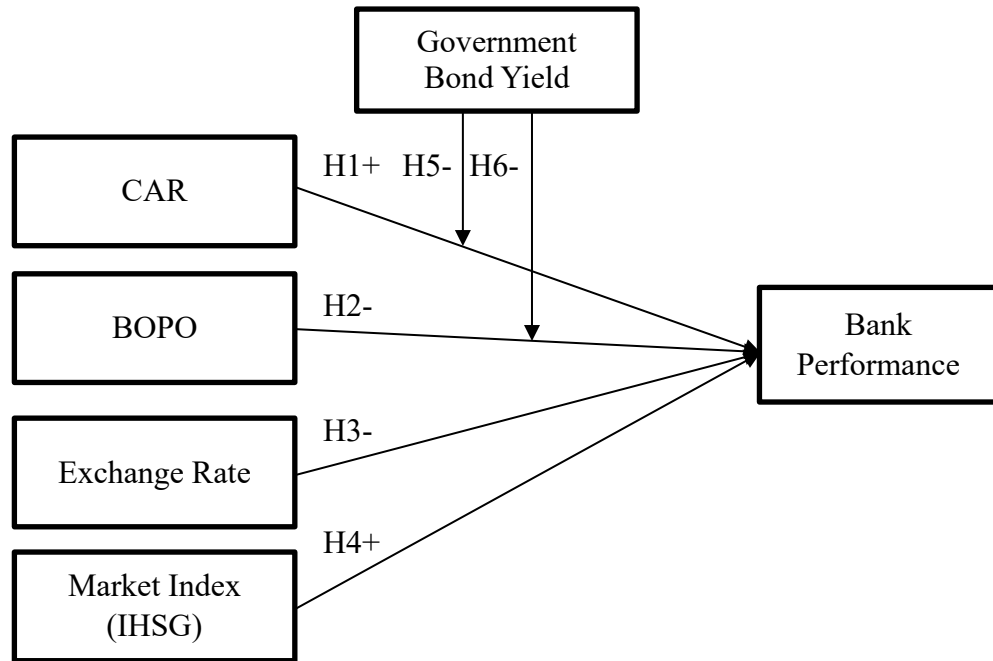


Figure 2.1. Research Framework

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Research Design

This study uses a quantitative explanatory research design to examine the relationships between internal banking indicators, external market factors, and bank performance in Indonesia during the 2020-2024 period using annual panel data. A quantitative approach is employed because the research analyzes numerical data and tests hypotheses using statistical methods applied to panel data. The explanatory design is appropriate as the study seeks to identify and evaluate the effects of capital adequacy, operational efficiency, exchange-rate movements, and overall market conditions on bank performance as reflected in stock returns. Additionally, the study uses Government Bond Yield as a moderating variable to assess whether market-based yield conditions influence the relationship between internal banking indicators and bank stock returns.

3.2. Operational Variables

3.2.1. Dependent Variables

According to Greene (2020), the dependent variable is the explained variable in a regression model and reflects the outcome whose variation is explained by one or more independent variables. In this study, bank performance is used as the dependent variable and is measured using stock returns. Stock returns are used because they capture changes in market valuation as reflected in the share-price movements of publicly listed banks.

Stock-price data are obtained from Investing.com for each bank included in the sample. Although the data source provides daily market data, this study uses the closing stock price at the end of each year to calculate annual stock returns. Therefore, stock returns are calculated based on the change between the closing stock price at the end of year and the closing stock price at the end of the previous year. Since the observation period begins in 2020,

the closing stock price at the end of 2019 is also used as the base value for calculating stock returns in 2020.

Daily stock return percentage is calculated as:

$$SR_{it} = \left(\frac{P_{it} - P_{it-1}}{P_{it-1}} - 1 \right) * 100\% \quad (3.1)$$

Where SR_{it} represents the stock returns percentage of bank i in year t , P_{it} represents the stock price of bank i in year t , and P_{it-1} represents the stock price of bank i before year t .

3.2.2. Independent Variables

Greene (2020) described independent variables as the explanatory variables used in a regression model to explain variations in the dependent variable. In this study, the independent variables consist of the following:

1. Capital Adequacy Ratio (CAR)

CAR data are obtained from the annual reports published by each bank. The CAR values used in this study are reported figures taken directly from banks' annual reports and expressed as percentages. The formula for CAR is:

$$CAR = \frac{Capital}{Risk\ Weighted\ Assets} \times 100\% \quad (3.2)$$

2. Operational Efficiency Ratio (BOPO)

BOPO data are obtained from the annual reports published by each bank. It is calculated by comparing total operating expenses to total operating income for each bank-year observation, using the following formula:

$$BOPO = \frac{Operating\ Expenses}{Operating\ Income} \times 100\% \quad (3.3)$$

3. Exchange Rate (USD/IDR)

Exchange-rate data are obtained from Investing.com using the USD/IDR exchange rate. Although the data source provides daily exchange-rate data, this study uses the exchange-rate value at the end of each year to calculate annual exchange-rate changes. The exchange-rate change is calculated by comparing the USD/IDR value at the end of year (t) with the USD/IDR value at the end of the previous year. Since the observation period begins in 2020, the end-of-2019 USD/IDR exchange-rate value is also used as the base value for calculating the exchange-rate change in 2020.

The annual exchange-rate change is calculated as follows:

$$ER_t = \left(\frac{R_t - R_{t-1}}{R_{t-1}} - 1 \right) * 100\% \quad (3.4)$$

where ER_t represents the exchange rate change in year t , R_t is the exchange-rate value at the end of year t , and R_{t-1} is the exchange-rate value at the end of the previous year.

4. Market Index (IHSG)

IHSG data are obtained from Investing.com using the IDX Composite Index closing value. Although the data source provides daily market-index data, this study uses the IHSG value at the end of each year to calculate annual market-index returns. The IHSG return is calculated by comparing the IHSG closing value at the end of year (t) with the IHSG closing value at the end of the previous year. Since the observation period begins in 2020, the end-of-2019 IHSG value is also used as the base value for calculating the IHSG return in 2020.

The annual IHSG return is calculated as follows:

$$IHSG_t = \left(\frac{P_t - P_{t-1}}{P_{t-1}} - 1 \right) * 100\% \quad (3.5)$$

where $IHSG_t$ represents the IHSG return in year t , P_t is the IHSG closing

value at the end of year t , and P_{t-1} is the IHSG closing value at the end of the previous year.

3.2.3. Moderating Variable

According to Baron and Kenny (1986), a moderating variable is a qualitative or quantitative variable that affects the direction or strength of the relationship between an independent variable and a dependent variable. This definition is further explained by Fairchild and MacKinnon (2009), who noted that moderation analysis is used to determine whether the effect of an independent variable on a dependent variable varies under different levels of a moderating variable.

Government bond yield is only applied as a moderating variable to CAR and BOPO because both variables represent bank-specific internal conditions, while government bond yield reflects broader market-based financial conditions. Meanwhile, exchange rate and IHSG are treated as direct external variables because they already represent macro-financial and market-level conditions. Using government bond yield to moderate exchange rate and IHSG may create conceptual overlap and potential multicollinearity concerns, as Vatcheva et al. (2016) explained how multicollinearity arises when explanatory variables are highly correlated, making it more difficult to isolate individual effects in a regression model.

Government bond yield data are obtained from Investing.com using the Indonesia 10-Year Bond Yield. Although the data source provides daily yield observations, this study uses the government bond yield observed at the end of each year within the period of 2020-2024 to represent the prevailing bond-market conditions for the corresponding year. The year-end yield values are incorporated directly into the regression model as the moderating variable and are interacted only with CAR and BOPO.

3.3. Population and Sampling

The population of this study consists of commercial banks in Indonesia that were publicly listed on the Indonesia Stock Exchange throughout the 2020-2024 observation period. According to Banerjee and Chaudhury (2010), a population should be clearly defined by specifying the units included in and excluded from the research.

For this study, banks were included only if they remained continuously listed during the 2020-2024 observation period and had complete annual data for CAR and BOPO. The banks also needed to have available year-end stock-price data from 2019 to 2024, since the end-of-2019 stock price is required as the base value for calculating stock returns in 2020. In addition, year-end data from 2019 to 2024 were collected for the exchange rate (USD/IDR) and the market index (IHSG), while the Indonesia 10-Year Government Bond Yield was obtained using the year-end yield value for each year from 2020 to 2024 to represent the moderating variable used in the model.

Based on data from the Indonesia Stock Exchange, Investing.com, and the annual reports of each bank, 34 banks met these criteria and were included in the analysis. Since all banks that fulfilled the criteria were used, this study applies a census approach, which is referred to by the Australian Bureau of Statistics (n.d.) as the inclusion of every unit in the defined population. This approach supports a balanced panel-data structure and reduces the risk of incomplete observations.

3.4. Data Collection Technique

Based on the definition made by Creswell (2014), this study used the quantitative approach because it examined measurable variables that can be analyzed using statistical procedures. The type of data used in this study is secondary data, which is categorized by Wickham (2019) as such because they are

obtained from existing sources rather than collected directly by the researcher. The data sources used in this study are as follows:

1. Official publications of publicly listed banks

The bank-specific financial data, CAR and BOPO, are obtained from audited annual financial statements released by each bank. These reports are accessed through official bank websites and disclosures submitted to the Indonesia Stock Exchange. The financial-statement data are collected annually for each bank included in the sample during the 2020-2024 period.

2. Investing.com

Investing.com provides the market data used in this study, including banking stock prices, the IHSG, the USD/IDR exchange rate, and the Indonesia 10-Year Government Bond Yield. Although the data are available on a daily basis, this study uses the year-end values from 2019 to 2024 to calculate annual stock returns, exchange-rate changes, and IHSG returns. The end-of-2019 values are used as the base values for calculating the 2020 observations, while the 2020-2024 year-end values are used to construct the annual panel data for the research period. For the moderating variable, the Indonesia 10-Year Government Bond Yield observed at the end of each year from 2020 to 2024 is used directly to represent the prevailing government bond yield conditions during each year.

3.5. Data Analysis Technique

Panel-data regression analysis is used as the analytical approach in this study. Greene (2020) described panel-data models as econometric models that analyze observations across both cross-sectional units and time periods. This approach is appropriate for the study because the data consist of several publicly listed banks observed annually from 2020 to 2024. Therefore, panel-data regression allows the analysis to capture both differences across banks and changes over time in financial and market conditions.

All statistical analyses in this study are conducted using EViews 13, which is used to estimate panel regression models, perform model selection tests, and evaluate moderation effects through interaction terms. The panel-data regression model used in this study can be expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} \dots + \beta_n Z_{it} + \beta_n (X_1 * Z)_{it} + \beta_n (X_2 * Z)_t + \beta_n (X_n * Z)_t \dots + \varepsilon_{it} \quad (3.6)$$

where Y represents the dependent variable, with X_1 , X_2 and X_n referring to the independent variables, and Z is the moderating variable. The constant term is denoted by β_0 , and β_1 to β_9 represent the regression coefficients measuring the effects of the independent variables and interaction terms. The subscript i refers to the cross-sectional unit, namely individual banks, and t denotes the time period in years. The term ε represents the error term, which captures unexplained variation in stock returns.

3.5.1. Panel Data Regression Estimation Model

Panel-data regression can be estimated using three main approaches, namely the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). According to Greene (2020), panel-data models are used to analyze observations that combine cross-sectional units and time periods, allowing the researcher to examine both differences across entities and changes over time. In this study, the cross-sectional units are publicly listed banks, while the time dimension covers the 2020-2024 period. The most appropriate estimation model is selected through formal model-selection tests. After the model is selected, the regression is estimated using EViews 13. Where necessary, Panel EGLS with cross-section weights is applied to address differences in error variance across banks, since banks may differ in size, risk profile, and market exposure.

1. Common Effect Model (CEM)

The Common Effect Model is the simplest panel-data estimation approach because it treats the data as a pooled combination of cross-sectional and time-series observations. According to Greene (2020), this

model assumes that all cross-sectional units have the same intercept and slope coefficients, meaning that it does not explicitly account for individual bank-specific effects or time-specific effects. Under this approach, the regression is estimated using Ordinary Least Squares (OLS), which Greene (2020) explains obtains coefficient estimates by minimizing the sum of squared residuals between observed and predicted values.

In this study, the CEM equation can be expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} \dots + \beta_n Z_{it} + \beta_n (X_1 * Z)_{it} + \beta_n (X_2 * Z)_t + \beta_n (X_n * Z)_t \dots + \varepsilon_{it} \quad (3.7)$$

where Y represents the dependent variable, with X_1 , X_2 and X_n referring to the independent variables, and Z is the moderating variable. The constant term is denoted by β_0 , and β_1 to β_9 represent the regression coefficients measuring the effects of the independent variables and interaction terms. The subscript i refers to the cross-sectional unit, namely individual banks, and t denotes the time period in years. The term ε represents the error term, which captures unexplained variation in stock returns.

2. Fixed Effect Model (FEM)

According to Greene (2020), the Fixed Effect Model allows each cross-sectional unit to have its own intercept while assuming that the slope coefficients remain constant across entities. This approach recognizes that individual banks may have unobserved characteristics that are constant over time, such as business orientation, management style, institutional structure, or operational strategy. These unobserved bank-specific characteristics may influence stock returns and therefore need to be controlled in the estimation. Fixed effects can be estimated using the Least Squares Dummy Variable (LSDV) approach, where dummy variables are introduced to capture individual-specific intercepts.

In this study, the FEM equation can be expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} \dots + \beta_n Z_{it} + \beta_n (X_1 * Z)_{it} + \beta_n (X_2 * Z)_t + \beta_n (X_n * Z)_t \dots + \alpha_{it} + \varepsilon_{it} \quad (3.8)$$

where α_{it} represents the unobserved time-invariant individual effect, while ε_{it} is the error term. The remaining variables follow the same definitions as in the CEM equation.

3. Random Effect Model (REM)

Greene (2020) explains that the random-effects approach assumes that individual-specific effects are not correlated with the explanatory variables included in the model. Under this assumption, REM can estimate both variation across banks and variation over time more efficiently than fixed effects. The Random Effect Model also accounts for individual differences across cross-sectional units, but it treats those differences as random components of the error structure rather than fixed intercepts.

In this study, the REM equation can be expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} \dots + \beta_n Z_{it} + \beta_n (X_1 * Z)_{it} + \beta_n (X_2 * Z)_t + \beta_n (X_n * Z)_t \dots + u_{it} + \varepsilon_{it} \quad (3.9)$$

where u_i represents the error component of each cross-section unit, and ε_{it} is the error component of the time series unit. The remaining variables follow the same definitions as in the previous equations.

3.5.2. Selection of Panel Data Regression Model

After estimating the panel-data regression models, the next step is to determine which specification is most appropriate for this study. Model selection is conducted by comparing CEM, FEM, and REM to determine whether the data are better represented by a pooled model, a model with fixed individual effects, or a model with random individual effects. Greene (2020) explained that panel-data models differ in the way they treat unobserved individual effects across cross-sectional units. In this study, the selection

process is conducted using the Chow Test, Hausman Test, and Lagrange Multiplier Test, with a significance level of 10 percent or 0.10.

1. Chow Test

The Chow Test is used to compare CEM and FEM. Originally developed by Chow (1960), this test examines whether allowing different intercepts across cross-sectional units provides a better model than treating all observations as pooled data. In this study, the hypotheses for the Chow Test are stated as follows:

H₀: The CEM is appropriate to be used

H₁: The FEM is appropriate to be used

Criteria:

If sig. value > α then H₀ is accepted

If sig. value < α then H₁ is accepted

2. Hausman Test

The Hausman Test is used to compare FEM and REM. According to Hausman (1978), this test examines whether the individual-specific effects are correlated with the explanatory variables. If the individual effects are not correlated with the explanatory variables, the REM may be appropriate because it provides consistent and efficient estimates. However, if the individual effects are correlated with the explanatory variables, the FEM is preferred because the REM estimates become inconsistent. In this study, the hypotheses for the Hausman Test are stated as follows:

H₀: The REM is appropriate to be used

H₁: The FEM is appropriate to be used

Criteria:

If sig. value > α then H₀ is accepted

If sig. value < α then H₁ is accepted

3. Lagrange Multiplier Test

The Lagrange Multiplier Test is used to compare REM and CEM. Greene (2020) explained that this test evaluates whether unobserved individual effects are statistically significant in a panel-data model. The test is based on the Lagrange Multiplier framework developed by Breusch and Pagan (1980) for detecting random effects in panel data. If random effects are not present, the pooled CEM is considered sufficient. However, if random effects are present, then REM is preferred because it accounts for unobserved variation across cross-sectional units. In this study, the hypotheses for the Lagrange Multiplier Test are stated as follows:

H₀: The CEM is appropriate to be used

H₁: The REM is appropriate to be used

Criteria:

If sig. value > α then H₀ is accepted

If sig. value < α then H₁ is accepted

3.5.3. Multicollinearity Test

The multicollinearity test is used to examine whether the independent variables in a regression model are highly correlated with one another. According to Gujarati and Porter (2009), multicollinearity refers to a situation in which two or more explanatory variables are highly linearly related. High multicollinearity can reduce the precision of coefficient estimates because it becomes more difficult to distinguish the individual effect of each explanatory variable on the dependent variable.

In this study, multicollinearity is evaluated using the Variance Inflation Factor (VIF). Gujarati and Porter (2009) explained that VIF shows how much the variance of a regression coefficient is increased due to correlation with other explanatory variables. According to J. H. Kim (2019), VIF values below 5 or 10 are generally considered acceptable, whereas values exceeding these thresholds may indicate potential multicollinearity problems, depending on the

level of conservatism adopted by the researcher. The VIF test is applied only to the core independent variables rather than the interaction terms because interaction terms are naturally correlated with their component variables and may therefore produce higher VIF values without necessarily indicating problematic multicollinearity.

3.5.4. Coefficient of Determination (Adjusted R-Squared)

The coefficient of determination is used to measure how much variation in the dependent variable can be explained by the independent variables included in the regression model. According to Gujarati & Porter (2009), R-squared indicates the explanatory power of a regression model by showing the proportion of variation in the dependent variable explained by the model.

In this study, the adjusted R-squared value is used because the regression model includes several independent variables and interaction terms. Adjusted R-squared provides a more appropriate measure of explanatory power because it adjusts the R-squared value based on the number of explanatory variables included in the model. A higher adjusted R-squared value indicates that the model has a greater ability to explain variations in stock returns, while a lower adjusted R-squared value indicates weaker explanatory power.

3.5.5. Significance Test

Significance testing in this study is carried out using the panel-data regression model. The analysis evaluates the individual effects of the independent variables and the moderating role of government bond yield through interaction terms. The regression equation used in this study is as follows:

$$\begin{aligned}
 SR_{it} = & \beta_0 + \beta_1 CAR_{it} + \beta_2 BOPO_{it} + \beta_3 ER_t + \\
 & \beta_4 IHSG_t + \beta_5 GBY_t + \beta_6 (CAR_i * GBY)_t + \\
 & \beta_7 (BOPO_i * GBY)_t + \varepsilon_{it}
 \end{aligned} \tag{3.10}$$

This model is used to examine whether each independent variable and interaction term has a statistically significant effect on stock returns through the partial test.

1. Model Feasibility Test (F-Test)

The F-test is used to evaluate the overall significance of the regression model by determining whether the independent variables jointly explain variation in the dependent variable. According to Gujarati & Porter (2009), the F-test examines the null hypothesis that all slope coefficients are simultaneously equal to zero, implying that the independent variables have no joint effect on the dependent variable. If the null hypothesis is rejected, the regression model is considered statistically significant as a whole.

In practice, the F-test may be evaluated using either the F-statistic or its probability value (Prob(F-statistic)). At a 5 percent significance level, the null hypothesis is rejected if the calculated F-statistic exceeds the critical F-value or, equivalently, if the probability value is less than 0.05. This indicates that the independent variables jointly have a statistically significant effect on the dependent variable. Conversely, if the probability value exceeds 0.05, the null hypothesis cannot be rejected, indicating that the independent variables do not have a statistically significant simultaneous effect on the dependent variable. Therefore, the hypothesis is as follows:

H_0 : The independent variables do not have a significant simultaneous effect on the dependent variable.

H_1 : The independent variables have a significant simultaneous effect on the dependent variable.

2. Partial Test (t-test)

According to Gujarati and Porter (2009), the partial test (t-test) is used to evaluate the statistical significance of individual regression

coefficients. In this study, the t-test is conducted at a 5 percent significance level to determine whether each independent variable and interaction term has a statistically significant effect on stock returns.

Because all research hypotheses specify the expected direction of the relationship between the variables, hypothesis testing is conducted using a one-tailed test. Gujarati and Porter (2009) explain that a one-tailed test is appropriate when the alternative hypothesis predicts either a positive or a negative effect based on theoretical and empirical justification. Although EViews reports two-tailed probability values by default, the hypothesis evaluation in this study is based on one-tailed probabilities.

When the estimated regression coefficient is consistent with the hypothesized direction, the one-tailed probability is calculated as:

$$p_{one-tailed} = \frac{p_{two-tailed}}{2} \quad (3.11)$$

However, if the estimated regression coefficient is opposite to the hypothesized direction, the one-tailed probability is calculated as:

$$p_{one-tailed} = 1 - \left(\frac{p_{two-tailed}}{2} \right) \quad (3.12)$$

Where, under this condition, the alternative hypothesis is not supported because the estimated relationship contradicts the hypothesised direction, even if the reported two-tailed probability is statistically significant.

Therefore, the directional hypotheses for the t-test are formulated according to the expected sign of each regression coefficient. For hypotheses predicting a positive effect:

$$H_0: \beta \leq 0$$

$$H_1: \beta > 0$$

For hypotheses predicting a negative effect:

$$H_0: \beta \geq 0$$

$$H_1: \beta < 0$$

3.6. Research Process

The research process begins with identifying the independent variables, the moderating variable, and the dependent variable used in the study. The second step involves collecting and preparing panel data for publicly listed banks during the 2020-2024 period. Financial ratio data are obtained from each bank's published annual reports, while market-based data are collected from Investing.com. Year-end market data are used to construct the research variables, where stock returns, exchange-rate changes, and IHSG returns are calculated from year-end prices, while the Indonesia 10-Year Government Bond Yield is represented by its year-end yield level. The third step consists of conducting panel-data regression analysis using EViews 13 by estimating the Common Effect Model, Fixed Effect Model, and Random Effect Model. Model selection is then performed using the Chow Test, Hausman Test, and Lagrange Multiplier Test to determine the most appropriate specification. After the model is selected, multicollinearity testing is conducted to ensure that the explanatory variables do not contain excessive linear relationships. The regression results are then evaluated using the F-test to assess the overall significance of the regression model, Adjusted R-squared to measure the explanatory power of the model, and the t-test to examine the significance of each regression coefficient according to the directional hypotheses developed in Chapter 2. Interaction terms are included only for CAR and BOPO to evaluate the moderating role of government bond yield on the relationships between the internal banking indicators and stock returns. The research process concludes by interpreting the empirical results to evaluate how internal banking indicators and external market factors influence bank stock returns, and how government bond yield moderates the relationships between the internal banking indicators and stock returns.

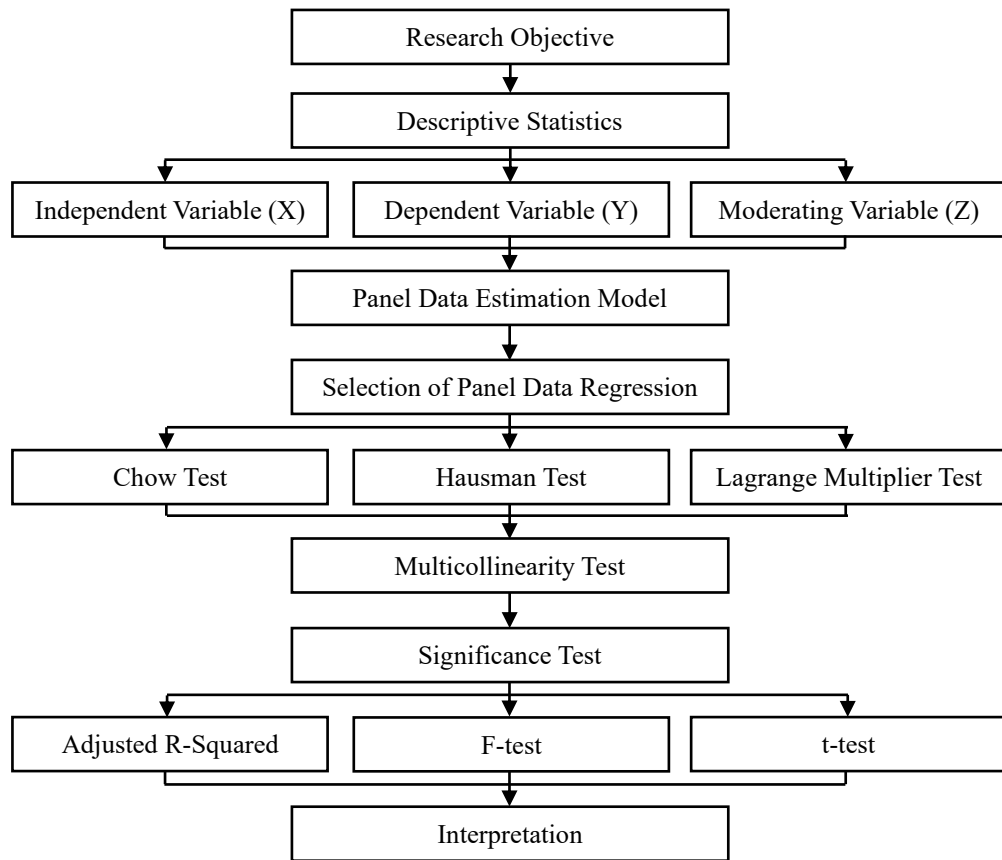


Figure 3.1. Research Process

CHAPTER 4

FINDINGS, ANALYSIS, AND DISCUSSION

4.1. Findings and Analysis

In this study, the unit of analysis is the annual financial and market data of banking companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period. The study uses six variables, which consist of four independent variables, one dependent variable, and one moderating variable. The independent variables are Capital Adequacy Ratio (CAR), Operational Efficiency Ratio (BOPO), Exchange Rate (USD/IDR), and Market Index (IHSG). Stock return is used as the dependent variable, while Government Bond Yield, measured by the Indonesia 10-Year Bond Yield, is used as the moderating variable. The data consist of 34 publicly listed banking companies observed over five years, resulting in 170 bank-year observations. The findings presented in this section include the descriptive statistics, model selection results, multicollinearity test, model feasibility (F-test), regression analysis, and hypothesis-testing results used to examine the relationships among the variables.

4.1.1. Descriptive Analysis

Descriptive statistics were used to summarize the main characteristics of the data used in this study. This analysis provided an overview of the distribution and variation of each variable before further regression analysis is conducted. The descriptive measures reported include the mean, median, minimum value, maximum value, and standard deviation. The variables examined in this study consist of Stock Return (SR) as the dependent variable, CAR, BOPO, Exchange Rate (ER), and Market Index (IHSG) as the independent variables, and Government Bond Yield (GBY) as the moderating variable. All statistical calculations are obtained using EViews. The results of the descriptive statistics are presented in Table 4.1.

Table 4.1. Descriptive Statistical Results

	SR	CAR	BOPO	ER	IHSG	GBY
Mean	17.3470	29.0164	89.8951	3.0561	2.5176	6.5478
Median	-7.3554	25.6150	85.1500	1.4957	4.0894	6.4820
Maximum	894.3320	72.8700	287.8600	9.2281	10.0753	7.0220
Minimum	-85.5927	10.5000	47.7000	-1.0922	-5.0872	5.9420
Std. Dev.	123.5048	11.6363	32.7575	3.5758	5.6279	0.3938
Observations	170	170	170	170	170	170

As shown in the table above, Stock Return has a mean value of 17.35%, which indicates that the sampled banks recorded an average annual stock return of 17.35% during the observation period. The median value is -7.36%, while the standard deviation of 123.50%. The mean is closer to the minimum value of -85.59% than to the maximum value of 894.33%, which suggests that most observations were concentrated at substantially lower return levels.

CAR has a mean value of 29.02%, indicating that, on average, the sampled banks maintained capital equivalent to 29.02% of their risk-weighted assets during the observation period. The median value is 25.62%, while the standard deviation is 11.64%. The mean is closer to the minimum value of 10.50% than to the maximum value of 72.87%, which suggests that most sampled banks maintained capital adequacy at relatively moderate levels rather than at the highest observed values.

BOPO has a mean value of 89.90%, which indicates banks incurred operating expenses equivalent to 89.90% of their operating income on average during the observation period. The median value is 85.15%, while the standard deviation is 32.76%. The mean is closer to the minimum value of 47.70% than to the maximum value of 287.86%, suggesting that most bank-year observations recorded relatively lower BOPO levels rather than the highest observed values.

The Exchange Rate has a mean value of 3.06%, indicating that the USD/IDR exchange rate increased by an average of 3.06% per year during the observation period. Since the exchange rate is measured as USD/IDR, an increase reflects rupiah depreciation against the US dollar. The median value is 1.50%, while the standard deviation is 3.58%. The mean is closer to the minimum value of -1.09% than to the maximum value of 9.23%, suggesting that most annual exchange-rate movements were concentrated at relatively lower levels rather than the highest observed depreciation.

For the Market Index, the mean value is 2.52%, indicating that the IHSG increased by an average of 2.52% per year during the observation period. The median value is 4.09%, while the standard deviation is 5.63%. The mean is closer to the maximum value of 10.08% than to the minimum value of -5.09%, suggesting that most annual market-index movements were concentrated at relatively higher levels rather than the lowest observed market decline.

Meanwhile, the Government Bond Yield has a mean value of 6.55%, indicating that the Indonesia 10-Year Government Bond Yield averaged 6.55% during the observation period. The median value is 6.48%, while the standard deviation is 0.39%. The mean is closer to the maximum value of 7.02% than to the minimum value of 5.94%, suggesting that government bond yields were generally concentrated at relatively higher levels within the observed range.

In addition to the summary statistics, the descriptive results also include a correlation coefficient matrix, which shows the linear relationships among the variables used in this study. The correlation matrix is used as an initial overview of the relationships between variables before the regression analysis is conducted. Generally, correlation values above 0.80 or below -0.80 may indicate a strong linear relationship between variables. The results are shown in the table below.

Table 4.2. Correlation Coefficient Matrix

	SR	CAR	BOPO	ER	IHSG	GBY
SR	1.0000 (----)					
CAR	0.0806 (1.0487)	1.0000 (----)				
BOPO	0.1956 (2.5847)	-0.0472 (-0.6130)	1.0000 (----)			
ER	-0.1409 (-1.8451)	0.0114 (0.2034)	-0.0617 (-0.8018)	1.0000 (----)		
IHSG	0.1101 (1.4352)	0.1068 (1.3918)	0.0613 (0.7955)	-0.1014 (-1.3206)	1.0000 (----)	
GBY	-0.1908 (-2.5193)	0.1471 (1.9275)	-0.0993 (-1.2936)	0.6768 (11.9172)	0.1044 (1.3600)	1.0000 (----)

Note: t-Statistic values are shown in brackets

The results in the table above show that Stock Return (SR) has a weak negative correlation with Government Bond Yield (GBY) (-0.1908) and the Exchange Rate (ER) (-0.1409). Meanwhile, SR has weak positive correlations with BOPO (0.1956), IHSG (0.1101), and CAR (0.0806). Among the explanatory variables, the highest absolute correlation is observed between GBY and ER (0.6768). Since all correlation coefficients are well below the commonly accepted threshold of 0.80 and above -0.80, the relationships among the variables are not sufficiently strong to indicate multicollinearity.

4.1.2. Panel Data Regression Model Selection

Panel-data regression model selection was conducted to determine the most appropriate estimation model for this study. The selection process was carried out by comparing the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) using the Chow Test, Hausman Test, and Lagrange Multiplier Test.

1. Chow Test

The Chow Test is used to determine whether CEM or FEM is more appropriate. In this study, a significance level (α) of 10%, or 0.10, is applied. If the probability value of the cross-section F is greater than 0.10, then CEM is preferred. If the probability value is below 0.10, then FEM is selected. The result of the Chow Test is shown in the table below.

Table 4.3. Chow Test Result

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.686318	(33.131)	0.895267
Cross section Chi-square	27.109920	33	0.754849

The test results in Table 4.3 show probability values of 0.90 for the cross-section F and 0.75 for the cross-section Chi-square. Since both values are greater than the significance level of 0.10, the null hypothesis is accepted, indicating that the Common Effect Model is more appropriate than the Fixed Effect Model.

2. Hausman Test

The Hausman Test is used to determine whether FEM or REM is more appropriate. This test is used to determine whether the individual effects are correlated with the regressors. In this study, a significance level (α) of 10%, or 0.10, is applied. If the probability value is below 0.10, then FEM is preferred. If the probability value is greater than 0.10, then REM is selected. The result of the Hausman Test is shown in the table below.

Table 4.4. Hausman Test Result

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0	5	1

***Cross-section test variance is invalid. Hausman statistic set to zero.**

****WARNING: estimated cross-section random effects variance is zero.**

As shown in Table 4.4, the Hausman Test in this study did not provide a valid basis for model selection. As shown in the estimation output above, EViews reported that the cross-section test variance is

invalid and that the estimated cross-section random-effects variance is zero, causing the Hausman statistic to be automatically set to zero. Although the output reports a probability value of 1.0000, this result is generated because the test statistic could not be validly computed rather than because the Random Effect Model is preferred. Therefore, the Hausman Test does not provide a decisive result for selecting between the Fixed Effect Model and the Random Effect Model.

3. Lagrange Multiplier Test

The Lagrange Multiplier (LM) Test is used to determine whether CEM or REM is more appropriate. In this study, a significance level (α) of 10%, or 0.10, is applied. If the probability value of the LM test is greater than 0.10, then CEM is preferred. If the probability value is below 0.10, then REM is preferred. The result of the LM Test is shown in the table below.

Table 4.5. Lagrange Multiplier Test Result

	Test Hypothesis
	Cross-section
Breusch-Pagan	1.982713 (0.1591)

Based on Table 4.5, the Breusch-Pagan cross-section test produces a probability value of 0.1591. Since this value is greater than the significance level of 0.10, the null hypothesis cannot be rejected. This indicates that there is insufficient evidence of random effects in the panel-data structure. Therefore, based on the LM Test, the Common Effect Model is preferred over the Random Effect Model.

4.1.3. Multicollinearity Test

To examine whether there is a strong linear relationship among the independent variables used in the regression model, a multicollinearity test is conducted. In this study, multicollinearity is evaluated using the Variance Inflation Factor (VIF). A regression model is considered free from serious

multicollinearity when the VIF value of each independent variable is below 5 or 10. The results of the multicollinearity tests are presented in the tables below.

Table 4.6. Multicollinearity Test Results

	Coefficient	Uncentered
Variable	Variance	VIF
CAR	0.385719	4.355585
BOPO	0.039678	4.197034
ER	6.472073	1.650253
IHSG	2.817127	1.232164

Based on Table 4.6, the Uncentered VIF values are 4.36 for CAR, 4.20 for BOPO, 1.65 for ER, and 1.23 for IHSG. Since all values are below both the threshold of 5 and 10, there is no indication of serious multicollinearity among the core independent variables. Therefore, the variables satisfy the multicollinearity assumption and can be included in the regression model.

As an additional diagnostic, a second multicollinearity test was conducted by including the moderating variable (GBY) together with the core independent variables. The purpose of this additional analysis was to examine whether the inclusion of GBY introduced substantial collinearity with the other explanatory variables. The results are presented in Table 4.7.

Table 4.7. Multicollinearity Test Results with Moderating Variable

	Coefficient	Uncentered
Variable	Variance	VIF
CAR	0.656440	7.550259
BOPO	0.077346	8.333409
ER	7.531313	1.956002
IHSG	2.776823	1.237092
GBY	34.963385	17.718660

As shown in Table 4.7, the VIF values for CAR (7.55) and BOPO (8.33) increase beyond the more conservative threshold of 5, although they remain below the conventional threshold of 10. Meanwhile, the VIF values for ER (1.96) and IHSG (1.24) remain below both thresholds, whereas GBY records

an Uncentered VIF value of 17.72, exceeding both the thresholds of 5 and 10. These results indicate that the inclusion of GBY increases the degree of collinearity among the explanatory variables, particularly with the bank-specific indicators.

4.1.4. Hypothesis Test

Based on the results of the panel-data model selection tests, the Common Effect Model was selected as the final estimation model in this study. The regression results were then evaluated using the coefficient of determination (Adjusted R-squared), the simultaneous test (F-test), and the partial test (t-test). The regression results are presented in two models. Model 1 estimates the direct effects of CAR, BOPO, Exchange Rate (ER), and the Market Index (IHSG) on Stock Returns with Government Bond Yield (GBY) included, but without the interaction terms. Model 2 extends the analysis by including the interaction terms between GBY and the bank-specific variables, namely CAR and BOPO. The results of both models are presented in the following table.

Table 4.8. Significance Test Results with Moderating Variable

Independent Variable	1	2
CAR	-0.0689 [0.8065]	10.3585 [0.0547]
BOPO	0.0403 [0.7799]	5.8830 [0.0015]***
ER	-0.0267 [0.9702]	0.4722 [0.3828]
IHSG	0.7416 [0.0985]	0.7486 [0.0134]***
GBY	-19.5386 [0.0020]***	89.0947 [0.0103]***
Moderating Variable		
CAR_GB		-1.5316 [0.0553]

BOPO_GBY		-0.9183 [0.0008]***
R-squared	0.0746	0.1514
Adjusted R-squared	0.0464	0.1147
F-statistic	2.6450 [0.0250]***	4.1292 [0.0003]***

Note: Probability values are shown in brackets

*****: significantly affect the dependent variable (prob. value < 0.05)**

1. Coefficient of Determination (Adjusted R-Squared)

The adjusted R-squared value is used to measure the explanatory power of the regression model after accounting for the number of variables included in the estimation. As shown in Table 4.8, Model 1 produces an adjusted R-squared value of 0.0464, indicating that 4.64% of the variation in Stock Returns can be explained by CAR, BOPO, Exchange Rate (ER), Market Index (IHSG), and Government Bond Yield (GBY), while the remaining 95.36% is explained by factors outside the model.

Model 2 produces an adjusted R-squared value of 0.1147, indicating that 11.47% of the variation in Stock Returns can be explained after the interaction terms between CAR and GBY, and between BOPO and GBY, are incorporated into the model. The remaining 88.53% of the variation is explained by other factors not included in the model. Compared with Model 1, the higher adjusted R-squared value of Model 2 suggests that including the interaction terms improves the explanatory power of the regression model.

Although the adjusted R-squared value of Model 2 is relatively low, this does not necessarily indicate that the regression model is inappropriate. Stock Returns are market-based performance measures that are influenced by numerous factors beyond the variables included in this study, such as firm-specific events, investor sentiment, macroeconomic

conditions, monetary policy, and other capital-market developments. Therefore, the results suggest that while CAR, BOPO, Exchange Rate, Market Index, Government Bond Yield, and their interaction terms contribute to explaining Stock Returns, a substantial proportion of the variation remains attributable to other factors outside the scope of this study.

2. Simultaneous Test (F-Test)

The F-test is used to determine whether the independent variables simultaneously have a significant effect on the dependent variable. At a 5% significance level, if the probability value of the F-statistic is less than 0.05, the regression model is considered statistically significant, indicating that the independent variables jointly affect the dependent variable. Conversely, if the probability value exceeds 0.05, the independent variables do not have a statistically significant simultaneous effect on the dependent variable.

Based on Table 4.8, Model 1 produces an F-statistic of 2.6450 with a probability value of 0.0250, which is below the 0.05 significance level. This indicates that CAR, BOPO, Exchange Rate (ER), Market Index (IHSG), and Government Bond Yield (GBY) simultaneously have a statistically significant effect on Stock Returns. Similarly, Model 2 produces an F-statistic of 4.1292 with a probability value of 0.0003, which is also below the 0.05 significance level. This indicates that the variables included in Model 2, together with the interaction terms CAR_GBY and BOPO_GBY, simultaneously have a statistically significant effect on Stock Returns. Therefore, both regression models are statistically significant and appropriate for hypothesis testing.

3. Partial Test (t-Test)

The partial test (t-test) is used to examine the individual effect of each variable on Stock Returns. In this study, a variable is considered

statistically significant when its probability value is less than 0.05. If the probability value is greater than 0.05, the variable is considered to have no statistically significant effect on Stock Returns. The results of the partial test for both regression models are presented in Table 4.8.

As shown in Table 4.8, the results for Model 1 show that CAR has a regression coefficient of -0.0689 with a probability value of 0.8065, indicating a negative but statistically insignificant effect on Stock Returns. BOPO has a regression coefficient of 0.0403 with a probability value of 0.7799, indicating a positive but statistically insignificant effect on Stock Returns. The Exchange Rate (ER) has a regression coefficient of -0.0267 with a probability value of 0.9702, indicating a negative but statistically insignificant effect on Stock Returns. Market Index (IHSG) has a regression coefficient of 0.7416 with a probability value of 0.0985, indicating a positive but statistically insignificant effect on Stock Returns. Government Bond Yield (GBY) has a regression coefficient of -19.5386 with a probability value of 0.0020, indicating a negative and statistically significant effect on Stock Returns.

For Model 2, CAR has a regression coefficient of 10.3585 with a probability value of 0.0547, indicating a positive but statistically insignificant effect on Stock Returns at the 5% significance level. BOPO has a regression coefficient of 5.8830 with a probability value of 0.0015, indicating a positive and statistically significant effect on Stock Returns. Exchange Rate (ER) has a regression coefficient of 0.4722 with a probability value of 0.3828, indicating a positive but statistically insignificant effect on Stock Returns. Market Index (IHSG) has a regression coefficient of 0.7486 with a probability value of 0.0134, indicating a positive and statistically significant effect on Stock Returns. GBY has a regression coefficient of 89.0947 with a probability value of 0.0103, indicating a positive and statistically significant effect on Stock Returns.

The interaction term CAR_GBY has a regression coefficient of -1.5316 with a probability value of 0.0553, indicating a negative but statistically insignificant moderating effect of Government Bond Yield on the relationship between CAR and Stock Returns at the 5% significance level. Meanwhile, BOPO_GBY has a regression coefficient of -0.9183 with a probability value of 0.0008, indicating that Government Bond Yield has a statistically significant negative moderating effect on the relationship between BOPO and Stock Returns.

4.2. Discussion

4.2.1. The Effect of CAR on Stock Returns

In this study, Capital Adequacy Ratio (CAR) represents the financial strength of a bank through its ability to maintain capital relative to its risk-weighted assets. Based on the regression results, Model 1 produced a negative coefficient of -0.0689 with a reported two-tailed probability value of 0.8065, indicating that CAR did not have a statistically significant direct effect on Stock Returns when the interaction terms were excluded. However, after the interaction terms were incorporated in Model 2, the coefficient changed to 10.3585 with a reported two-tailed probability value of 0.0547. Because H1 predicted a positive relationship, the hypothesis was evaluated using the one-tailed testing procedure described in Equation 3.11. The corresponding one-tailed probability was 0.0274, which was below the 5 percent significance level. Therefore, H1 is supported.

The regression results indicate that CAR became positively associated with Stock Returns after the interaction terms were incorporated into the model. This finding suggests that stronger capital adequacy may have been viewed favourably by investors because higher capital levels enhance a bank's ability to absorb unexpected losses, maintain financial stability, and withstand periods of economic uncertainty. During the 2020-2024 observation period, investors

may therefore have considered well-capitalised banks to be more resilient, increasing confidence in their long-term performance and contributing to higher Stock Returns. The reason why this positive relationship became statistically significant only after incorporating the interaction terms is discussed further in Section 4.2.5.

This finding is consistent with the valuation framework proposed by Williams (1938) and Gordon (1959), which suggests that stronger financial conditions can increase firm value by reducing perceived risk and supporting higher expected future cash flows. The result also supports the theoretical expectation that well-capitalized banks are viewed more positively by investors because stronger capital positions contribute to financial stability and long-term sustainability. Compared with previous studies, the finding differs from Mariam et al. (2021) and Safitri et al. (2024), who reported that CAR did not significantly influence accounting-based measures of bank performance. In contrast, the present study measures bank performance using Stock Returns, which reflect investors' market valuation rather than internal operating performance. Therefore, the positive relationship observed in this study suggests that capital adequacy may be more strongly reflected in market-based performance than in accounting-based indicators, particularly after considering the moderating role of Government Bond Yield.

4.2.2. The Effect of BOPO on Stock Returns

In this study, the Operational Efficiency Ratio (BOPO) was used to measure the efficiency of a bank in managing its operating expenses relative to its operating income. Based on the regression results, Model 1 produced a positive regression coefficient of 0.0403 with a reported two-tailed probability value of 0.7799, indicating that BOPO did not have a statistically significant direct effect on Stock Returns when the interaction terms were excluded. After the interaction terms were incorporated in Model 2, the regression coefficient increased to 5.8830 with a reported two-tailed probability value of 0.0015. However, H2 predicted a negative relationship between BOPO and Stock

Returns. Because the estimated coefficient was positive and therefore opposite to the hypothesised direction, the hypothesis was evaluated using the one-tailed testing procedure described in Equation 3.12. Under this procedure, the one-tailed probability exceeded the 5 percent significance level. Therefore, H2 is not supported.

The positive coefficient in Model 2 suggests that, after accounting for the moderating role of Government Bond Yield, higher BOPO values were associated with higher Stock Returns during the observation period. Although a higher BOPO generally indicates lower operational efficiency because a greater proportion of operating income is used to cover operating expenses, the 2020-2024 observation period coincided with the COVID-19 pandemic and the subsequent economic recovery. During this period, many banks experienced increases in operating expenses as they adapted to pandemic-related conditions, including the implementation of health and safety measures, digital banking development, information technology investment, and other operational adjustments required to maintain business continuity. Consequently, the higher BOPO observed during this period may not have been interpreted by investors solely as a sign of inefficiency, but also as a reflection of necessary operating expenditures that supported the bank's resilience and long-term competitiveness. Since Stock Returns reflect investors' expectations regarding future performance rather than current operating efficiency alone, these expenditures may have contributed to a more favourable market valuation despite temporarily increasing operating costs.

This finding does not support the initial expectation based on the valuation framework of Williams (1938) and Gordon (1959), which suggests that lower operational efficiency should reduce firm value by weakening expected future cash flows. The result also differs from Mariam et al. (2021), who found that BOPO had a negative and significant effect on NIM, and Oktaviani et al. (2019), who found that BOPO had a negative and significant effect on ROA. However, those studies measured accounting-based banking

performance, whereas this study used Stock Returns as a market-based performance measure. Accounting-based measures directly capture the effect of operating expenses on current profitability, while Stock Returns also incorporate investors' expectations regarding future growth and business sustainability. Therefore, operating expenditures that temporarily reduce accounting profitability may still be viewed positively by investors if they are expected to strengthen the bank's long-term performance. The difference in findings may also reflect the unique economic conditions during the 2020-2024 period, when maintaining business continuity and investing in operational adaptation became important considerations for the banking sector.

4.2.3. The Effect of the Exchange Rate on Stock Returns

In this study, the Exchange Rate was used to represent movements in the value of the Indonesian rupiah against the United States dollar. Since the exchange rate was measured using USD/IDR, an increase in the exchange rate indicated rupiah depreciation against the United States dollar. Based on the regression results, Model 1 produced a negative regression coefficient of -0.0267 with a reported two-tailed probability value of 0.9702, indicating that the Exchange Rate did not have a statistically significant direct effect on Stock Returns when the interaction terms were excluded. After the interaction terms were incorporated in Model 2, the regression coefficient changed to 0.4722 with a reported two-tailed probability value of 0.3828. However, H3 predicted a negative relationship between the Exchange Rate and Stock Returns. Because the estimated coefficient was positive and therefore opposite to the hypothesised direction, the hypothesis was evaluated using the one-tailed testing procedure described in Equation 3.12. Under this procedure, the one-tailed probability exceeded the 5 percent significance level. Therefore, H3 is not supported.

The regression results suggest that, after accounting for Government Bond Yield and its interaction terms, exchange-rate movements did not have a statistically significant effect on the Stock Returns of the sampled banks. One

possible explanation is that exchange-rate movements affected the banking sector primarily through broader macro-financial conditions rather than through banks' operating performance directly. Most publicly listed Indonesian banks conduct the majority of their lending and deposit activities in rupiah, reducing their direct exposure to exchange-rate fluctuations. Although movements in the rupiah may influence investor sentiment, capital flows, and overall economic conditions, these broader effects may already be captured by other market variables included in the model, such as the Market Index and Government Bond Yield. Consequently, the Exchange Rate did not exhibit an independent effect on Stock Returns after controlling for those variables.

This result is not aligned with the valuation logic of Williams (1938) and Gordon (1959), which suggests that higher macro-financial risk may reduce firm value by increasing investors' required rate of return. The finding also differs from Mariam et al. (2021), who found that the Exchange Rate had a negative and statistically significant effect on Net Interest Margin. However, Mariam et al. (2021) measured bank performance using an accounting-based indicator, whereas this study uses Stock Returns as a market-based performance measure. Therefore, the findings suggest that exchange-rate movements may not have been a primary factor influencing investors' valuation of publicly listed Indonesian banks during the 2020-2024 period.

4.2.4. The Effect of Market Index on Stock Returns

In this study, the Market Index was represented by the Indonesia Stock Exchange Composite Index (IHSG), which reflects overall conditions in the Indonesian stock market. Based on the regression results, Model 1 produced a positive regression coefficient of 0.7416 with a reported two-tailed probability value of 0.0985, indicating a positive relationship with Stock Returns. After the interaction terms were incorporated in Model 2, the regression coefficient remained positive at 0.7486 with a reported two-tailed probability value of 0.0134. Because H4 predicted a positive relationship between the Market Index and Stock Returns, the hypothesis was evaluated using the one-tailed testing

procedure described in Equation 3.11. The corresponding one-tailed probabilities were below the 5 percent significance level in both models. Therefore, H4 is supported.

The regression results indicate that positive movements in the Market Index were associated with higher Stock Returns among the sampled banks during the observation period. An increase in the Market Index generally reflects stronger investor confidence and more favourable expectations regarding overall capital-market conditions. Under such conditions, investors may increase their demand for equity securities, including banking stocks, which may contribute to higher stock returns. This finding is expected because the banking sector represents a substantial proportion of the Indonesian equity market. Consequently, improvements in overall market conditions are often accompanied by stronger investor demand for banking shares. As a result, movements in the Market Index are likely to be reflected in the Stock Returns of listed banks.

This result is consistent with the valuation framework of Williams (1938) and Gordon (1959), which suggests that favourable expectations regarding future performance and lower perceived market risk can support higher stock valuations. The finding is also in line with Chiang et al. (2024), who found that market return had a positive and significant effect on Indonesian bank stock returns, and Suwito (2020), reported that IHSG had a positive and significant effect on banking stock returns. Therefore, the findings suggest that investor sentiment and overall market performance played a more important role in explaining the Stock Returns of publicly listed Indonesian banks than movements in the Exchange Rate during the 2020-2024 observation period.

4.2.5. The Moderating Effect of Government Bond Yield on the Relationship between CAR and Stock Returns

In this study, Government Bond Yield was used as a moderating

variable to examine whether bond-market conditions influenced the relationship between CAR and Stock Returns. Based on the regression results, Model 1 produced a negative regression coefficient of -0.0689 with a reported two-tailed probability value of 0.8065, indicating that CAR did not have a statistically significant direct effect on Stock Returns when the interaction terms were excluded. However, after the interaction terms were incorporated in Model 2, CAR produced a positive regression coefficient of 10.3585 with a reported two-tailed probability value of 0.0547. The interaction term between CAR and Government Bond Yield produced a negative regression coefficient of -1.5316 with a reported two-tailed probability value of 0.0553. Because H5 predicted a negative moderating influence of Government Bond Yield on the relationship between CAR and Stock Returns, the hypothesis was evaluated using the one-tailed testing procedure described in Equation 3.12. The corresponding one-tailed probability was 0.0277, which was below the 5 percent significance level. Therefore, H5 is supported.

The findings suggest that Government Bond Yield changed how investors valued banks' capital strength when assessing banking stocks. As discussed in Section 4.2.1, stronger capital adequacy became positively associated with Stock Returns after the moderating effect was incorporated, indicating that investors generally viewed well-capitalised banks more favourably. However, the negative interaction coefficient indicates that this positive relationship weakened as Government Bond Yield increased. During periods of higher government bond yields, investors may have placed greater emphasis on the return available from relatively lower-risk government securities. As a result, although strong capital adequacy continued to signal financial stability and resilience, this signal became less influential in determining Stock Returns because investors demanded higher expected returns from equity investments relative to fixed-income securities.

This result is consistent with the valuation framework of Williams (1938) and Gordon (1959), which suggests that increases in the required rate

of return reduce the present value of expected future cash flows. When Government Bond Yield increased, investors had access to more attractive low-risk investment alternatives, reducing the relative importance of capital strength alone in supporting bank stock valuations. In other words, maintaining a high level of capital adequacy remained beneficial, but it was no longer sufficient to generate the same level of positive investor response under higher-yield conditions. Therefore, Government Bond Yield did not diminish the importance of CAR itself, but rather reduced the extent to which investors rewarded strong capital positions through higher Stock Returns during the 2020-2024 observation period.

4.2.6. The Moderating Effect of Government Bond Yield on the Relationship between BOPO and Stock Returns

In this study, Government Bond Yield was used as a moderating variable to examine whether bond-market conditions influenced the relationship between the BOPO and Stock Returns. Based on the regression results, Model 1 produced a positive regression coefficient of 0.0403 with a reported two-tailed probability value of 0.7799, indicating that BOPO did not have a statistically significant direct effect on Stock Returns when the interaction terms were excluded. After the interaction terms were incorporated in Model 2, BOPO produced a positive regression coefficient of 5.8830 with a reported two-tailed probability value of 0.0015, while the interaction term between BOPO and Government Bond Yield produced a negative regression coefficient of -0.9183 with a reported two-tailed probability value of 0.0008. Because H6 predicted a negative moderating influence of Government Bond Yield on the relationship between BOPO and Stock Returns, the hypothesis was evaluated using the one-tailed testing procedure described in Equation 3.12. The corresponding one-tailed probability was 0.0004, which was below the 5 percent significance level. Therefore, H6 is supported.

The findings suggest that Government Bond Yield changed how investors interpreted operational efficiency when valuing banking stocks. As

discussed in Section 4.2.2, the positive BOPO coefficient indicates that higher operating expenses during the 2020-2024 period were not necessarily perceived negatively by investors because many banks incurred additional operating costs related to the COVID-19 pandemic, digital transformation, branch operations, and service continuity. These expenditures may have been viewed as necessary investments to maintain business operations and support future performance. However, the negative interaction coefficient indicates that this positive relationship weakened as Government Bond Yield increased. During periods of higher bond yields, investors may have become more selective in holding bank stocks because government bonds offered more attractive risk-adjusted returns. Under these conditions, investors were likely to place greater emphasis on banks' cost efficiency, causing higher BOPO to be viewed less favourably than when bond yields were relatively low.

This result is consistent with the valuation logic of Williams (1938) and Gordon (1959), which suggests that increases in the required rate of return reduce equity valuation by raising investors' expected returns from alternative investments. When Government Bond Yield increased, government securities became relatively more attractive than bank stocks, causing investors to evaluate operating expenses more critically. In other words, operating expenditures that may have been interpreted as necessary investments during lower-yield conditions became less acceptable when bond yields rose because investors expected stronger efficiency alongside higher required returns. Therefore, Government Bond Yield did not simply moderate the statistical relationship between BOPO and Stock Returns, but also changed how investors interpreted operational efficiency under different financial-market conditions.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

This study examined the effects of Capital Adequacy Ratio (CAR), Operational Efficiency Ratio (BOPO), Exchange Rate, and Market Index on the Stock Returns of publicly listed banks in Indonesia during the 2020-2024 period. In addition, this study investigated whether Government Bond Yield moderates the relationships between the bank-specific indicators, namely CAR and BOPO, and Stock Returns. Using panel-data regression analysis on 34 publicly listed banks, the study provides empirical evidence regarding the relationships among these variables. Based on the findings presented in the previous chapter, several conclusions can be drawn. First, the capital adequacy of banks (measured by CAR) has a positive effect on Stock Returns after considering the moderating role of Government Bond Yield. Second, the banks' operational efficiency (measured by BOPO) exhibits a positive relationship with Stock Returns rather than the expected negative relationship. Third, the Exchange Rate does not have a statistically significant effect on Stock Returns. Fourth, the Market Index has a positive effect on Stock Returns. Fifth, Government Bond Yield weakens the positive relationship between CAR and Stock Returns. Finally, Government Bond Yield also weakens the positive relationship between BOPO and Stock Returns. Overall, the findings suggest that investors valued banks not only on the basis of their internal financial conditions but also according to broader financial-market conditions. While stronger capital adequacy and favourable market conditions were associated with higher Stock Returns, the effects of bank-specific financial indicators were influenced by changes in Government Bond Yield. This indicates that bond-market conditions played an important role in shaping how investors evaluated the financial strength of publicly listed banks during the 2020-2024 period.

5.2. Recommendations

5.2.1. For Investors

Based on the findings of this study, the following recommendations are proposed for investors:

1. Evaluate CAR together with Government Bond Yield when assessing banking stocks. The findings indicate that stronger capital adequacy is associated with higher Stock Returns, but this positive relationship becomes weaker when Government Bond Yield increases. Therefore, both bank-specific financial strength and broader bond-market conditions should be considered simultaneously in investment decisions.
2. Consider overall Market Index conditions as part of the investment evaluation process. Since the Market Index has a positive effect on Stock Returns, favourable market conditions may provide additional support for the performance of banking stocks. Evaluating market trends together with bank-specific information may therefore lead to more informed investment decisions.
3. Interpret BOPO in the context of a bank's overall business strategy rather than in isolation. Although BOPO exhibits a positive relationship with Stock Returns in this study, the direction differs from the initial theoretical expectation. Investors should therefore consider whether higher operating expenses are associated with activities that may strengthen the bank's long-term competitiveness, such as digital transformation, branch development, or service improvements, rather than assuming that a higher BOPO always reflects weaker performance.
4. Monitor changes in Government Bond Yield as part of banking stock analysis. The findings show that higher Government Bond Yield weakens the positive relationships between both Capital Adequacy Ratio and Operational Efficiency Ratio and Stock Returns. Consequently, changes in bond-market conditions may influence how investors respond to bank-specific financial indicators.

5.2.2. For Bank Management

Based on the findings of this study, the following recommendations are proposed for bank management:

1. Maintain adequate capital while effectively communicating the bank's capital position to investors. The findings indicate that stronger CAR is associated with higher Stock Returns, suggesting that maintaining sound capital adequacy and clearly communicating financial resilience may strengthen investor confidence and market valuation.
2. Ensure that increases in operating expenditures are supported by clear long-term strategic objectives and are communicated transparently to investors. Although BOPO exhibits a positive relationship with Stock Returns in this study, the direction differs from the initial theoretical expectation. This suggests that investors may perceive higher operating expenses more positively when they are associated with initiatives such as digital transformation, business expansion, or service improvements that support future growth.
3. Consider overall market conditions when communicating financial performance and corporate strategies. Since the Market Index has a positive effect on Stock Returns, management should recognise that investors evaluate banking performance not only based on internal financial indicators but also within the broader capital-market environment.
4. Monitor Government Bond Yield as part of financial planning and investor communication. The findings show that higher Government Bond Yield weakens the positive relationships between both Capital Adequacy Ratio and Operational Efficiency Ratio and Stock Returns. Consequently, changes in bond-market conditions should be considered when evaluating financing decisions, capital strategies, and communication with investors regarding the bank's financial performance.

5.2.3. For Future Researchers

Based on the findings and limitations of this study, the following recommendations are proposed for future researchers:

1. Further investigate the positive relationship between BOPO and Stock Returns. Since the direction of the relationship differs from the theoretical expectation, future studies may examine whether this finding is associated with strategic investments, digital transformation, expansion activities, or other factors that influence how investors interpret higher operating expenses.
2. Examine whether the insignificant effect of the Exchange Rate is specific to the 2020-2024 observation period. Future studies may compare periods before, during, and after the COVID-19 pandemic to determine whether different macroeconomic conditions influence the relationship between exchange-rate movements and banking stock returns.
3. Investigate additional macro-financial variables that may influence Stock Returns or moderate the relationship between bank-specific indicators and Stock Returns. Since the regression model explains only a relatively small proportion of the variation in Stock Returns, future studies may include variables such as policy interest rates, inflation, market volatility, or economic growth to improve the explanatory power of the model.
4. Extend the observation period and expand the sample beyond the banking industry. A longer observation period may capture different economic cycles, while comparing banking companies with firms from other sectors may determine whether the relationships identified in this study are specific to banks or applicable to other industries.

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APPENDICES

Appendix A. List of Sample Banks

Table A.1. List of Sample Banks

No.	Ticker	Bank Name
1	AGRO	Bank Raya Indonesia Tbk
2	AGRS	Bank IBK Indonesia Tbk
3	BABP	Bank MNC Internasional Tbk
4	BACA	Bank Capital Indonesia Tbk
5	BBCA	Bank Central Asia Tbk
6	BBKP	Bank KB Bukopin Tbk
7	BBMD	Bank Mestika Dharma Tbk
8	BBNI	Bank Negara Indonesia (Persero) Tbk
9	BBRI	Bank Rakyat Indonesia (Persero) Tbk
10	BBTN	Bank Tabungan Negara (Persero) Tbk
11	BBYB	Bank Neo Commerce Tbk
12	BDMN	Bank Danamon Indonesia Tbk
13	BINA	Bank Ina Perdana Tbk
14	BJBR	Bank Pembangunan Daerah Jawa Barat dan Banten Tbk
15	BJTM	Bank Pembangunan Daerah Jawa Timur Tbk
16	BKSW	Bank QNB Indonesia Tbk
17	BMAS	Bank Maspion Indonesia Tbk
18	BMRI	Bank Mandiri (Persero) Tbk
19	BNBA	Bank Bumi Arta Tbk
20	BNGA	Bank CIMB Niaga Tbk
21	BNII	Bank Maybank Indonesia Tbk
22	BNLI	Bank Permata Tbk
23	BRIS	Bank Syariah Indonesia Tbk
24	BSIM	Bank Sinarmas Tbk
25	BTPN	Bank BTPN Tbk
26	BTPS	Bank BTPN Syariah Tbk
27	BVIC	Bank Victoria International Tbk
28	MAYA	Bank Mayapada International Tbk

29	MCOR	Bank China Construction Bank Indonesia Tbk
30	MEGA	Bank Mega Tbk
31	NISP	Bank OCBC NISP Tbk
32	NOBU	Bank Nationalnobu Tbk
33	PNBN	Bank Pan Indonesia Tbk
34	SDRA	Bank Woori Saudara Indonesia 1906 Tbk

Appendix B. Raw Market Data

Table B.1. Year-End Banking Stock Prices

Ticker	2019	2020	2021	2022	2023	2024
AGRO	194	1,013	1,810	404	310	232
AGRS	135	143	159	90	83	72
BABP	48	48	186	101	60	54
BACA	300	376	266	131	132	131
BBCA	6,685	6,770	7,300	8,550	9,400	9,675
BBKP	160	415	267	101	80	54
BBMD	2,800	1,500	2,000	2,120	2,000	1,930
BBNI	7,850	6,175	6,750	4,613	5,375	4,350
BBRI	4,400	4,068	4,110	4,940	5,725	4,080
BBTN	2,120	1,725	1,668	1,350	1,250	1,140
BBYB	263	247	2,456	645	436	218
BDMN	3,950	3,140	2,350	2,730	2,780	2,540
BINA	860	690	3,810	3,990	4,090	4,190
BJBR	1,185	1,546	1,331	1,345	1,150	910
BJTM	685	680	750	710	625	540
BKSW	180	106	192	102	81	71
BMAS	358	275	1,105	657	580	585
BMRI	7,675	6,325	3,513	4,963	6,050	5,700
BNBA	322	332	3,240	925	745	600
BNGA	965	995	965	1,185	1,695	1,730
BNII	206	346	332	228	242	208
BNLI	1,265	2,640	1,535	1,015	920	945
BRIS	330	2,194	1,736	1,290	1,740	2,730
BSIM	585	505	875	845	890	820
BTPN	3,250	3,110	2,620	2,643	2,613	2,200
BTPS	4,250	3,750	3,580	2,790	1,690	925
BVIC	84	114	204	107	99	89
MAYA	5,449	4,581	660	293	256	206
MCOR	129	139	116	80	78	74
MEGA	1,883	2,135	2,513	2,638	2,550	2,065

NISP	845	820	670	745	1,180	1,315
NOBU	890	825	710	511	740	575
PNBN	1,335	1,065	770	1,540	1,210	1,860
SDRA	821	732	565	546	541	416

Table B.2. Raw Macroeconomic Data (2019-2024)

Year	Indonesia 10-Year Government Bond Yield	Exchange Rate (USD/IDR)	Market Index (IHSG)
2019	7.047	13,882.5	6,299.54
2020	5.942	14,040.0	5,979.07
2021	6.368	14,250.0	6,581.48
2022	6.925	15,565.0	6,850.62
2023	6.482	15,395.0	7,272.80
2024	7.022	16,090.0	7,079.90

Appendix C. Variable Calculation Examples

Formula:

$$SR_{it} = \left(\frac{P_{it} - P_{it-1}}{P_{it-1}} - 1 \right) * 100\% \quad (3.13)$$

Table C.1. Example of Stock Return Calculation (BBCA)

Year	Previous Year Price (IDR)	Current Year Price (IDR)	Calculation	Stock Return (%)
2020	6,685	6,770	$((6,770 - 6,685) / 6,685) \times 100$	1.2715
2021	6,770	7,300	$((7,300 - 6,770) / 6,770) \times 100$	7.8287
2022	7,300	8,550	$((8,550 - 7,300) / 7,300) \times 100$	17.1233
2023	8,550	9,400	$((9,400 - 8,550) / 8,550) \times 100$	9.9415
2024	9,400	9,675	$((9,675 - 9,400) / 9,400) \times 100$	2.9255

Formula:

$$ER_t = \left(\frac{R_t - R_{t-1}}{R_{t-1}} - 1 \right) * 100\% \quad (3.14)$$

Table C.2. Exchange Rate Return Calculation

Year	Previous Year (USD/IDR)	Current Year (USD/IDR)	Calculation	Exchange Rate Change (%)
2020	13,882.5	14,040.0	$((14,040.0 - 13,882.5) / 13,882.5) \times 100$	1.1345
2021	14,040.0	14,250.0	$((14,250.0 - 14,040.0) / 14,040.0) \times 100$	1.4957
2022	14,250.0	15,565.0	$((15,565.0 - 14,250.0) / 14,250.0) \times 100$	9.2281
2023	15,565.0	15,395.0	$((15,395.0 - 15,565.0) / 15,565.0) \times 100$	-1.0922
2024	15,395.0	16,090.0	$((16,090.0 - 15,395.0) / 15,395.0) \times 100$	4.5145

Appendix D. Final Dataset Used for Regression Analysis

Table D.1. Final Dataset Used for Regression Analysis

Bank	Year	SR	GBY	ER	IHSG	CAR	BOPO
AGRO	2020	422.1649	5.942	1.1345	-5.0872	24.3300	97.1200
AGRO	2021	78.6772	6.368	1.4957	10.0753	20.2400	287.8600
AGRO	2022	-77.6796	6.925	9.2281	4.0894	43.7400	93.3400
AGRO	2023	-23.2673	6.482	-1.0922	6.1627	43.8400	90.5100
AGRO	2024	-25.1613	7.022	4.5145	-2.6523	44.2900	96.6800
AGRS	2020	5.9259	5.942	1.1345	-5.0872	30.4900	127.3500
AGRS	2021	11.1888	6.368	1.4957	10.0753	39.6700	98.3500
AGRS	2022	-43.3962	6.925	9.2281	4.0894	43.4500	91.6900
AGRS	2023	-7.7778	6.482	-1.0922	6.1627	48.0400	90.0300
AGRS	2024	-13.2530	7.022	4.5145	-2.6523	39.7400	82.4800
BABP	2020	0.0000	5.942	1.1345	-5.0872	15.75	98.09
BABP	2021	287.5000	6.368	1.4957	10.0753	24.31	97.81
BABP	2022	-45.6989	6.925	9.2281	4.0894	23.62	88.16
BABP	2023	-40.5941	6.482	-1.0922	6.1627	31.00	92.73
BABP	2024	-10.0000	7.022	4.5145	-2.6523	24.53	95.02
BACA	2020	25.3333	5.942	1.1345	-5.0872	18.1100	98.2300
BACA	2021	-29.2553	6.368	1.4957	10.0753	41.2800	98.8400
BACA	2022	-50.7519	6.925	9.2281	4.0894	53.7700	98.8400
BACA	2023	0.7634	6.482	-1.0922	6.1627	35.5700	97.2100
BACA	2024	-0.7576	7.022	4.5145	-2.6523	40.0800	97.1300
BBCA	2020	1.2715	5.942	1.1345	-5.0872	25.8000	63.5000
BBCA	2021	7.8287	6.368	1.4957	10.0753	25.7000	54.2000
BBCA	2022	17.1233	6.925	9.2281	4.0894	25.8000	46.1000
BBCA	2023	9.9415	6.482	-1.0922	6.1627	29.4000	43.7000
BBCA	2024	2.9255	7.022	4.5145	-2.6523	29.4000	41.7000
BBKP	2020	159.3750	5.942	1.1345	-5.0872	12.0800	168.1000
BBKP	2021	-35.6627	6.368	1.4957	10.0753	20.2600	171.2000
BBKP	2022	-62.1723	6.925	9.2281	4.0894	19.0800	226.2200
BBKP	2023	-20.7921	6.482	-1.0922	6.1627	27.0500	223.2400
BBKP	2024	-32.5000	7.022	4.5145	-2.6523	16.3800	192.5800
BBMD	2020	-46.4286	5.942	1.1345	-5.0872	46.4900	67.5900
BBMD	2021	33.3333	6.368	1.4957	10.0753	48.1200	51.7000
BBMD	2022	6.0000	6.925	9.2281	4.0894	44.2400	52.7400
BBMD	2023	-5.6604	6.482	-1.0922	6.1627	49.9300	60.5800
BBMD	2024	-3.5000	7.022	4.5145	-2.6523	44.9300	62.0600
BBNI	2020	-21.3376	5.942	1.1345	-5.0872	16.8000	93.3000
BBNI	2021	9.3117	6.368	1.4957	10.0753	19.7000	81.2000
BBNI	2022	-31.6593	6.925	9.2281	4.0894	19.3000	68.6000
BBNI	2023	16.5185	6.482	-1.0922	6.1627	22.0000	68.4000
BBNI	2024	-19.0698	7.022	4.5145	-2.6523	21.4000	70.0000

BBRI	2020	-7.5455	5.942	1.1345	-5.0872	20.6100	86.5800
BBRI	2021	1.0324	6.368	1.4957	10.0753	25.2800	83.5800
BBRI	2022	20.1946	6.925	9.2281	4.0894	23.3000	78.6500
BBRI	2023	15.8907	6.482	-1.0922	6.1627	25.2300	78.9200
BBRI	2024	-28.7336	7.022	4.5145	-2.6523	24.4100	79.8700
BBTN	2020	-18.6321	5.942	1.1345	-5.0872	19.3400	91.6100
BBTN	2021	-3.3043	6.368	1.4957	10.0753	19.1400	89.2800
BBTN	2022	-19.0647	6.925	9.2281	4.0894	20.1700	86.0000
BBTN	2023	-7.4074	6.482	-1.0922	6.1627	20.0700	86.1000
BBTN	2024	-8.8000	7.022	4.5145	-2.6523	18.5000	88.7000
BBYB	2020	-6.0837	5.942	1.1345	-5.0872	32.7800	96.7100
BBYB	2021	894.3320	6.368	1.4957	10.0753	55.4900	224.0100
BBYB	2022	-73.7378	6.925	9.2281	4.0894	36.7900	127.2800
BBYB	2023	-32.4031	6.482	-1.0922	6.1627	27.8600	112.2700
BBYB	2024	-50.0000	7.022	4.5145	-2.6523	35.3000	99.3400
BDMN	2020	-20.5063	5.942	1.1345	-5.0872	25.0000	88.9000
BDMN	2021	-25.1592	6.368	1.4957	10.0753	26.7000	86.6000
BDMN	2022	16.1702	6.925	9.2281	4.0894	26.3000	72.9000
BDMN	2023	1.8315	6.482	-1.0922	6.1627	27.5000	75.7000
BDMN	2024	-8.6331	7.022	4.5145	-2.6523	26.2000	79.7000
BINA	2020	-19.7674	5.942	1.1345	-5.0872	40.0800	93.8000
BINA	2021	452.1739	6.368	1.4957	10.0753	53.1400	92.4200
BINA	2022	4.7244	6.925	9.2281	4.0894	31.1200	82.4300
BINA	2023	2.5063	6.482	-1.0922	6.1627	26.1000	84.3700
BINA	2024	2.4450	7.022	4.5145	-2.6523	25.0700	93.8700
BJBR	2020	30.4641	5.942	1.1345	-5.0872	17.3100	83.9500
BJBR	2021	-13.9069	6.368	1.4957	10.0753	17.7800	81.9400
BJBR	2022	1.0518	6.925	9.2281	4.0894	19.1900	80.3500
BJBR	2023	-14.4981	6.482	-1.0922	6.1627	20.0500	85.3100
BJBR	2024	-20.8696	7.022	4.5145	-2.6523	19.7000	90.2000
BJTM	2020	-0.7299	5.942	1.1345	-5.0872	21.6400	77.7600
BJTM	2021	10.2941	6.368	1.4957	10.0753	23.5200	75.9500
BJTM	2022	-5.3333	6.925	9.2281	4.0894	24.7400	76.1500
BJTM	2023	-11.9718	6.482	-1.0922	6.1627	25.7100	77.2700
BJTM	2024	-13.6000	7.022	4.5145	-2.6523	23.4900	81.8900
BKSW	2020	-41.1111	5.942	1.1345	-5.0872	24.5300	116.1400
BKSW	2021	81.1321	6.368	1.4957	10.0753	29.9200	234.5000
BKSW	2022	-46.8750	6.925	9.2281	4.0894	38.5900	134.6000
BKSW	2023	-20.5882	6.482	-1.0922	6.1627	62.2300	94.5300
BKSW	2024	-12.3457	7.022	4.5145	-2.6523	56.1500	90.0700
BMAS	2020	-23.1844	5.942	1.1345	-5.0872	16.5300	87.5800
BMAS	2021	301.8182	6.368	1.4957	10.0753	13.6900	89.4800
BMAS	2022	-40.5430	6.925	9.2281	4.0894	31.5500	84.9900
BMAS	2023	-11.7199	6.482	-1.0922	6.1627	50.1200	93.2900
BMAS	2024	0.8621	7.022	4.5145	-2.6523	43.5200	120.1300

BMRI	2020	-17.5896	5.942	1.1345	-5.0872	19.9000	80.0300
BMRI	2021	-44.4585	6.368	1.4957	10.0753	19.6000	67.2600
BMRI	2022	41.2753	6.925	9.2281	4.0894	19.4600	57.3500
BMRI	2023	21.9021	6.482	-1.0922	6.1627	21.4800	51.8800
BMRI	2024	-5.7851	7.022	4.5145	-2.6523	20.1000	56.4600
BNBA	2020	3.1056	5.942	1.1345	-5.0872	25.9800	92.0200
BNBA	2021	875.9036	6.368	1.4957	10.0753	41.8700	88.8700
BNBA	2022	-71.4506	6.925	9.2281	4.0894	59.2700	91.3100
BNBA	2023	-19.4595	6.482	-1.0922	6.1627	72.8700	89.7000
BNBA	2024	-19.4631	7.022	4.5145	-2.6523	65.0700	87.8300
BNGA	2020	3.1088	5.942	1.1345	-5.0872	21.9200	89.3800
BNGA	2021	-3.0151	6.368	1.4957	10.0753	22.6800	78.3700
BNGA	2022	22.7979	6.925	9.2281	4.0894	22.1900	74.1000
BNGA	2023	43.0380	6.482	-1.0922	6.1627	24.0200	71.4700
BNGA	2024	2.0649	7.022	4.5145	-2.6523	23.3400	74.0200
BNII	2020	67.9612	5.942	1.1345	-5.0872	24.3100	87.8300
BNII	2021	-4.0462	6.368	1.4957	10.0753	27.1000	82.6900
BNII	2022	-31.3253	6.925	9.2281	4.0894	26.6500	83.1000
BNII	2023	6.1404	6.482	-1.0922	6.1627	27.7400	83.1300
BNII	2024	-14.0496	7.022	4.5145	-2.6523	25.5500	89.5600
BNLI	2020	108.6957	5.942	1.1345	-5.0872	35.7000	88.8000
BNLI	2021	-41.8561	6.368	1.4957	10.0753	34.9000	90.1000
BNLI	2022	-33.8762	6.925	9.2281	4.0894	34.2000	82.4000
BNLI	2023	-9.3596	6.482	-1.0922	6.1627	35.3000	81.7000
BNLI	2024	2.7174	7.022	4.5145	-2.6523	34.6000	76.1000
BRIS	2020	564.8485	5.942	1.1345	-5.0872	18.2400	84.6100
BRIS	2021	-20.8751	6.368	1.4957	10.0753	22.0900	80.4600
BRIS	2022	-25.6912	6.925	9.2281	4.0894	20.2900	75.8800
BRIS	2023	34.8837	6.482	-1.0922	6.1627	21.0400	71.2700
BRIS	2024	56.8966	7.022	4.5145	-2.6523	21.4000	69.9300
BSIM	2020	-13.6752	5.942	1.1345	-5.0872	17.2900	111.7000
BSIM	2021	73.2673	6.368	1.4957	10.0753	29.1200	97.1200
BSIM	2022	-3.4286	6.925	9.2281	4.0894	29.4900	93.2700
BSIM	2023	5.3254	6.482	-1.0922	6.1627	25.3400	103.3600
BSIM	2024	-7.8652	7.022	4.5145	-2.6523	30.4600	90.8300
BTPN	2020	-4.3077	5.942	1.1345	-5.0872	25.5500	85.5000
BTPN	2021	-15.7556	6.368	1.4957	10.0753	26.2000	76.0000
BTPN	2022	0.8779	6.925	9.2281	4.0894	25.6800	75.1000
BTPN	2023	-1.1351	6.482	-1.0922	6.1627	27.6500	83.7000
BTPN	2024	-15.8056	7.022	4.5145	-2.6523	27.9900	83.2000
BTPS	2020	-11.7647	5.942	1.1345	-5.0872	49.4400	76.2400
BTPS	2021	-4.5333	6.368	1.4957	10.0753	58.2700	58.1200
BTPS	2022	-22.0670	6.925	9.2281	4.0894	53.6600	59.9700
BTPS	2023	-39.4265	6.482	-1.0922	6.1627	51.6000	74.4200
BTPS	2024	-45.2663	7.022	4.5145	-2.6523	53.1600	75.3700

BVIC	2020	35.7143	5.942	1.1345	-5.0872	16.6800	112.0900
BVIC	2021	78.9474	6.368	1.4957	10.0753	17.4900	104.9400
BVIC	2022	-47.5490	6.925	9.2281	4.0894	21.9700	79.4400
BVIC	2023	-7.4766	6.482	-1.0922	6.1627	19.9500	91.6700
BVIC	2024	-10.1010	7.022	4.5145	-2.6523	21.5300	88.0000
MAYA	2020	-15.9295	5.942	1.1345	-5.0872	15.4500	98.4100
MAYA	2021	-85.5927	6.368	1.4957	10.0753	14.3700	98.8300
MAYA	2022	-55.6061	6.925	9.2281	4.0894	11.1300	99.3200
MAYA	2023	-12.6280	6.482	-1.0922	6.1627	10.7800	99.4000
MAYA	2024	-19.5313	7.022	4.5145	-2.6523	10.5000	99.5100
MCOR	2020	7.7519	5.942	1.1345	-5.0872	35.2800	97.7000
MCOR	2021	-16.5468	6.368	1.4957	10.0753	37.9600	92.7500
MCOR	2022	-31.0345	6.925	9.2281	4.0894	32.7300	87.7600
MCOR	2023	-2.5000	6.482	-1.0922	6.1627	37.4500	82.7600
MCOR	2024	-5.1282	7.022	4.5145	-2.6523	30.7200	83.3900
MEGA	2020	13.3829	5.942	1.1345	-5.0872	31.0400	65.9400
MEGA	2021	17.7049	6.368	1.4957	10.0753	27.3000	56.0600
MEGA	2022	4.9741	6.925	9.2281	4.0894	25.4100	56.7600
MEGA	2023	-3.3359	6.482	-1.0922	6.1627	26.1700	65.6000
MEGA	2024	-19.0196	7.022	4.5145	-2.6523	25.7700	73.6100
NISP	2020	-2.9586	5.942	1.1345	-5.0872	22.0400	81.1300
NISP	2021	-18.2927	6.368	1.4957	10.0753	23.0500	76.5000
NISP	2022	11.1940	6.925	9.2281	4.0894	21.5300	71.0900
NISP	2023	58.3893	6.482	-1.0922	6.1627	23.6900	71.0100
NISP	2024	11.4407	7.022	4.5145	-2.6523	23.6000	70.9900
NOBU	2020	-7.3034	5.942	1.1345	-5.0872	22.0200	92.1600
NOBU	2021	-13.9394	6.368	1.4957	10.0753	20.9100	91.3300
NOBU	2022	-28.0282	6.925	9.2281	4.0894	18.5400	89.2700
NOBU	2023	44.8141	6.482	-1.0922	6.1627	23.4800	89.2600
NOBU	2024	-22.2973	7.022	4.5145	-2.6523	23.7900	82.8000
PNBN	2020	-20.2247	5.942	1.1345	-5.0872	29.5800	79.5400
PNBN	2021	-27.6995	6.368	1.4957	10.0753	29.8600	86.0900
PNBN	2022	100.0000	6.925	9.2281	4.0894	30.0700	74.5300
PNBN	2023	-21.4286	6.482	-1.0922	6.1627	32.4000	78.1800
PNBN	2024	53.7190	7.022	4.5145	-2.6523	34.5400	78.7200
SDRA	2020	-10.8404	5.942	1.1345	-5.0872	19.9900	74.2200
SDRA	2021	-22.8142	6.368	1.4957	10.0753	24.4800	70.3200
SDRA	2022	-3.3628	6.925	9.2281	4.0894	23.6600	67.3000
SDRA	2023	-0.9158	6.482	-1.0922	6.1627	23.8800	77.4500
SDRA	2024	-23.1054	7.022	4.5145	-2.6523	31.0900	84.9700