MACROECONOMIC AND BANK SPECIFIC DETERMINANTS OF BANK STOCK RETURN: A CASE STUDY IN MALAYSIA

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BY

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A final year project submitted in partial fulfillment of the requirement for the degree of

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DECLARATION

We hereby declare that:

(1) This undergraduate FYP is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this FYP has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the FYP.

(4) The word count of this research report is 22,140.

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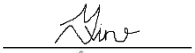
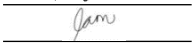
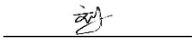
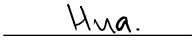
1. Khor Yong Xin	18ABB03226	
2. Lam Sook Mun	18ABB01964	
3. Low Wai Tung	18ABB05119	
4. Yiap Qian Hua	18ABB03984	

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LIST OF ABBREVIATIONS

ABMB	Alliance Bank Malaysia Berhad
AFFIN	Affin Bank Berhad
AMBANK	AMMB Holdings Berhad
APT	Arbitrage Pricing Theory
BLUE	Best Linear Unbiased Estimator
BNM	Bank Negara Malaysia
BSR	Bank Stock Return
CAPM	Capital Asset Pricing Model
CIMB	CIMB Group Holdings Berhad
EMH	Efficient Market Hypothesis
ER	Exchange Rate
FGLS	Feasible Generalized Least Square
FBMKLCI	FTSE Bursa Malaysia Kuala Lumpur Composite Index
GDP	Gross Domestic Product
HLBANK	Hong Leong Bank Berhad
IR	Interest Rate
JB	Jarque-Bera Test
LLC	Levin-Lin-Chu Test

ln	Natural Logarithm
MAYBANK	Malayan Banking Berhad
NIM	Net Interest Margin
NPL	Non-performing Loan Ratio
OLS	Ordinary Least Square
OPR	Overnight Policy Rate
PBBANK	Public Bank Berhad
RHBBANK	RHB Bank Berhad
TBTF	Too Big to Fail
TOL	Tolerance
VIF	Variance Inflation Factor

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PREFACE

The topic that will be conducted in this research is macroeconomic and bank-specific determinants of bank stock return in Malaysia. The banking industry is always the backbone of Malaysia's financial system. Hence, the performance of the bank is one of the critical factors in the economic growth of Malaysia. In order to keep the financial system stable, all of the parties need to understand how the internal and external factors affect the bank stock return, which reflects the bank's performance as well.

This research project will outline several macroeconomic and bank-specific factors that affect the stock return of commercial banks in Malaysia. Those macroeconomic and bank-specific variables that have been included in this research report are interest rate, exchange rate, bank size, net interest margin, non-performing loan ratio, and financial crisis. These variables are the key factors that have an impact on the stock return of commercial banks in Malaysia.

The outcomes of this research could provide valuable information to the government, policy makers, bank management, investors, as well as academicians to have better insights into the determinants of bank stock return and the environment of the financial market in Malaysia.

ABSTRACT

This research aims to determine the macroeconomic and bank-specific determinants of the stock return of the banking sector in Malaysia. Eight listed commercial banks are chosen in this research, comprising of Alliance Bank Malaysia Berhad, Affin Bank Berhad, AMMB Holdings Berhad, CIMB Group Holdings Berhad, Hong Leong Bank Berhad, Malayan Banking Berhad, Public Bank Berhad, and RHB Bank Berhad. Secondary data is adopted in this research, and the data are gathered on an annual basis from 2011 to 2020 via the sources of Bloomberg and Bank Negara Malaysia. The dependent variable is bank stock return whereas the independent variables consist of macroeconomic factors, bank-specific determinants, and dummy variable. Macroeconomic variables are interest rate and exchange rate while the bank-specific determinants include bank size, net interest margin, and non-performing loan ratio. This research also takes into account the financial crisis of 2020 by inserting the dummy variable. Preliminary tests and diagnostic checking, for instance, unit root test, multicollinearity, autocorrelation, heteroscedasticity, and normality, have been conducted to verify the reliability of the regression model. Feasible Generalized Least Square (FGLS) regression is the panel data model that has been applied in this research. The results proved that interest rate, exchange rate, non-performing loan ratio, and financial crisis have a significantly negative relationship with bank stock return. On the other hand, bank size and net interest margin show an insignificant relationship with bank stock return. This research is able to provide crucial implications to several parties, which are government, policy makers, bank management, investors, and academicians. Some limitations of this research have been identified, and the corresponding recommendations have been proposed for future researchers to overcome them.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

In the year 2020, the Malaysian government imposed the Movement Control Order several times to restrict the public's social activities and contain the virus spread. The frequent lockdown damaged Malaysia's economic performance, especially those cyclical sectors such as the banking industry. Due to the increasing unemployment rate, dismal expansion in business loans and high credit risk exposure influenced bank performance badly. The banking industry is always the backbone of Malaysia's financial system. Its important role lies in its function of channeling the fund efficiently from savers to borrowers, maintaining the liquidity of the financial system. Also, banks provide plenty of specialized financial products and services to facilitate financing activities. The unique role of banks in the financial system makes them vulnerable to any inverse changes in bank determinants. When the bank's performance is affected badly, depositors and related bank stakeholders will be panic and withdraw their invested funds from the bank, ending up with a bank run. A large amount of sudden withdrawal from the bank will also distort the financial system operation, eventually affecting the country's economy.

Chapter one is a guiding chapter that presents a brief summarization of this research paper. The important elements such as the research background, problem statement, research objectives and questions, and significance of research will be encompassed in this chapter.

1.1 Research Background

The Central Bank of Malaysia, Bank Negara Malaysia (BNM), is a statutory organization that began operations on 26 January 1959, and it is governed by the Central Bank of Malaysia Act 2009. BNM plays a crucial role in promoting monetary and financial stability to ensure the sustainable growth of the Malaysian economy. In Malaysia, there are 26 commercial banks (including 8 local and 18 foreign commercial banks), 16 Islamic banks, and 11 investment banks, as shown in Table 1.1 (Bank Negara Malaysia [BNM], 2021). Commercial banks provide retail banking services such as receiving deposits, giving loans, and providing financial guarantees. Commercial banks also offer trade financing services such as trust receipts, banker's acceptance, shipping guarantees, and letters of credit. Islamic banks refer to banks that comply with Islamic Shariah law and focus on mutual risk, profit sharing, and fairness. Investment banks act as middlemen to help companies access capital markets to raise funds (Norsilah, 2021).

Table 1.1:

List of Banking Institutions in Malaysia

LIST OF BANKING INSTITUTIONS	
Local Commercial Banks	
• Affin Bank Berhad • Alliance Bank Malaysia Berhad • AmBank (M) Berhad • CIMB Bank Berhad	• Hong Leong Bank Berhad • Malayan Banking Berhad • Public Bank Berhad • RHB Bank Berhad
Foreign Commercial Banks	
• Bangkok Bank Berhad • Bank of America Malaysia Berhad • Bank of China (Malaysia) Berhad	• Industrial and Commercial Bank of China (Malaysia) Berhad • J.P. Morgan Chase Bank Berhad

• BNP Paribas Malaysia Berhad • China Construction Bank (Malaysia) Berhad • Citibank Berhad • Deutsche Bank (Malaysia) Berhad • HSBC Bank Malaysia Berhad • India International Bank Malaysia Berhad	• Mizuho Bank (Malaysia) Berhad • MUFG Bank (Malaysia) Berhad • OCBC Bank (Malaysia) Berhad • Standard Chartered Bank Malaysia Berhad • The Bank of Nova Scotia Berhad • Sumitomo Mitsui Banking Corporation Malaysia Berhad • United Overseas Bank (Malaysia) Berhad
Islamic Banks	
• Affin Islamic Bank Berhad • Al Rajhi Banking & Investment Corporation (Malaysia) Berhad • Alliance Islamic Bank Berhad • AmIslamic Bank Berhad • Bank Islam Malaysia Berhad • Bank Muamalat Malaysia Berhad • CIMB Islamic Bank Berhad • Hong Leong Islamic Bank Berhad	• HSBC Amanah Malaysia Berhad • Kuwait Finance House (Malaysia) Berhad • Maybank Islamic Berhad • MBSB Bank Berhad • OCBC Al-Amin Bank Berhad • Public Islamic Bank Berhad • RHB Islamic Bank Berhad • Standard Chartered Saadiq Berhad
Investment Banks	
• Affin Hwang Investment Bank Berhad • Alliance Investment Bank Berhad • AmInvestment Bank Berhad	• KAF Investment Bank Berhad • Kenanga Investment Bank Berhad • Maybank Investment Bank Berhad

• CIMB Investment Bank Berhad • Hong Leong Investment Bank Berhad	• MIDF Amanah Investment Bank Berhad • Public Investment Bank Berhad • RHB Investment Bank Berhad

Note. From BNM (2021).

A well-developed country requires a healthy banking system since the banks play a significant role in developing and growing the country's economy. This research focuses on the banking industry because generally, banks are sensitive to the changes of both macroeconomic variables and bank-specific variables, especially those public listed banks. Nowadays, most of the commercial banks have chosen to go public listed on Bursa Malaysia. The banks' primary capital structure has shifted from consumer deposits to equity capital. The equity holders, also known as the bank partners, pay attention to the stock price changes since it directly affects the stock return. They prefer to invest in those securities with high returns. Therefore, the decision of equity holders whether to invest depends on the volatility of stock price, and it subsequently influences the future sustainability of the banks (Isa, Ismail, Latif & Samsudin, 2021).

The most recent financial crisis was provoked by a deep economic recession during the COVID-19 pandemic in 2020. According to BNM (2020a), in the second quarter of 2020, the Gross Domestic Product (GDP) shrank by 17.1% due to the implementation of the Movement Control Order by the government to cope with the COVID-19 infections. At the same time, Malaysian stocks slid, and the Ringgit weakened as much as 0.4% (Mookerjee & Yap, 2021). The uncertainty of the economic environment created higher provisions for the banks and made investors more concerned about the bank asset quality. The banks' profits were also influenced by the contraction of interest margins caused by the consecutive decline in the Overnight Policy Rate (OPR) to 1.75% (Tan, 2021). As a result of various factors and the uncertainty of the pandemic, FTSE Bursa Malaysia Kuala Lumpur

Composite Index (FBMKLCI) and Finance Index slumped to the lowest record in March 2020, as shown in Figure 1.1.

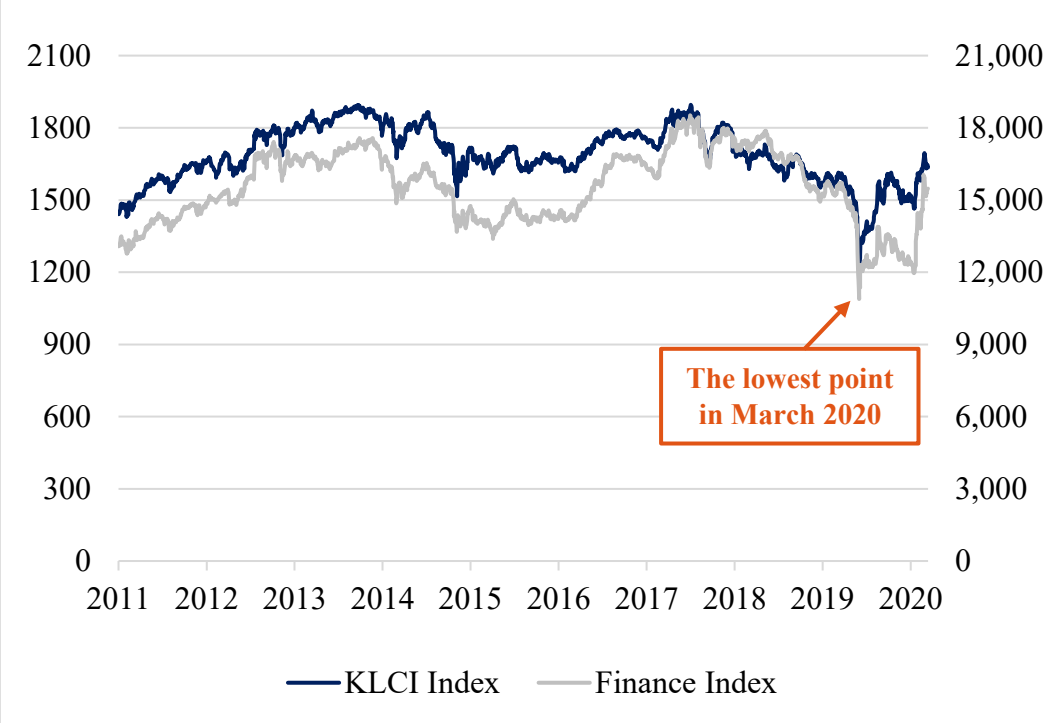

Figure 1.1. FBMKLCI Index and Finance Index from 2011 to 2020. Adapted from Yahoo Finance (2021) and Investing.com (2021).

Meanwhile, banking sector stocks account for a large weightage of both the FBMKLCI Index and the Finance Index. Any downtrend in the banking sector might lead to the decline of the index. Hence, it is important to examine the determinants that will have an impact on the changes in the bank stock price. There is a lot of studies done by the researchers such as Nurazi and Usman (2016), Septanti, Siregar and Sasongko (2016), Rjoub, Civcir and Resatoglu (2017), Nepal (2018), Hakim and Martono (2019), Endri (2020) and Ahmad and Razilah (2021) to investigate the determinants of the stock return in the banking sector. Various determinants were found out, for instance, capital adequacy ratio, non-performing loan ratio, net interest margin, operating expenses to operating income, return on equity, return on assets, loan to deposit ratio, bank size, interest rate, exchange rate, inflation, money supply, and gross domestic product. Since there are many factors

that will affect the bank stock return significantly, it is essential to carry out research on the determinants of bank stock return and to discover any discrepancies with the previous studies.

1.2 Research Problem

In the last few decades, the Malaysian banking industry witnessed significant growth. The banking industry has also become one of the largest contributors to Malaysia's GDP. Since the banking industry is always a backbone for a country's financial system, an advancement from the prospective banking industry can exert a substantial positive impact on economic development. A thriving banking industry can broaden the lending restriction and enhance the lending capabilities, which can result in a healthy business environment contributing to a reduction in the balance of payment (Arsalan & Iqbal, 2020). In brief, an optimal banking sector must be in a state of remarkable financial soundness.

Banks are unique and vital entities because of the mismatched liquidity between assets and liabilities, possibly leading to a bank run caused by the vast depositor withdrawals. Even the strongest and the largest bank cannot sustain a severe loss of public trust as the money owed by the bank can usually be withdrawn more promptly compared to the money earned. Banks are significant to the whole economy since they act as the medium of exchange, enhancing a country's payment system. Financial transactions such as deposits, withdrawals, cheques, credit card payments, and online payments are primarily facilitated through commercial banks. The failure of one bank can lead to the failure of the whole payment system, resulting in economic deterioration. Banks are particularly important due to their role in financial resources allocation among numerous industries in the economy. The failure of banks may reduce the credit flows to the economy, thus resulting in an economic slowdown.

Therefore, a belief of too big to fail (TBTF) exists. According to Moosa (2010), TBTF is a belief assuming that the government does not allow the major financial institutions to fail because they are big. The government will bail out the large financial institution to reduce losses and protect creditors in the case of bank failure. In this case, large banks will be highly preferable to investors due to the protection by the government. Even though large banks are always preserved by TBTF, it is associated with some criticisms. According to Omarova (2019), TBTF motivates the issue of moral hazard for large banks. It provides the incentives for large banks to act irresponsibly and take excessive risks to earn greater profit since they are guaranteed survival by the government.

Not only the failure of Domestic Systematically Important Banks, including MAYBANK, CIMB, and PBBANK, may lead to significant disruption of the economy. In fact, the phrase "Too big to fail" is not specifically applied to large banks since small banks have often been bailed out historically. Small-sized banks are intercorrelated due to market concentration, they are systematically important, and mass failures among them can pose severe disruptions to financial stability (Coppola, 2013). Besides, small domestic banks can cater for the financial ecosystem well. They are important fund providers to local Small and Medium Enterprises that promote economic development, limiting the wealth flows from poor to rich regions (Hakenes, Hasan, Molyneux & Xie, 2015). The structural reason is that large banks can earn more interest income by utilizing the same amounts of resources to underwrite the larger loan (Abello, 2020). In short, the small banks play an important role as the large bank in maintaining a healthy financial environment.

The financial crisis will engender a severe negative impact on the performance of financial institutions. It will lead to huge volatility of the bank stock price, subsequently the stock return since people anticipate the banks will be underperformed, resulting in selling pressure (Ahmad et al., 2021). The crisis might cause capital outflow from the foreigners in a country, resulting in currency depreciation. For example, during the COVID-19 pandemic, there was a net

foreigner portfolio capital outflow in Malaysia that amounted to RM26.2 billion, which was caused by the rising risk aversion and the seriousness of the global health crisis (BNM, 2020a). This situation subsequently led to a depreciation of the Ringgit against the US Dollar during the first quarter of 2020. According to Lee, Kuo and Lee (2018), the exchange rate might be the possible determinant of bank stock return because the exchange rate volatility will cause gains or losses in terms of translation regarding the net foreign positions of the bank. On the contrary, the bank stock return might not be exposed to exchange rate risk if the bank utilizes the derivatives to hedge against the foreign exchange uncertainty.

Government can use the interest rate, a type of monetary policy instrument, to fight the issue of recession or economic boom. In the recent pandemic crisis, the Malaysia Monetary Policy Committee diminished the OPR to 1.75%, a historically low record. Such policy created challenges for all banks. Lower interest rates caused less attractive deposits and a decay in the interest rate earnings, resulting in a dip in the bank's profit (Khoo, 2020). In this situation, Malaysian banking stocks experienced heavy selling pressure, resulting in falling of banks' stock prices (Tan, 2020). The selling motive was caused by the expectation of the shrinking in the net interest income margin of the bank because of the interest rate cut by the central bank. Nonetheless, according to Rjoub et al. (2017), interest rate and the bank stock return are negatively related due to the maturity mismatch issue between bank assets and liabilities.

On top of that, loan deferment is one of the policies implemented by the Malaysian government to survive the economic recession. However, due to the loan deferment granted by the government, banks suffered a larger credit risk and liquidity risk. At the same time, the loan deferment provided a cushion for the banks to avoid the extensive deterioration of the asset quality (Jalil, 2020). Investors are concerned about the asset quality of the bank since it can be the determinant of the bank stock return. According to Hakim et al. (2019), when the bank has low asset quality, where there is a high non-performing loan, the bank might incur high costs. As a

result, the bank profitability will be lower, which will lead to a reduction in the stock price.

In the most recent financial crisis, the COVID-19 pandemic, all Malaysia listed commercial banks' stock prices experienced a decline in March 2020 caused by various determinants, as shown in Figure 1.2. The falling stock price brings adverse impacts to the bank. Krantz (2012) stated that when the stock price drops, the bank might face difficulty in raising additional funds by using equity. The lower the stock price, the larger the number of additional shares issued, thus resulting in expensive stock-based deals and a higher cost of raising funds. The bank might also be compelled to use debt financing, such as a bond, to raise additional funds if the stock price drops sharply by a huge amount. Nevertheless, a higher cost of using debt financing will be required due to the high-interest rate compensated to the investors. Furthermore, the falling bank stock price also contributes to a few issues, such as rushing withdrawal by depositors, higher takeover risk, negative press releases, and lower employee retention (Palmer, 2011; Murphy, 2021).

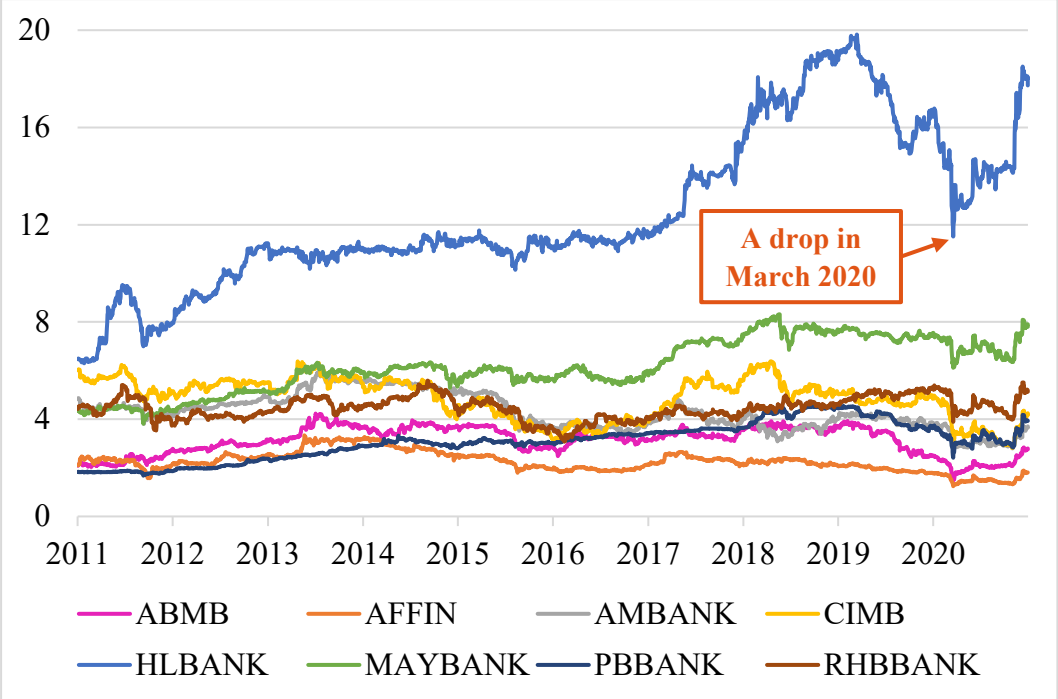

Figure 1.2. Malaysia Bank Stock Price from 2011 to 2020. Adapted from Bloomberg (2021).

In fact, there is only a few past research studying the determinants of bank stock return in the country of Malaysia. Also, there is a variety of researchers who keep arguing about selecting the appropriate variables to become the determinants of bank stock returns. It is difficult because there are numerous empirical past studies on the responsiveness of bank stock return to a vast of macroeconomic and bank-specific variables. Therefore, it is challenging to compare the outcome of this empirical literature because they involve different variables, estimation methods, models, and industries. In this way, this research will evaluate the factors that will impact the bank stock return of eight listed commercial banks in Malaysia to provide a better understanding.

1.3 Research Questions

There are six research questions in this research:

i. Is there a significant relationship between interest rate and bank stock return?
ii. Is there a significant relationship between exchange rate and bank stock return?
iii. Is there a significant relationship between bank size and bank stock return?
iv. Is there a significant relationship between net interest margin (NIM) and bank stock return?
v. Is there a significant relationship between non-performing loan ratio (NPL) and bank stock return?
vi. Is there a significant relationship between financial crisis and bank stock return?

1.4 Research Objectives

1.4.1 General Objectives

This research aims to examine the relationship between the macroeconomic and bank-specific determinants on the stock return of the banking sector.

1.4.2 Specific Objectives

There are six specific objectives in this research:

i. To determine the relationship between interest rate and Malaysian bank stock return.
ii. To determine the relationship between exchange rate and Malaysian bank stock return.
iii. To determine the relationship between bank size and Malaysian bank stock return.
iv. To determine the relationship between net interest margin (NIM) and Malaysian bank stock return.
v. To determine the relationship between non-performing loan ratio (NPL) and Malaysian bank stock return.
vi. To determine the relationship between financial crisis and Malaysian bank stock return.

1.5 Research Significance

In earlier, most of the studies about the impact of macroeconomic and internal factors always focused on the general stock return, but fewer researchers conducted the research focusing on the bank stock return in Malaysia. This research contributes to the existing literature by analyzing the relationship between macroeconomic, internal bank-specific determinants and Malaysia bank stock return. Bank stock return is chosen as the dependent variable in this research, whilst the macroeconomic and bank-specific components denote the independent variables in this research. The macroeconomic variables include interest rate and exchange rate whereas the bank-specific determinants are bank size, net interest margin, and non-performing loan ratio. The financial crisis is also taken into account in this research. This research allows investors, bank management, and government to understand better on the macroeconomic and bank-specific factors as well as the financial market in Malaysia.

According to Hakim et al. (2019), investment decisions for banking companies can be seen by analyzing the financial condition of the company. In other words, a good banking industry must be in a state of significant financial soundness, and it can be assessed through financial statement analysis. Suppose a company's financial performance is in good condition. In that case, it will have implications on stock prices, where the prices will rise as an effect of good company performance, resulting in higher stock returns. However, the financial condition of banking companies is sensitive to government policy, bank-specific factors, and macroeconomic conditions. Hence, the outcome of this research can be used as additional information for the investors and shareholders. By knowing well how the internal and external factors affect the bank stock return, the investors may make their decision wisely through investing with fewer risks and less uncertainty to earn a desirable return.

This research will contribute to bank management in terms of performance evaluation. It helps the bank determine some critical factors that could affect the overall performance. According to Hunjra, Shahzad, Chani, Hassan, and Mustafa (2014), the stock return is the biggest concern for companies, and it is an important indicator to determine the firm's overall strength. By conducting this research, the bank management is able to own a clearer picture regarding the effect of macroeconomic and bank-specific factors on the bank stock return. As a result, they could gain higher competitive advantages than others in the industry.

This research provides some valuable information to the government that helps to fulfil the objective of BNM, which is to promote financial stability. The banking industry's performance can be an indicator of the economic growth of one country. Meanwhile, all the Malaysian banks are supervised by the central bank. Thus, it is crucial for the government to familiarize with how the internal and external factors affect the bank stock return and propose suitable policies to keep the financial system stable. Besides, this research also consists the purpose of convincing policymakers by presenting a better picture of how the internal and external factors affect the bank stock return.

1.6 Research Structure

1.6.1 Chapter 1

Chapter 1 shows a brief idea or concept about the research and the purpose of the research. This chapter includes the research background, research problem, objectives, and questions. In addition, it also includes the significance of this research.

1.6.2 Chapter 2

Chapter 2 shows the relevant underlying theories and a detailed literature review on all the selected variables. This chapter displays a proposed theoretical framework, identifying the relationship between independent and dependent variables. Lastly, this chapter discusses the development of the testable hypotheses.

1.6.3 Chapter 3

Chapter 3 shows the methodology and the data, which are used in this research project. This chapter will begin with the introduction, research and sampling design, data collection method, data analysis tools, and a conclusion.

1.6.4 Chapter 4

Chapter 4 presents the findings and analysis of the result of this research project. It illustrates the relationship between macroeconomic and bank-specific factors with the bank stock return. All the details of the results will be included in this chapter.

1.6.5 Chapter 5

Chapter 5 shows the summary of the findings, implications for the policymakers, and limitations of the research. Besides, some recommendations to future researchers will also be provided in this chapter.

1.7 Conclusion

Overall, Chapter 1 has narrated the background of this research, research problem, and research significance. This research is targeted to determine the relationship between macroeconomic, bank-specific determinants, and bank stock return. The following chapter will discuss and present a literature review on other researchers' thesis.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Chapter 2 is a literature review chapter, where the researchers will review plenty of past studies related to bank stock return determinants and summarize the outcomes. Based on the past study results, the researchers can identify the underlying theories to support the theoretical model and deduce hypotheses regarding the variables affecting the bank stock return. The relationship between the determinants and stock return will be developed in the conceptual framework.

2.1 Underlying Theories

2.1.1 Capital Asset Pricing Model (CAPM)

According to Perold (2004), the Capital Asset Pricing Model (CAPM) was proposed by Jack Treynor (1962), William Sharpe (1964), John Lintner (1965), and Jan Mossin (1966). CAPM is a model that creates the relationship between expected return and risk in asset pricing. It uses the expected return of a risk-free asset, the expected return of the market, and the specific beta of the security to forecast the expected return of the security (Kyangavo, 2016).

The equation of CAPM is as follow:

$$E(R_i)=R_f+\beta_i(E(R_m)-R_f)$$

Where:

$E(R_i)$ = Expected return of a security

R_f = Risk free rate

β_i = Beta of the security

$E(R_m)$ = Expected market return

$(E(R_m)-R_f)$ = Risk premium

CAPM is the one-factor model, where the stock price movement is only determined by the market risk, which is beta (Zuhroh, 2020). Investors will anticipate a higher return when there is a higher market risk, indicating a positive relationship. However, there are many disputes arising among researchers and academics, arguing that the variance of the stock price is not solely affected by the beta (Nurazi et al., 2016). Besides, CAPM is also associated with some limitations, such as its assumption of a perfectly efficient market, and no existence of tax and transaction costs. To cope with the limitations of CAPM, an alternative way, which is Arbitrage Pricing Theory (APT), is developed.

2.1.2 Arbitrage Pricing Theory (APT)

Arbitrage Pricing Theory (APT) was proposed by Stephen Ross, an American economist, in the year of 1976 to fill in the constraints of the CAPM (Kyangavo, 2016; Zuhroh, 2020). APT is a general asset pricing theory that indicates that the expected return of security can be predicted by a linear function of numerous determinants, such as macroeconomic or

bank-specific factors. In that linear function, there will be each specific beta coefficient factor representing the sensitivity of each factor variation.

The equation of APT is as follow:

$$E(R_i)=R_f+\beta_{i1}RP_1+\beta_{i2}RP_2+\ldots+\beta_{in}RP_n$$

Where:

$E(R_i)$ = Expected return of a security

R_f = Risk free rate

β_{in} = Sensitivity of a security's price to factor

RP_n = Risk premium associated with factor

APT is a multi-factor asset pricing model, and it does not hold the assumption of a perfectly efficient market (Kyangavo, 2016). APT allows asset mispricing, where the asset can be either undervalued or overvalued for a short period of time. Nonetheless, the asset price will be corrected back to its fair value due to the market action of arbitrageurs, who always capture the opportunity to earn risk-free profit from the mispriced securities.

APT provides a more flexible approach compared to CAPM. This theory allows the researchers to customize their research since it postulates an unknown number of unknown variables affecting the asset price (Kyangavo, 2016). However, APT also consists of its flaw because it does not specify the key variables, causing analysts to take a lot of time to examine numerous factors that may affect the asset price (Dossa, 2020). This research is supported by APT to discover the key macroeconomic and bank-specific variables, which influence the bank stock return.

2.1.3 Efficient Market Hypothesis (EMH)

According to Musa and Okologume (2020), the Efficient Market Hypothesis (EMH) is a model derived by Eugene Fama in 1970, and it is in line with the Random Walk Theory. EMH assumes that the market is efficient, and the stock price always reflects all the information received by the market at any moment. Therefore, it is impossible to earn profits from either selling overvalued stock or purchasing undervalued stock because the stock price has always adjusted promptly to reflect any new information once the market receives it. It also means that the stock is always traded at its fair price, and investigating the factors that determine the stock price is useless to forecast the price movement (Kyangavo, 2016).

There are three types of market efficiency levels in EMH, comprising of the weak form, semi-strong form, and strong form (Sewell, 2012; Kyangavo, 2016). The weak form of EMH assumes that the stock price reflects all historical information, so performing the technical analysis cannot provide consistent abnormal returns. The semi-strong form of EMH indicates that the stock price has instantly adjusted with all the information in the weak form and any new publicly available information. In this case, there is no use of fundamental analysis, including company-specific factors, industrial factors, and economic factors. In the strong form of EMH, the stock price has incorporated all information in the semi-strong form and all private and insider information. Hence, insider trading is not able to outperform the market.

This research focuses on examining the semi-strong form of EMH to determine whether it does hold. If the semi-strong form of EMH is held, it indicates that the stock price has fully adjusted with all past and public information, so it is not possible to study the information of macroeconomic and bank-specific variables to forecast the stock price.

2.2 Review of Variables

2.2.1 Dependent Variable: Bank Stock Return

Stock return is defined as the profit or loss of stock value invested within a range of periods, and the return is typically quoted in percentage form. Radha and Gopinathan (2019) also defined the return as the profit gained because of an increased stock price. The rising in stock price is determined by the law of demand-supply and bargaining power; the more demand for shares from investors, the stock price tends to go up. Investors can enjoy the benefits of stock return when a winning investment is made. The return is a motivating reason to attract capital injection from investors.

Based on the past studies, natural log return will be applied rather than the discrete return or raw share price. Estimating share return in a natural logarithm is because the log return is time additive or time consistent, indicating the log return can be easily added across subsequent time periods. The normalization of log return is relatively meaningful and enables investors and researchers to study the stock return in comparable metrics. The log normal distribution nature supports the normality and stationarity assumption when performing statistical estimation (Hudson & Gregoriou, 2015).

Typically, company performance is one of the important criteria to determine the purchase of a company's stock. The stock return allows investors to identify and earn the gap between the actual and expected earning capability of a company. If the company has superior financial performance, it will have implications for the stock price to rise as a result of satisfying operating performance. Internal bank factors, like favourable

earning capability and fulfilling non-performing ratio, may surge the company's stock return since investors tend to place their bet on gainers (Hakim et al., 2019; Hossain, 2020). Specifically for a bank, the theory of too big to fail makes the bank size become the interest of measurement (Nepal, 2018; Hossain, 2020)

Besides the internal factors, the macroeconomic factors also have an impact on the stock return in an efficient market (Pradhan & Dahal, 2016; Ali, Bashir, Ahmed & Ishaq, 2018; Nepal, 2018; Arsalan et al., 2020). Macroeconomic factors refer to the variables beyond the company's control, such as interest rate, exchange rate, political issues, legal environment, and so on (Hakim et al., 2019). However, some researchers point out that the majority of equity markets in Asia are not efficient as in developed countries. Thus, macroeconomic factors do not possess a significant impact on the performance of share return (Amadeo, 2021). Alternatively, investors will also long the stock with a good company reputation over its history to increase the chance to earn a higher rate of return from the investment made (Hakim et al., 2019).

In brief, the determinants of stock price movement are always a matter of debate because determining stock return is a complex and conflicting task. There are numerous empirical past studies on the responsiveness of bank stock return to a vast of macroeconomic and bank-specific variables. Therefore, it is challenging to compare the outcome of the empirical literature because they involve different variables, estimation methods, models, and industries.

There are also several theoretical channels through which internal bank risk factors influence banking return. For instance, Yuninda and Kusumawardhani (2021) examined the effect of the stock price in the banking industry with banking internal financial ratios. The internal factors

applied in the literature are return on assets, capital adequacy ratio, asset growth, loan to deposit, and debt to equity. The annual samples taken were ten listed banks on Indonesia Stock Exchange. The period collected was starting from 2010 to 2018. The findings showed a significant impact of all the variables on the share price of banks in Indonesia. Among them, the return on assets has the largest positive impact on the share price because the higher return on assets indicates the optimal earning skills of the company to maximize the utilization of earning assets, generating more profits for the company. The maximized profits will thus maximize the dividend distributed to the company's shareholders; the alluring dividend return eventually increases the share price.

Lastly, there are studies examining the impact of macroeconomic and microeconomics variables on the banking share price simultaneously (Nurazi et al., 2016; Septanti et al., 2016; Endri, 2020). For instance, by applying fixed effect estimation and panel granger causality test, Rjoub et al. (2017) pointed out that money supply, interest rate, bank size, earning, management quality, and asset quality are significantly influence the Turkish bank share price.

2.2.2 Independent Variable: Interest Rate

The interest rate can be defined as the amount charged on the principal by lenders to borrowers for the assets used. Interest can be used to refer to the rental or the leasing fee that is charged to the borrower. The lease rate of the assets, for instance, buildings or vehicles, is also an interest rate. Typically, a lender will charge a lower interest rate for a less risky borrower. On the contrary, a high risky borrower will be offered a greater interest rate. It is essential to have a good credit score because the lender will consider the risk of the potential borrower by examining his or her credit score in order

to qualify for the best loans. In short, the interest rate represents the cost of debt for the borrower. At the same time, it also signals the rate of return for the lender (Banton, 2021).

Pigott (2020) investigated the relationship between macroeconomic variables on the KBW Nasdaq Bank Index. The index is the proxy for the 24 leading bank stock returns in the US. The researcher categorized the independent variables into financial and real economic variables. The financial variables helped estimate the future macroeconomic conditions, including consumer price index, money supply, and Federal Fund Rate in the US. The real economy variables are those non-financial elements such as personal consumption expenditure, unemployment, and total nonfarm payroll. Multiple regression analysis is carried out using 132 monthly observations from 2009 to 2019. Based on the outcome, the researcher declared that the Fed Fund Rate impact the KBW index the most. As the Fed Fund Rate escalates, the financial environment is said to be performing well and more financially secure to deposit in banks. Apart from this, the research done by Ha (2021) is to study the macroeconomic variables, comprising GDP, Gold Price, Ninety-Day Interbank Interest Rate, and USD/VND Exchange Rate. The findings indicated that an increase in the 90-day interbank interest rate causes upward pressure on the bank share price, implying that investors have larger expectations for bank earnings. In addition, the findings from Gatua (2013) indicated that interest rate is positively related to the bank share price.

However, there are some studies having contradictory results. The study of Mugambi and Okech (2016) examined the determinants of stock returns of the listed banks on the Nairobi Securities Exchange. The exchange rate, interest rate, inflation and GDP are the main economic variables examined. It relied on secondary data from 2000 to 2015. The study applied the treasury bill rate to determine the impact of interest rate, and the findings showed a significant and negative relationship between the treasury bill rate

and the bank stock return. Investors can choose to invest in either the treasury bill or the stock market. Generally, investors will tend to direct their money to the treasury bill, rather than the stock market when the rate is higher. In this way, the investors can benefit from getting a higher return. As a result, the demand for equities falls, leading to a decline in stock prices as well as return. Furthermore, the banks have to increase the deposit rates to make the deposits more attractive when the treasury bill rate rises. Under such circumstances, the interest rate will increase, adversely impacting the bank's profit. This will make the stock unattractive to the investors, thus lowering the demand. Besides, another research investigated the interest rates sensitivity to the stock return of financial institutions trading on the Karachi Stock Exchange. Instead of using the T-bill rate as a proxy for interest rate, the repo rate or policy rate was employed. The data was gathered from 29 financial institutions from 2004 to 2011. A negative relationship between stock return and interest rate was found in the study of Khan and Mahmood (2013). According to Rjoub et al. (2017), the negative relationship is caused by the mismatch issue, where the average duration of assets, such as housing loans and hire purchases, are usually longer than the liabilities, such as fixed deposits.

2.2.3 Independent Variable: Exchange Rate

An exchange rate refers to a rate of exchanging one country's currency to another country's currency. Its function is to determine the value of numerous currencies in relation to each other. In simple words, exchange rates are quoted between two currencies and are impacted by two factors, which are the domestic currency value and the foreign currency value (Corporate Finance Institute [CFI], 2021a). According to several past research, the exchange rate and bank stock return have shown contradictory results.

According to Jain, Narayan and Thomson (2011), the purpose of the researchers is to study the relationship between four primary Australian banks: Australia New Zealand Bank, Commonwealth Bank of Australia, National Australia Bank, and Westpac Banking Corporation. They investigate the relationship by using the EGARCH model and monthly data from 1992 to 2007. According to the findings, the researchers noticed that the exchange rate variable has a statistically significant and favourable impact on bank stock returns for all banks. The researchers found that an increase in bank stock returns occurs when the Australian dollar depreciates. According to the findings, Australia New Zealand Bank's returns benefit the most from an increase in the Australian dollar. Besides, the major goal of the study by Ram, Dave and Rajesh (2019) is to determine the relationship between stock prices of India's top-performing public and private sector banks and non-financial factors. The result indicated that the exchange rate significantly and positively affected the stock prices of banking stocks of both public and private from 2006 to 2017. Apart from this, the research done by Bhattarai (2018) also showed that there is a statistically significant and positive relationship between exchange rate and market share price.

On the contrary, Nurazi et al. (2016) sought to assess the impact of financial fundamentals information on stock return by using the CAMELS ratio and macroeconomic variables such as interest rate, exchange rate and inflation rate of 15 banks in the Indonesian banking sector for the observation period from 2002 to 2011. Based on the findings, the impact of the exchange rate on bank stock returns is negative and significant in the Indonesia stock exchange. In addition, Rafiq, Jun, Naseem and Mohsin (2019) figured out how market risk, exchange rate, interest rate and bank stock returns all interact in Pakistan. The US dollar was used as an exchange rate indicator, and the continuously compounded return was used as a bank stock return indicator. The result showed that the effect of the exchange rate on bank stock return is significantly negative. Besides, Chucks, Felix and Temile (2021) found that the exchange rate is significant but negatively related to the market price of share, and this indicates that when the exchange rate

declines, the price of the stock drops. Apart from this, the findings from Veronika and Zuhroh (2021) also showed that the impact of the exchange rate on bank stock prices is significantly negative.

On top of that, there are some past studies expressed that the exchange rate brings an insignificant relationship with bank stock price. For example, the research from Endri (2020) revealed that the exchange rate has an insignificant negative effect on the bank stock price while the findings from Musa et al. (2020) also explained that the exchange rate was not significant and yet inversely related to the returns of banking index. This implies that the exchange rate variable carries a limited impact on the banking industry's stock return.

2.2.4 Independent Variable: Bank Size

Bank size indicates the varieties of financial servicing or business and the amount of financial products that the bank can offer to its clients. In other words, the size of a firm can be determined through its scale of management or the number of assets owned compared to its peer in the same industry. In the following, the natural logarithm of total assets owned by banks is measured and used as the proxy for bank size (Lestari, Tarigan, & Pohan, 2021). Presumably, the regulators, public, and investors care about the entire balance sheet of banks rather than their equity hold or market cap because the book value of the banks can provide a comprehensive view to the stated parties. Therefore, total assets may be the better measurement for size (Nepal, 2018).

There is a vast of empirical studies obtaining similar results about the relationship between the bank stock return and bank size. For instance,

Wadud (2017) applied the fixed effect model to measure the impact of bank size on the listed bank stock return in Bangladesh from 2007 to 2016. The outcome eventually indicates that the bank size is significant and positively related to the bank share price. The following results from Pradhan et al. (2016), Nepal (2018), and Hossain (2020) also get the same result as Wadud. Generally, investors perceive that large banks can benefit from economies of scale and scope, and diversify well their investment-loan portfolio efficiently and geographically to reduce the overall risk and cost (Lestari et al., 2021). Furthermore, the larger bank normally offers their customers better and wide range of banking services compared to the smaller ones. Large banks commonly occupy a stronger and dominant position in the equity market. Thus, their stocks are actively traded among investors in exchange because the shares of large banks are more liquid and marketable. In a nutshell, the temptation to purchase the large bank's share lead to a higher share price (Bhattarai, 2014). Another explanation from Nepal (2018) tells that the effect of bank size on the bank share price is pronounced especially amid the financial crisis. The supports and bailouts released by the government reassure the investors to transfer their fund from risky assets to large banks' share, which is now acknowledged as less risky assets.

The relationship between size and bank share price is inconclusive yet, although a majority of the past studies showed positive results. A study carried out by Chowdhury, Dovash, and Islam (2019) pointed out that bank size is significantly and negatively related to the share price of banks. The sample included 30 banks listed on Dhaka Stock Exchange in Bangladesh from 2011 to 2015. Adusei (2015) revealed that the negative connection between bank share price and its size could be understood through the crux of agency cost. The theory states that the bank operating manager has incompatible goals with the rest of the bank's stakeholders. The former is assumed to pursue their personal achievements at the expenses of the latter. In simple words, the decision and actions executed by the managers are inordinately skewed toward their personal aggrandizement. Consequently, large banks are characterized by bad governance and postulated as the

outcome of managerial empire-building. The negative relationship of bank return and size is also supported by the too-big-to-fail hypothesis (Laeven, Ratnovski, & Tong, 2014). The researchers indicated that large and complex banks highly contribute to systematic risk as the government is reluctant to unwind the large bank, which involves extreme risk-taking behaviour. With the expectation of regulators' bailout, large banks are tended to take on excessing risk to maximize their profit generation.

On the other hand, there are also researchers determining that the size has no explanatory power toward stock price movement (Bhattarai, 2014). Ardiansyaha, Siregar, Hakim, and Siregar (2020) examine the determinants affecting the bank stock returns listed on the Indonesia Stock Exchange during the period ranging from 2014 to 2018. The final result also indicates that the bank size has an insignificant effect on the share return of sample banks in Indonesia.

2.2.5 Independent Variable: Net Interest Margin (NIM)

$$\text{Net Interest Margin} = \frac{\text{Interest Revenue-Interest Expenses}}{\text{Average Earning Assets}}$$

According to CFI (2021b), the banks' profitability can be measured by using net interest margin (NIM). NIM refers to the difference between the interest income generated and the interest paid out to the lender. In other words, NIM examines how well the investment decisions are made by a company as compared to the situation of the debt held by the company, and it has a direct relationship with the interest rates in the economy. NIM is measured by the net interest income to average earning assets and expressed as a percentage. According to Lartey, Antwi and Boadi (2013), NIM is essential

in determining bank profitability. However, many factors such as operational cost, financial repression, competition, interest rate, and inflation rate will affect the interest income. For instance, the higher the inflation rate, the higher the operational costs. As a consequence, it will cut down the interest revenue generated by the bank, causing a decrease in the bank's profitability.

Throughout several recent literatures related to NIM and bank stock return, most of the research revealed a negative relationship or no relationship between NIM and bank stock return. Wijayanti (2010) investigated the effect of financial performance on the bank stock price of all banks listed on the Indonesia Stock Exchange in 2005 using regression analysis. The findings suggested that NIM negatively affects the bank stock price. This is due to the inefficiency of national banking. Thus, it can be said that although the bank has a high NIM, the bank is still inefficient due to the high operating costs. Furthermore, Endri (2020) analyzed the elements that affect the banking stock price listed on the Indonesia Stock Exchange from the year of 2006 to 2016. It employed the panel data regression method on 11 banks. The results revealed that NIM has a negative and significant effect on the bank stock price. This means that when the NIM ratio drops, the bank can still manage its performance well if the bank operations can remain efficient. As a result, the bank stock demand and price will rise.

Additionally, the study of Indiani and Dewi (2016) on the effect of the rate bank health variable on the stock price of 15 banking companies on the Indonesia Stock Exchange from 2012 to 2014 gave different results. The NIM ratio does not affect stock prices as the stock market is immunized to the company’s earnings information, such as interest margin. This can be further explained by the banking NIM information being insufficient to influence the investment decisions of investors. A large NIM ratio does not indicate that the bank earns many profits because the net profits might be affected by the underperformed operating cost. The findings align with the

study of Nurazi et al. (2016), which revealed that NIM does not contribute a significant effect to the bank stock return. The researchers found that the NIM is not significantly explaining the variation of bank stock return. Instead, the variation changes according to the high volatility of interest rates during the financial crisis in Indonesia along the observation period. For instance, the real-time and remaining effects of the financial crisis in 1989 and the global financial crisis in 2008 made the banking industry face difficulties in managing the asset-liabilities gap and maximizing the net interest income amid the financial crisis.

2.2.6 Independent Variable: Non-performing Loan Ratio (NPL)

$$\text{Non-Performing Loan Ratio (NPL)} = \frac{\text{Non-Performing Loan}}{\text{Total Loan}}$$

According to Federal Deposit Insurance Corporation (2021), asset quality represents the amount of existing and potential credit risk that arises from the loan and investment portfolios, other real estate owned, off-balance-sheet transactions, and other assets. Asset quality is one of the essential elements in examing the overall situation of a bank as it covers the bank loan quality, reflecting the bank earnings. One of the important indicators of asset quality is the non-performing loan ratio (NPL) because generally, most of the assets owned by a bank are loans, and the loans have the largest amount of risk to the bank's capital. According to Hanks (2018), NPL is a ratio that compares the total amount of non-performing loans to the total amount of outstanding loans in a bank.

Throughout several recent literatures related to NPL and bank stock return, there is a consensus among the researchers that NPL has a negative impact on bank stock return. Only a few researches indicate a positive relationship between these two variables. Septanti et al. (2016) conducted a study to analyze the developments of macroeconomics, financial performance, and stock returns on four state-owned banks listed on the Indonesia Stock Exchange by using path analysis techniques from 2006 to 2016. The findings suggest that NPL has a significantly positive impact on bank stock return. This indicates that investors still favour the stocks of state-owned banks as long as the performance of the bank is good and the bank still earns profits. Furthermore, Sarwar and Ahmad (2018) conducted a study to figure out the banking industry's stock market performance of ten emerging markets in Asia using panel data techniques from 2005 to 2016. The results indicate that NPL has a positive impact on the bank stock price.

On the contrary, Sujarwo (2015) conducted research on the impact of CAMELS analysis as an indicator of bank performance towards bank stock price using multiple linear regression analysis on data of 31 banks in Indonesia from 2011 to 2013. The findings suggest that the NPL has a negative and significant effect on the bank stock price. Furthermore, Poudel (2017) examined the macroeconomic and firm-specific variables affecting stock price using multiple regression models on ten commercial banks in Nepal from 2004 to 2016. The result indicates that NPL was negatively related to the bank share price in which the bank with better asset quality and lower NPL ratio, reflecting the bank is in a healthy condition. As a result, the bank can generate better profit, and the market appreciates this condition in the rising share price. These results are in line with the research of Rjoub et al. (2017), which revealed that NPL is significant and negatively related to the bank stock price. This is because poor bank management can lead to wrong lending decisions, decreasing asset quality and lowering bank performance. Low bank performance will decrease investor confidence towards the bank, and thus they tend to invest less in those low-performance banks.

Additionally, the research from Nurazi et al. (2016) showed that NPL has an insignificant but positive impact on the bank stock price. The findings are also in line with the study of Endri (2020), which revealed that NPL has an insignificant and negative impact on the bank stock price. Furthermore, Nugroho, Halik, and Arif (2020) examine the effect of the CAMELS ratio on Indonesia's banking share prices using multiple regression analysis on four state banks documented on the Indonesia Stock Exchange over the period from 2012 to 2019. The finding suggests that NPL has no significant impact on the share price of state-owned banks. The situation can be explained where the investors still think that state-owned banks, which have a huge market share in terms of assets, are safe, even though there is a high value of the bank's NPL. Thus, the investors will ignore NPL in investment decisions.

2.2.7 Independent Variable: Financial Crisis

Malaysia's economic downturn accelerated in the fourth quarter, with a new viral outbreak late in 2020 contributing to the country's worst annual performance since the Asian financial crisis. The economy lost 3.4% in the fourth quarter from a year earlier, the third consecutive contraction and a larger decline than the -3.1% forecasted by Bloomberg analysts. The GDP shrank by 5.6% in 2020, its lowest year since 1998, and fell short of the government forecast of -3.5% to -5.5% (Shukry, 2021).

According to the research done by Ahmad et al. (2021), their goal was to determine how volatile stock prices were during the financial crisis. The multivariate model is used to analyze monthly time series data from 1996 to 2014, with the inclusion of a dummy variable for the financial crisis. To investigate stock price movements, the usual Ordinary Least Square (OLS) and Johannsen cointegration tests are used. The results of multivariate

research show that financial crisis has a negative and statistically significant relationship with stock price volatility. When a financial crisis occurs, a negative magnitude indicates that stock prices will fall. It has an effect on the stock market and causes it to be unstable. The financial crisis causes unstable stock price volatility because investors will tend to sell stocks that will cause them to lose money, lowering the price of that stock. Apart from this, the result from Ali and Afzal (2012) also determined that the stock return will be impacted detrimentally during the financial crisis. On top of that, the findings from Sakthivel, VeeraKumar, Raghuram, Govindarajan and Anand (2014) concluded that the worldwide economic crisis exerted a negative influence on the expected return and made the stock market become highly volatile. The results of the dummy variables for crisis done by Rjoub et al. (2017) also showed a negative link with stock prices. In other words, during the crisis, bank stock values fall as a result of a lack of confidence in the banking sectors, resulting in a price drop.

2.3 Proposed Theoretical Framework

Figure 2.1 shows a proposed theoretical framework that examines the relationship between the stock return with three bank-specific determinants, namely bank size, net interest margin (NIM), and non-performing loan ratio (NPL) as well as two macroeconomic determinants, specifically interest rate and exchange rate. Meanwhile, the financial crisis is also considered as one of the determinants. This research is to investigate the determinants of stock return of eight listed commercial banks in Malaysia with the bank-specific and macroeconomic factors from the period of 2011 to 2020.

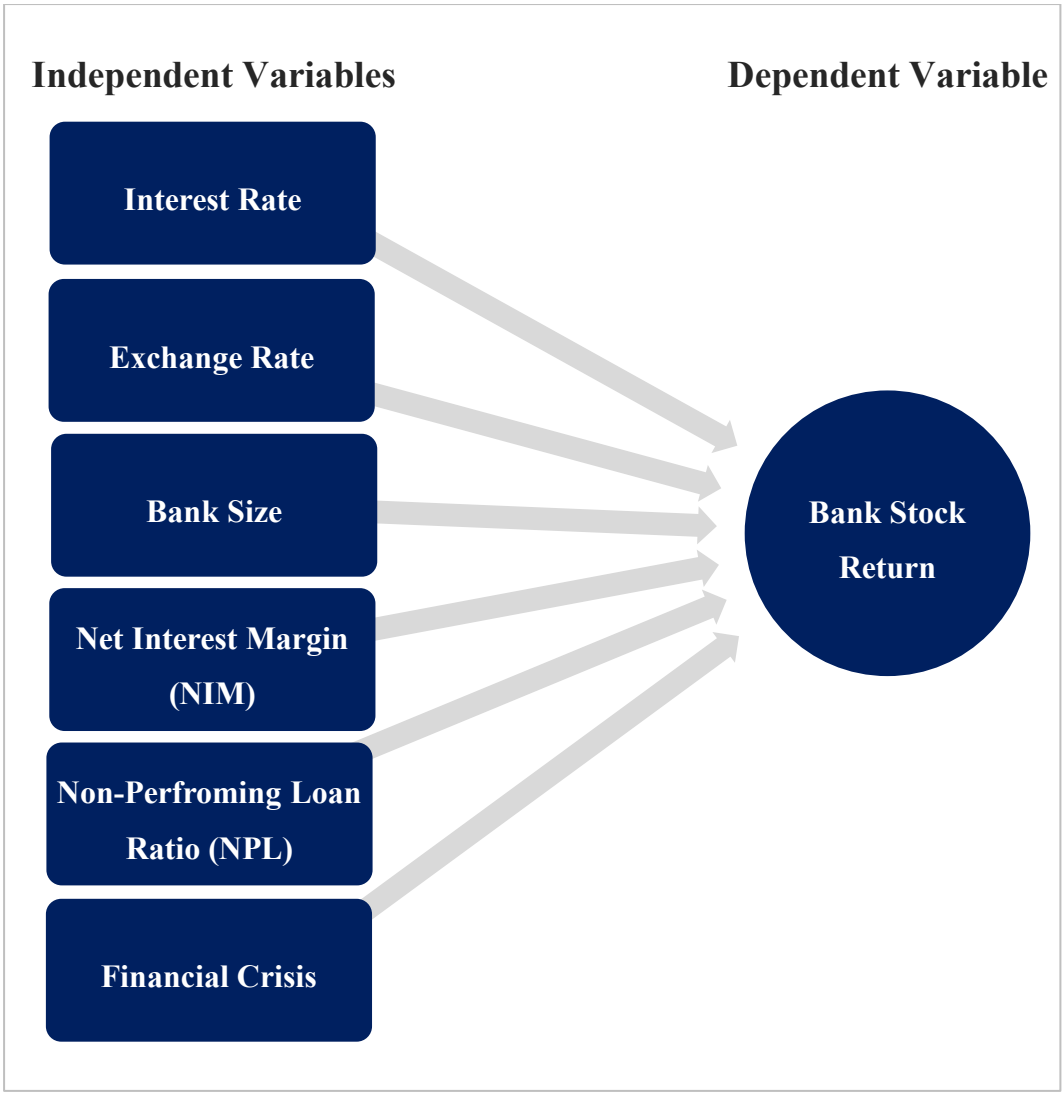

Figure 2.1. Proposed Theoretical Framework

2.4 Hypotheses Development

The hypotheses are stated to study the relationship between macroeconomic and bank internal factors concerned with the stock return of listed banks in Malaysia. The variables involved include interest rate, exchange rate, bank size, NIM, NPL, and financial crisis.

2.4.1 Interest Rate

H_0: There is no significant relationship between interest rate and bank stock return.

H_1: There is a significant relationship between interest rate and bank stock return.

The interest rate is a critical macroeconomic element that shows a direct relationship with the growth of the economy. The cost of capital, or the price paid for the usage of money over a period, is commonly referred to as the interest rate. The interest rate can be referred to as the borrowing cost from a borrower's view of point. The interest rate charged by a lender is the fee charged for lending money. The relationship between interest rates and the stock market can assist investors in determining how changes in both variables may affect the assets. They may also be better equipped to make more informed financial decisions as a good investor will always want to invest in a market that is efficient. In an efficient market, only a few people can make extraordinary profits, which leads to a loss of trust in the market among the broader public. When the bank deposit rate increases, the investors will typically shift their investment from the stock market to the bank deposits such as certificates of deposit and fixed deposits. The demand in the stock market makes the share price drop. On the flip side, the higher interest rate means the lending rate increase as well, and it will create constraints on public consumption and reduce investment in the economy, resulting in lower share price. Thus, the bank share price is inversely related to the interest rate (Alam & Uddin, 2009).

2.4.2 Exchange Rate

H_0: There is no significant relationship between exchange rate and bank stock return.

H_1: There is a significant relationship between exchange rate and bank stock return.

Generally, the exchange rate is related to the change of the expected stock return. According to Federal Reserve Bank of San Francisco (1996), a bank without foreign assets or liabilities can be exposed to currency risk because the exchange rate can affect the profitability of its domestic banking operations. For example, a bank in the United States offers a bank loan to a United States exporter. When the dollar appreciates, it will cause the United States exporter to face difficulties to compete with international companies. Besides, the United States exporter will also receive less amount of money when exchanging foreign currency to dollars. As a result, the profit of the exporter will reduce, and there is a high chance that the exporter will be unable to pay back the loan. In this case, the bank will also suffer losses. Hence, the bank has foreign currency exposure, where the appreciation of the currency will decrease bank profits. Besides, the foreign exchange rate will impact the bank via the consistent influence on the nature and degree of foreign competition, the demand for loans, as well as other banking aspects (Emerson, Fryer, Koehler, Paulin, Downen, Hamel & Wedd, 2021). Hence, the variation of the stock return is caused by the changes in the exchange rate because it will impact the bank profit, subsequently affecting the stock price. In short, the appreciation of the currency will make the bank profit decline, decreasing the bank stock price.

2.4.3 Bank Size

H_0: There is no significant relationship between bank size and bank stock return.

H_1: There is a significant relationship between bank size and bank stock return.

Bank size refers to the total assets owned by the bank as stated in the balance sheet or the size of the management scale. The relationship between bank size and bank stock return is expected to be positive. This is because a larger bank can reduce its cost and risk by having the advantage of economies of scale and a diversified loan portfolio (Lestari et al., 2021). Nonetheless, a small bank might not be able to do so. Besides, a larger bank generally has a better reputation and offers more variety of products compared to a smaller bank. Therefore, investors will be more willing to purchase large bank stock, leading to higher stock prices and greater stock returns. On top of that, a large bank will always be bailout by the government, which can be explained by the too big to fail, as Moosa (2010) mentioned. By having the safeguard of the government, the large bank stock becomes lower risk stock, and it will be more attractive to the investors. Greater demand for large bank stock contributes to higher stock returns in terms of capital gain.

2.4.4 Net Interest Margin (NIM)

H_0: There is no significant relationship between NIM and bank stock return.

H_1: There is a significant relationship between NIM and bank stock return.

NIM shows the cost of bank intermediation services and the efficiency of the bank, which can affect bank performance. In short, banks generate profit from NIM through interest activities (Ximenes, 2014). A positive value of the NIM shows an indication that the bank effectively and efficiently invests, whereas a negative value of the NIM implies that there are inefficient investments made by the bank. In the latter scenario, a bank may choose to take corrective action by shifting those assets towards more profitable investments or applying funds toward outstanding debt (Bloomenthal, 2021). Theoretically, a higher NIM would increase the profitability of the bank. Hence, it gives a positive signal to the investors on the stock price.

2.4.5 Non-Performing Loan Ratio (NPL)

H_0: There is no significant relationship between NPL and bank stock return.

H_1: There is a significant relationship between NPL and bank stock return.

Non-performing loan ratio (NPL), as an indicator of the asset quality of a bank, can be used to examine the overall condition of a bank because it measures the bank loan quality, and reflects its earnings. Theoretically, NPL is negatively related to the bank stock price. According to Hanks (2018), NPL assesses the effectiveness of a bank in collecting loan repayments. NPL also reflects the credit risk of a bank. The greater the amount of NPL, the larger the credit risk borne by the banking company, and hence, the lower quality of loan assets. When the bank's asset quality decreases, the bank needs to set aside more capital in order to cover the related credit risk and book higher provisions to prepare for the expected losses, leading to higher costs. Thus, it will reduce bank profitability, in turn affecting the decline in stock prices (Hakim et al., 2019).

2.4.6 Financial Crisis

H_0: There is no significant relationship between financial crisis and bank stock return.

H_1: There is a significant relationship between financial crisis and bank stock return.

The financial crisis in the year of 2020, namely the COVID-19 pandemic, has caused a global shock around the world. It has deteriorated both supply and demand chain in the global economy. From the point of view of the supply side, nationwide movement restrictions, temporary closedown of the businesses, declined labour production due to the infections, and social distancing disrupted the supply severely. From the perspective of the demand side, job cuts, suffering losses by businesses, and pessimism about the economic condition diminished the consumption and investment from individuals as well as corporations (Chudik, Mohaddes, Pesaran, Raissi & Rebucci, 2020). As a consequence, many countries, including Malaysia, suffered an economic recession. Amid the global recession, the stock market normally will be descent. Because of the gloomy financial environment, the stock market has become extremely volatile, and the share price will swing drastically. Investors have to react promptly to any sources of news regarding the stock market. To minimize the risk encountered, some investors will withdraw all their funds from the stock market and move to a safety cab ("The Impact of Recessions on Investors," 2021). In short, this shows that the financial crisis will bring a negative impact on stock prices and returns.

2.5 Conclusion

In short, Chapter 2 mainly focuses on discussing the summarized outcomes from the previous studies. The empirical results provide the researchers with knowledge of bank stock return and its determinants while aiding in constructing an appropriate theoretical model for this research.

CHAPTER 3: METHODOLOGY

3.0 Introduction

In this chapter, the methodology adopted in this research to accomplish the model will be discussed deeply. The research design, sampling design, research framework and data collection methods will be constructed and explained in detail in this chapter. Proposed data analysis tools also will be justified in this chapter.

3.1 Research Design

The main purpose of this research is to examine the macroeconomic and bank-specific determinants that affect the stock return of eight selected local commercial banks listed on Bursa Malaysia throughout the year from 2011 to the year 2020. The factors affecting the bank stock return include macroeconomic factors represented by interest rate and exchange rate and bank-specific factors represented by bank size, net interest margin (NIM), and non-performing loan ratio (NPL). Whereas, the financial crisis is included as the dummy variable. All the secondary data are collected from Bank Negara Malaysia (BNM) and Bloomberg on an annual basis.

Quantitative research is applied in this research by collecting well-prepared secondary data from online sources. Quantitative research is the process of collecting and analysing numerical data, and it can be applied to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations (Bhandari, 2021). Moreover, the correlation coefficients and assurance

coefficients are perceived to indicate the strength of the connection between the variables. Therefore, quantitative research is a crucial part of the approach.

Stata as well as EViews 12, econometric software programs, have been chosen to be the main analysis tool in conducting the hypothesis testing in this research. Stata and EViews 12 are the tools that help in developing the statistical relation based on data and analyzing of the collection data which is panel data in bid to verify the correlation between the response variable with the explanatory variables in this research.

3.2 Sampling Design

3.2.1 Target Population

Throughout the whole research, the main targeted population is set to be the banking industry listed on Bursa Malaysia. This research used eight listed local commercial banks that operate in Malaysia, which is in line with the research topic. The data availability for all these banks is contributed to the main factor in choosing these eight banks as the target population. Table 3.1 shows the list of the banks that have been chosen for this research.

Table 3.1:

List of Local Commercial Banks in Malaysia

No.	Name of Banks
1.	Alliance Bank Malaysia Berhad (ABMB)
2.	Affin Bank Berhad (AFFIN)
3.	AMMB Holdings Berhad (AMBANK)
4.	CIMB Group Holdings Berhad (CIMB)
5.	Hong Leong Bank Berhad (HLBANK)
6.	Malayan Banking Berhad (MAYBANK)
7.	Public Bank Berhad (PBBANK)
8.	RHB Bank Berhad (RHBBANK)

3.2.2 Sampling Size

A large sample size can provide a more precise outcome and allow researchers to examine significant test effect better. Thus, a total number of 80 observations has been collected as the sample size of the data in this research. All the data are collected on an annual basis, consisting of 10 years of data from the year 2011 to the year 2020 for eight different Malaysia listed commercial banks.

3.3 Data Collection Methods

3.3.1 Secondary Data

A secondary data collection method is applied in this research. Secondary data refers to those existing data that has previously been collected by other researchers and can be accessed by others. Secondary data collection is relatively cost-effective and can be easily obtained compared to primary data. Particularly amid the pandemic, it is quite challenging to collect primary data from the public physically. The secondary data used in this research is mainly composed of the government agency such as BNM and Bloomberg.

3.3.2 Research Framework

This research investigates the relationship between macroeconomic and bank-specific determinants and bank stock return in Malaysia. Bank stock return is chosen as the dependent variable in this research, whilst macroeconomic factors represented by interest rate and exchange rate and bank-specific factors represented by bank size, NIM, and NPL are the independent variables used in this research. At the same time, the dummy variable to measure the financial crisis is also included as the independent variable in this research.

Panel data regression model:

$$lnBSR_{it}=\beta_0+\beta_1 IR_{it}+\beta_2 lnER_{it}+\beta_3 lnSize_{it}+\beta_4 NIM_{it}+\beta_5 NPL_{it}+\beta_6 DCrisis_{it}+\mu_{it}$$

(Equation 3.1)

Where:

lnBSR = Bank stock return in term of log return

IR = Interest rate with the proxy of 3-month treasury bill rate

lnER = Exchange rate in natural logarithm form

lnSize = Bank size in natural logarithm form

NIM = Net interest margin

NPL = Non-performing loan ratio

DCrisis = 1, if year 2020; 0, otherwise

Subscript i = Banks (ABMB, AFFIN, AMBANK, CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK)

Subscript t = Period in annual basis from 2011 to 2020

β = Model estimation parameters

μ = Error term

3.3.3 Variables Description

Table 3.2 describes the definition of each variable used in this research.

Table 3.2:

Definition of Variables

Variables		Definition
Dependent Variable	Bank Stock Return (lnBSR)	Bank stock return refers to the gains or losses incurred when holding a stock within a range of periods (Radha et al., 2019).
Macroeconomic Variables	Interest Rate (IR)	The interest rate is the cost to borrow money or the return for lending money (Banton, 2021).
	Exchange Rate (lnER)	The exchange rate is the comparison between MYR value and USD value (Chen, 2020).
Bank-specific Variables	Bank Size (lnSize)	Bank size indicates the total asset and the scale of management owned by a bank (Lestari et al., 2021).
	Non-performing Loan Ratio (NPL)	Non-performing loan ratio measures the efficiency of banks in investment decisions and policies (Kagan, 2021).
	Net Interest Margin (NIM)	Net interest margin measures the net interest income from credits products after deducting the outgoing interest (Bloomenthal, 2021).
Dummy Variable	Financial Crisis (DCrisis)	The financial crisis is the dummy variable to measure the COVID-19 pandemic crisis, where the dummy variable equals to 1 if year 2020, and 0, otherwise.

3.3.4 Sources of Data

Table 3.3 shows the sources of the data of each variable used in this research.

Table 3.3:

Sources of Data

Variable	Proxy	Formula	Unit Measurement	Source
lnBSR	Changes of Bank Share Price	$\log_e \frac{\text{Share Price}_t}{\text{Share Price}_{t-1}}$	Percentage	Bloomberg
IR	3-months Treasury Bill Rate	-	Percentage	Bank Negara Malaysia
lnER	Exchange Rate of MYR/USD	$\log_e$Exchange Rate	Percentage	Bank Negara Malaysia
lnSize	Bank Total Asset	$\log_e$Bank Total Asset	Percentage	Bloomberg
NIM	Earnings	$\frac{\text{Net Interest Income}}{\text{Total Earning Assets}}$	Percentage	Bloomberg
NPL	Asset Quality	$\frac{\text{Non-performing Loan}}{\text{Gross Loan}}$	Percentage	Bloomberg
DCrisis	Covid-19 Pandemic	-	-	-

3.4 Proposed Data Analysis Tools

3.4.1 Preliminary Test

3.4.1.1 Unit Root Test: Levin-Lin-Chu (LLC) Test

Stationarity involves the concept of consistency of distribution. The series only shows stationary when the distributions such as mean and variance of the variable are the same at different locations of the time, holding the period length constant. To deal with trend and seasonal variables, the differencing approach is commonly applied to find out the stationarity of the variable. A nonstationary series can produce spurious results when regressing econometric modelling, leading to inadequate forecasting and understanding.

Levin-Lin-Chu (LLC) unit root will be adopted to examine whether the variables have a unit root. LLC test imposes the restriction that all balanced panels share a common autoregressive. Furthermore, the augmented LLC test with additional lags helps mitigate the serial correlation that existed because of the assumption. The LLC assumes the idiosyncratic errors to be independently distributed across the panels, and the errors will thus follow a stationary invertible autoregressive moving average process for each panel parameter. The LLC test is allowed to be adjusted accordingly to create conditions plausible with microeconomic and macroeconomic datasets. The LLC test is recommended with a moderate-sized balanced panel model, 25 to 250 observations. The LLC test also works pretty well when the

requirement N/T is approximate to zero, implying the N is smaller than T ("xtunitroot – Panel-Data Unit-Root Tests," 2020).

The hypothesis of the unit root test is represented as below:

H_0: The time series contains a unit root.

H_1: The time series does not contain a unit root.

Decision Rule: Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.

3.4.1.2 Multicollinearity

Exact collinearity indicates the existence of the perfect linear relationship between two covariates, for example, two independent variables. One variable can be explained by another variable. The removal of the variable with exact collinearity will not cause a loss of information from the regression model. When such a collinearity relationship exists among more than two independent variables in a model, the scenario can now be defined as multicollinearity (Kim, 2019). Multicollinearity arises because of the adding of unrelated explanatory variables into modelling, increasing the chances that the added variables are correlated with others.

The consequence of multicollinearity is leading the estimated outcome to forecasting error. Multicollinearity will enlarge the standard error of the variable's coefficient, making them become insignificant in the Student's T-test. The misleading outcomes might make researchers omit important explanatory variables when assessing the significance of the variables (Kumari, 2008).

There is no formal test to identify the presence of multicollinearity. Thus, few informal methods can be applied. For example, researchers can simply observe the pairwise correlation matrix among the variables. A high correlation between the two variables might be a sign of collinearity. The other way to detect multicollinearity is a high coefficient of determination R^2 but fewer significant regression coefficients. High R^2 ($R^2 > 0.8$) indicates the overall model is significant, while insignificant variables mean the estimated parameter of the variables are not significant to explain the model. The third method is observing the Variance Inflation Factor (VIF) and Tolerance (TOL) value. The equation for VIF is:

$$\frac{1}{1-R^2}$$

Where $R^2 = 0$ indicates no multicollinearity, $R^2 = 1$ indicates the presence of exact multicollinearity. TOL is the reciprocal of VIF, $1-R^2$. The thumb of rule is the VIF shows the figure above 10 while TOL is lower than 0.1, closing to 0, multicollinearity exists. Although the VIF method is useful to detect multicollinearity, it cannot determine the regressors causing multicollinearity.

Multicollinearity is a data deficiency issue. Therefore, no remedial measures can be applied to overcome the problem. If multicollinearity is weak, researchers are advised to ignore it. However, when the multicollinearity is strong, the troubled variables which are highly correlated can be removed, but this can cause specification bias (Gujarati & Porter, 2009).

3.4.2 Diagnostic Checking

3.4.2.1 Autocorrelation: Wooldridge Test

The problem of autocorrelation arises when the idiosyncratic errors are correlated with each other over time, where $\text{cov}(\varepsilon_{it},\varepsilon_{ij}) \neq 0$. Autocorrelation will violate the Best Linear Unbiased Estimator (BLUE) assumption of Ordinary Least Square (OLS). The existence of autocorrelation in panel models will bias the estimated standard errors, and the estimated parameters become less efficient.

The Wooldridge test proposed by Wooldridge, as cited in Drukker (2003), is applied to determine the presence of autocorrelation. The Wooldridge test is relatively more flexible because it requires fewer restrictions than others. To apply the Wooldridge test, first differencing the linear one-way model and removing the time-invariant variables and constant.

$$\Delta Y_{it} = \Delta X_{it}\beta_1 + \Delta\varepsilon_{it}$$

$\Delta\varepsilon$ and $\Delta\varepsilon_{it-1}$ is supposed to be -0.5 if they are not serially correlated. The first step of the Wooldridge test is regressing the changes of the dependent variable on changes of the independent variable to estimate the parameter β_1 and obtain error term $\hat{\mu}_{it}$. Then, regress the $\hat{\mu}_{it}$ from the equation with the first-differenced variables on their lags. In the light of the correlation observation, the autocorrelation problem can be verified through testing whether the lagged error term is equal to -0.5. In addition, Wooldridge's method is robust to conditional heteroscedastic idiosyncratic error terms since the variance covariances matrix of estimators is restructured for clustering at the panel level (Drukker, 2003).

The hypothesis of the autocorrelation test is represented as follow:

H_0: There is no serial correlation in the error term.

H_1: There is serial correlation in the error term.

Decision Rule: Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.

3.4.2.2 Heteroscedasticity: Breusch-Pagan / Cook-Weisberg Test

Homoscedasticity is one of the critical assumptions that must be fulfilled when regressing a classical linear model. Heteroscedasticity indicates that the variance of the error term varies over time. Once the homoscedasticity assumption is violated, the estimated model is biased, and statistical inferences are invalid because the model is no longer BLUE. The estimated parameter is also not efficient because the minimum variance cannot be identified. The main causes of heteroscedasticity are the presence of outliers in data and the omission of regressors. There are two types of heteroscedasticity, unconditional and conditional heteroscedasticity. Under conditional heteroscedasticity, the changes of the variance are predictable, and the variables are cyclical in nature. On the flip side, the conditional heteroscedasticity is unpredictable, and there is no tell-tale sign regarding the scattering of data (Gujarati et al., 2009). The most common used heteroscedasticity test, which is Breusch-Pagan / Cook-Weisberg Test, will be employed in this research.

The hypothesis of the heteroscedasticity test is represented as below:

H_0: There is homoscedasticity.

H_1: There is heteroscedasticity.

Decision Rule: Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.

3.4.2.3 Normality: Jarque-Bera Test

The idiosyncratic error is always assumed to be normally distributed in a classical normal linear regression model. Otherwise, the result is considered invalid. The significance of the coefficient becomes unreliable and meaningless. In this research, the Jarque-Bera (JB) normality test is applied in order to identify the distribution of the error terms of the model before running any regression analysis (Gujarati et al., 2009).

The JB test will first compute the skewness and kurtosis coefficient of the OLS residual to identify its goodness of fit. For a normally distributed error, the S is supposed to be 0, and K=3, the joint hypothesis can come out with the JB statistic value to be zero. The formula of the JB test statistic is shown as below:

$$JB=n\left[\frac{S^2}{6}+\frac{(K-3)^2}{24}\right]$$

Where:

n = Sample size

S = Skewness coefficient

K = Kurtosis coefficient

The hypothesis of the normality test is represented as follow:

H_0: There is a normal distribution of the error terms.

H_1: There is no normal distribution of the error terms.

Decision Rule: Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.

3.4.3 Panel data regression

Panel regression refers to the combination of time series and cross-sectional datasets, having space and time dimensions at the same time. It has a double subscript on its regressors. The prominent characteristic of panel regression is the taking account of individual heterogeneity into the estimation. The panel regression can provide more informative and efficient results to researchers. The panel regression can also capture complex behavioural effects that pure time-series and cross-sectional data unable to do so. The drawbacks of panel data are a distortion of measurement error leading to unreliable results, selectivity problems such as self-selectivity and non-response, and lastly cross-sectional dependence (Baltagi, 2005). The panel model that will be included in the following content is Feasible Generalized Least Square (FGLS).

3.4.3.1 Feasible Generalized Least Square (FGLS)

In the presence of serial correlation and heteroscedasticity in a linear panel data model, the outcome of simple pooled OLS estimation becomes severely biased and unreliable because of the inefficient estimator. In the following situations, Feasible Generalised Least Square (FGLS) will be adopted. Taking into consideration of heteroscedasticity and serial correlation in model, FGLS estimation can obtain more efficient estimators compared to pooled OLS (Liao, Choi & Bai, 2020). The FGLS is practically useful when the covariance matrix is unknown. The prior requirement is that the time dimension of the panel model is larger than its cross-sectional dimension, where T>N. The FGLS tends to produce optimistic standard error only when the feasibility is ensured (Hoechle, 2007).

3.5 Conclusion

In conclusion, this chapter has covered research and sampling design as well as the methods of collecting the data. Besides, the data analysis tools have also been proposed in this chapter. All the required data will be imported into the Excel worksheet, and the data analysis will be made using Stata and EViews 12. The computed results will be revealed in the following chapter.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

Chapter 4 shows the data results computed by using Stata and EViews 12 and makes the interpretation on the results. The tests conducted in this chapter include preliminary test, diagnostic checking, and panel data regression, as discussed in Chapter 3. There are two sections that can be divided in this chapter, comprising of descriptive analysis as well as inferential analysis.

4.1 Descriptive Analysis

Table 4.1 shows the descriptive analysis of both dependent and independent variables, where the descriptive statistics, for instance, minimum value, maximum value, mean, median, standard deviation, and Jarque-Bera value, are included. Bank stock return, exchange rate, and bank size are represented in the form of natural logarithms while interest rate, net interest margin (NIM), non-performing loan ratio (NPL) are measured in percentage.

From the period of 2011 to 2020, the bank stock return recorded a minimum value of -0.3799 and a maximum value of 0.4137. The lowest value is primarily due to the financial crisis caused by the COVID-19 pandemic in the year 2020. The mean, median and standard deviation of the bank stock return are derived as 0.0259, 0.0386, and 0.1502 respectively. Meanwhile, the p-value of the Jarque-Bera for the bank stock return is 0.4053, which is greater than the significant level of 5%, indicating the bank stock return is normally distributed.

Table 4.1:

Descriptive Statistics

	lnBSR	IR	lnER	lnSize	NIM	NPL
Minimum	-0.3799	2.0210	1.1178	17.4010	1.3000	0.4000
Maximum	0.4137	3.2305	1.5010	20.5688	2.8800	5.1100
Mean	0.0259	2.9235	1.3292	19.0732	1.9448	1.8875
Median	0.0386	3.0165	1.3956	19.1098	1.9100	1.8100
Standard Deviation	0.1502	0.3297	0.1312	0.8742	0.3496	0.9985
Jarque-Bera	1.8062	78.3105	8.7117	3.9288	2.4496	4.9409
	(0.4053)	(0.0000)	(0.0128)	(0.1402)	(0.2938)	(0.0845)

Note. The p-value of the Jarque-Bera Test is shown in parenthesis.

The interest rate with the proxy of the 3-months treasury bill rate has a value ranging from 2.0210 to 3.2305. The minimum value of 2.0210 is mainly due to the recession during the pandemic as well as the decision of the Monetary Policy Committee of BNM to lower the interest rate. The interest rate is amounted to 2.9235 on average while the median is computed as 3.0165. The standard deviation of the interest rate is 0.3297, and the p-value of the Jarque-Bera Test is 0.0000.

Besides, the exchange rate recorded a minimum value of 1.1178 and a maximum value of 1.5010. The average value of the exchange rate is 1.3292 whilst the middle value of the exchange rate is determined as 1.3956. The standard deviation of the exchange rate is 0.1312, which is the lowest value among all variables. At the same time, the p-value of the Jarque-Bera Test for the exchange rate is 0.0128.

Throughout the period from 2011 to 2020, the value of bank size ranged from 17.4010 to 20.5688. The highest value of the bank size is primarily contributed by Maybank, which is always known as the largest bank in Malaysia. On average, the

bank size is amounted to 19.0732, which is slightly lower than the median of 19.1098. The standard deviation of the bank size is derived as 0.8742 while the p-value of the Jarque-Bera for the bank size is 0.1402, revealing that the bank size is normally distributed.

The minimum value and the maximum value of the NIM from 2011 to 2020 are 1.30 and 2.88, respectively. At the same time, the mean value and median value of the NIM are computed as 1.9448 and 1.9100, where the mean is greater than the median. The standard deviation of the NIM is recorded as 0.3496. The NIM recorded a p-value of 0.2938 in the Jarque-Bera. It means that there is a normal distribution in the NIM because the p-value is amounted larger compared to the 5% significant level.

NPL has the values ranging from a minimum of 0.40 to a maximum of 5.11. Throughout the period, NPL has an average value of 1.8875 and the middle value of 1.8100 in the data set. Meanwhile, the standard deviation of the NPL is amounted to 0.9985, which is the largest value among all variables. It indicates that the data of NPL are spread out over a wider range of values. The p-value of the NPL in the Jarque-Bera Test is 0.0845, proving that the NPL is normally distributed at the significant level of 5%.

4.2 Inferential Analysis

In the inferential analysis, the methodology of this research will be further discussed in detail via providing the result evidence generated from the Stata software as well as a complete interpretation of the results.

4.2.1 Preliminary Test

4.2.1.1 Unit Root Test: Levin-Lin-Chu (LLC) Test

Table 4.2:

Result of Levin-Lin-Chu (LLC) Test

Variables	Stationary	Statistics	p-value
lnBSR	Level	-6.8182***	(0.0000)
IR	Level	-4.2706***	(0.0000)
lnER	Level	-1.9888**	(0.0234)
lnSize	Level	-5.4959***	(0.0000)
NIM	Second Difference	-2.8958***	(0.0019)
NPL	First Difference	-2.7488***	(0.0030)

Note. ***, **, and * denote stationary at significant level of 1%, 5%, and 10% respectively.

Table 4.2 represents the Levin-Lin-Chu (LLC) unit root test result by adopting the analytic tool, Stata. Under the null hypothesis of the LLC test, the series is non-stationary in nature. LLC test without placing the time trend indicates the panel datasets, which are company internal factors since the time dimension, T, usually increases at a slower rate compared to the cross-sectional dimension, N, if $\frac{\sqrt{N}}{T} \rightarrow 0$. Vice versa, in the circumstance of macroeconomic variable, the T is increasing at a higher rate compared to the N, if $\frac{N}{T} \rightarrow 0$. Thus, the time trend is included to make the test more plausible (Levin, Lin & Chu, 2002; "xtunitroot – Panel-Data Unit-Root Tests," 2020). In this research, the unit root tests against variables bank stock return (lnBSR), bank size (lnSize), net interest margin (NIM), and non-performing loan ratio (NPL) are examined without time trend, while the variables such

as interest rate (IR) and exchange rate (lnER) are examined with the adding of a time trend.

The result of the LLC test indicates that there are three variables, namely bank stock return, interest rate, and bank size, showing stationary at level at 1% significant level while only one variable, exchange rate, is stationary at level at 5% significant level. On the other hand, the rest, NIM and NPL, are not stationary at level unit root test because of their inconsistent statistical property. Therefore, applying the differencing approach by computing the difference among the continuous series. It helps stabilize the unstable mean effectively, thus eliminating the trend and making the non-stationary time series stationary. Besides, non-stationary variables are encouraged to be measured in natural logarithm form because the log transformation can help stabilize the standard deviation between consecutive observations (Hyndman & Athanasopoulos, 2018). In this research, NIM and NPL have already been measured in percentage form. Therefore, log transformation is only applied to bank stock return, exchange rate and bank size.

In the first difference of the LLC test, NPL turns stationary at the significant level of 1% while the NIM still remains as non-stationary as at level form. Therefore, second differencing is applied to NIM to ensure the NIM become stationary at the significant level of 1%.

4.2.1.2 Multicollinearity

Table 4.3:

Correlation Matrix between Independent Variables

	IR	lnER	lnSize	NIM	NPL	DCrisis
IR	1.0000					
lnER	-0.1545	1.0000				
lnSize	-0.0577	0.1560	1.0000			
NIM	0.2539	-0.5128	0.2873	1.0000		
NPL	-0.0258	-0.2681	-0.1375	0.3901	1.0000	
DCrisis	-0.9182	0.1543	0.0811	-0.3152	-0.0181	1.0000

Table 4.3 indicates the correlation matrix between the explanatory variables in this research, which are interest rate, exchange rate, bank size, NIM, NPL, and financial crisis. The correlation matrix reveals that no serious multicollinearity is found among all six variables since the correlation is not higher than 0.80, except for the variables of interest rate and financial crisis, which have a correlation of -0.9182.

Table 4.4:

Variance Inflation Factor (VIF) and Tolerance (TOL) Results

	VIF	TOL
IR	6.60	0.1516
lnER	1.61	0.6204
lnSize	1.47	0.6810
NIM	2.34	0.4271
NPL	1.33	0.7506
DCrisis	7.00	0.1428

The result of the correlation matrix is further supported by the Variance Inflation Factor (VIF) as well as Tolerance (TOL), as shown in Table 4.4. As long as the degree of VIF is greater than 10 or the degree of TOL is smaller than 0.1, then there will be the multicollinearity issue. It means that none of the variables has the issue of multicollinearity, including interest rate and financial crisis, which showed multicollinearity issue in the correlation matrix, since interest rate recorded VIF degree of 6.60 and TOL of 0.1516 while financial crisis showed VIF degree of 7.00 and TOL of 0.1428.

Even though there is slight multicollinearity between interest rate and financial crisis, both variables are still included in this research since omitting any variable might cause a more problematic issue. According to Lindner, Puck and Verbeke (2020), in a regression model, a high VIF means that the coefficient variance is too large, instead of too small, and it is larger than the independent variables that have no correlation. This subsequently leads to larger standard errors, showing that the significance results under high VIF underestimate the statistical significance, but not overestimate it. Therefore, the significant results could be considered conservative. On the other hand, omitting any variable that has correlation might cause too low standard errors, resulting in biased and spurious significant results. Most importantly, multicollinearity does not make the model biased. It is not an econometric problem that would not affect the regression coefficients.

4.2.2 Diagnostic Checking

Table 4.5:

Diagnostic Checking Results

Type of Test	Statistics	p-value
Wooldridge Test	3.9310*	(0.0878)
Breusch-Pagan / Cook-Weisberg Test	7.9800***	(0.0047)
Jarque-Bera Test	2.5872	(0.2743)

Note. ***, **, and * denote significant level at 1%, 5%, and 10% respectively.

The diagnostic checking results are summarized in Table 4.5, where Wooldridge Test detects autocorrelation, Breusch-Pagan / Cook-Weisberg Test verifies heteroscedasticity, and Jarque-Bera Test identifies the normal distribution of the model.

4.2.2.1 Autocorrelation: Wooldridge Test

Table 4.6:

Hypothesis Testing of Wooldridge Test

Hypothesis	H_0 = There is no serial correlation in the error term. H_1 = There is a serial correlation in the error term.
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.0878
Decision Making	Do not reject H_0 since the p-value (0.0878) is greater than the significant level (5%).
Conclusion	There is no serial correlation in the error term.

Table 4.6 shows the hypothesis testing of the Wooldridge Test, which is to verify the autocorrelation, and the result reveals that there is no issue of autocorrelation. Therefore, the model is reliable.

4.2.2.2 Heteroscedasticity: Breusch-Pagan / Cook-Weisberg Test

Table 4.7:

Hypothesis Testing of Breusch-Pagan / Cook-Weisberg Test

Hypothesis	H_0 = There is homoscedasticity. H_1 = There is heteroscedasticity.
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.0047
Decision Making	Reject H_0 since the p-value (0.0047) is less than the significant level (1%).
Conclusion	There is heteroscedasticity.

The hypothesis testing of heteroscedasticity, specifically the Breusch-Pagan / Cook-Weisberg Test, is indicated in Table 4.7. The conclusion drawn signals that heteroscedasticity presents in the model. In order to solve the heteroscedasticity, a proposed model, namely Feasible Generalized Least Square (FGLS), will be used in this research, and its results will be discussed further in the later section.

4.2.2.3 Normality: Jarque-Bera Test

Table 4.8:

Hypothesis Testing of Jarque-Bera Test

Hypothesis	H_0 = There is a normal distribution of the error terms. H_1 = There is no normal distribution of the error terms.
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.2743
Decision Making	Do not reject H_0 since the p-value (0.2743) is greater than the significant level (10%).
Conclusion	There is a normal distribution of the error terms.

Table 4.8 shows the hypothesis testing of the Jarque-Bera Test, which is carried out to discover the normality. According to the computed data, it indicates that the model has a normal distribution of the error terms.

4.2.3 Feasible Generalized Least Square (FGLS)

lnBSR=1.4403-0.3755IR-0.4505lnER+0.0265lnSize-0.0695NIM

-0.0281NPL-0.3984DCrisis (Equation 4.1)

Table 4.9:

Result of Feasible Generalized Least Square (FGLS) Regression

Dependent Variable: lnBSR			
Independent Variables	**Coefficient**	**Statistics**	**p-value**
IR	-0.3755	-3.73***	(0.000)
lnER	-0.4505	-3.34***	(0.001)
lnSize	0.0265	1.52	(0.130)
NIM	-0.0695	-1.08	(0.281)
NPL	-0.0281	-1.66*	(0.098)
DCrisis	-0.3984	-3.45***	(0.001)
c	1.4403	3.10***	(0.002)

Note. ***, **, and * denote significant level at 1%, 5%, and 10% respectively.

The computed results of FGLS are presented in Table 4.9. This research selected the option of coding with panels(hetero) and without corr(ar1) in running FGLS by using Stata. The reason behind this is because the model has the features of heteroscedasticity as well as no autocorrelation, which is exactly fit to the model in this research. The bank stock return (lnBSR) is represented as the dependent variable in this research, while the rest of the variables act as the independent variables. Interest rate (IR) and exchange rate (lnER) are macroeconomic variables, while bank size (lnSize), net interest margin (NIM), and non-performing loan ratio (NPL) are bank-specific determinants. The financial crisis (DCrisis) is in the form of a dummy variable.

4.2.3.1 Interest Rate (IR)

Table 4.10:

Hypothesis Testing of Interest Rate (IR)

Hypothesis	H_0:β_1=0 H_1:$\beta_1 \neq 0$
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.000
Decision Making	Reject H_0 since the p-value (0.000) is less than the significant level (1%).
Conclusion	There is a relationship between interest rate and bank stock return at the significant level of 1%.
Interpretation	$\widehat{\beta_1} = -0.3755$ If the interest rate increases by 1 percentage point, on average, the bank stock return of ABMB, AFFIN, AMBANK, CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK will decrease by 37.55%, respectively, over the period from 2011 to 2020, ceteris paribus.

Based on Table 4.10, there is a negative and significant relationship between interest rate and bank stock return. The result clearly shows consistency with the research done by Mugambi et al. (2016), who found that when interest rates rise, more investors will direct their assets to the money market, for instance, purchasing treasury bills, in order to take advantage of the higher expected returns than the stock market as a whole. As a result, demand for stocks diminishes, and prices fall as well. Furthermore, this research is supported by Tu (2012), who found that interest rates have a negative and

significant impact on the banking industry's stock return because when interest rates rise, consumers will save money rather than invest it. On top of that, AL-Shubiri (2010) supported that there is a negative coefficient of the lending interest rate and significantly affects the stock price when the interest rate is high. The investors' access to cash is limited, resulting in a negative influence on the stock price.

4.2.3.2 Exchange Rate (lnER)

Table 4.11:

Hypothesis Testing of Exchange Rate (lnER)

Hypothesis	H_0:β_2=0 H_1:$\beta_2 \neq 0$
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.001
Decision Making	Reject H_0 since the p-value (0.001) is less than the significant level (1%).
Conclusion	There is a relationship between exchange rate and bank stock return at the significant level of 1%.
Interpretation	$\widehat{\beta_1} = -0.4505$ If the exchange rate increases by 1%, on average, the bank stock return of ABMB, AFFIN, AMBANK, CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK will decrease by 0.45%, respectively, over the period from 2011 to 2020, ceteris paribus.

Table 4.11 shows the hypothesis testing of the exchange rate, and the conclusion reveals that there is a negative and significant relationship between exchange rate and bank stock return. The significant and negative relationship is proven by Chucks et al. (2021), who claim that the lower the exchange rate, the lower the price of the stock, as there is a sharp drop in the share price of the listed banks while the exchange rate has risen dramatically. Moreover, the result is in line with the research of Mehta (2019), who found that currency volatility has a substantial impact on the stock market returns of overseas investors in general. The foreign investors could obtain a larger value for their money as the currency depreciates, but at the same time, the depreciation would also reduce their profits during the time that they convert local currency to foreign currency for repatriation. In addition, the research conducted by Veronika et al. (2021) proves that the exchange rate negatively impacts the bank share price as investors reacted unfavourably to the fall of the currency rate, as seen by the drop in bank share prices. When there is depreciation, investors rectify their shares because they believe the present stock value is too high compared to the intrinsic value of the stock at this moment or in the future.

4.2.3.3 Bank Size (lnSize)

Table 4.12:

Hypothesis Testing of Bank Size (lnSize)

Hypothesis	H_0:β_3=0 H_1:$\beta_3 \neq 0$
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.130
Decision Making	Do not reject H_0 since the p-value (0.130) is greater than the significant level (10%).
Conclusion	There is no relationship between bank size and bank stock return at the significant level of 10%.
Interpretation	$\widehat{\beta_3} = 0.0265$ If the bank size increases by 1%, on average, the bank stock return of ABMB, AFFIN, AMBANK, CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK will increase by 0.03%, respectively, over the period from 2011 to 2020, ceteris paribus.

Table 4.12 shows that the bank size is insignificantly and positively related to the bank stock return. The positive relationship is found to be similar with majorities of the previous research paper (Pradhan et al., 2016; Wadud, 2017; Nepal, 2018; Hossain, 2020). Generally, the stock of large banks is transacted frequently and possesses high marketability in the equity market. The high liquidity features contribute to a higher banking share price (Gandhi & Lustig, 2015). Wadud (2017) also stated that a large bank with tremendous asset volume has better access to investment opportunities compared to the smaller one. Thus, the well-diversified portfolio makes the

investment yield of large banks is typically higher, ending up with excellent financial performance. The insignificant result between bank size and stock return is supported by Ardiansyaha et al. (2020), who investigated the effect of bank size on the banking shares in Indonesia. In addition, Bhattarai (2014) also obtained a similar insignificant result where the bank size is not relevant to explaining banking stock changes.

4.2.3.4 Net Interest Margin (NIM)

Table 4.13:

Hypothesis Testing of Net Interest Margin (NIM)

Hypothesis	H_0:β_4=0 H_1:$\beta_4 \neq 0$
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.281
Decision Making	Do not reject H_0 since the p-value (0.281) is greater than the significant level (10%).
Conclusion	There is no relationship between NIM and bank stock return at the significant level of 10%.
Interpretation	$\widehat{\beta_4} = -0.0695$ If NIM increases by 1 percentage point, on average, the bank stock return of ABMB, AFFIN, AMBANK, CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK will decrease by 6.95%, respectively, over the period from 2011 to 2020, ceteris paribus.

Table 4.13 shows that NIM is insignificantly and negatively related to the bank stock return. The negative relationship between the variables is proven by Wijayanti (2010) and Endri (2020), who claimed that NIM negatively affects the bank stock price. Furthermore, the insignificant relationship between NIM and bank stock return is supported by Indiani et al. (2016). The NIM information is insufficient to give any investment signal for investors. In other words, a high NIM ratio does not indicate that the banks are making a large profit due to huge corporate operating costs incurred. The results are similar to the study of Nurazi et al. (2016), which revealed that NIM does not perform a significant contribution toward stock returns.

4.2.3.5 Non-performing Loan Ratio (NPL)

Table 4.14:

Hypothesis Testing of Non-performing Loan Ratio (NPL)

Hypothesis	H_0:β_5=0 H_1:$\beta_5 \neq 0$
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.098
Decision Making	Reject H_0 since the p-value (0.098) is less than the significant level (10%).
Conclusion	There is a relationship between NPL and bank stock return at the significant level of 10%.
Interpretation	$\widehat{\beta_5} = -0.0281$ If NPL increases by 1 percentage point, on average, the bank stock return of ABMB, AFFIN, AMBANK,

CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK will decrease by 2.81%, respectively, over the period from 2011 to 2020, ceteris paribus.

Table 4.14 shows that there is a negative and significant relationship between NPL and bank stock return. The findings align with the study conducted by Sujarwo (2015), who found that the NPL has a negative and significant effect on the bank stock price. Furthermore, the negative relationship between NPL and bank stock return is also proven by Poudel (2017), in which the smaller the bank's NPL, the healthier the bank's condition. Since the bank's condition is healthy, it can generate better profit, and the market will value this situation in the rising of the share price. The similar result is also shown in the study of Rjoub et al. (2017), which revealed that NPL is significantly and negatively related to the bank stock price as poor bank management reduces the bank asset quality, subsequently lowering the bank performance. Generally, investors behave lower confidence towards any bank with substandard performance. Hence, they tend to withdraw investments from those banks with unsatisfactory performance.

4.2.3.6 Financial Crisis (DCrisis)

Table 4.15:

Hypothesis Testing of Financial Crisis (DCrisis)

Hypothesis	H_0:β_6=0 H_1:$\beta_6 \neq 0$
Significance Level	1% / 5% / 10%
Decision Rule	Reject H_0 if the p-value is less than the significant level. Otherwise, do not reject H_0.
p-value	0.001
Decision Making	Reject H_0 since the p-value (0.001) is less than the significant level (1%).
Conclusion	There is a relationship between financial crisis in the year 2020 and bank stock return at the significant level of 1%.
Interpretation	$\widehat{\beta_6}$= -0.3984 100 × [exp (-0.3984) – 1] = 100 × (0.6714 – 1) = -32.86% On average, the bank stock return of ABMB, AFFIN, AMBANK, CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK during the financial crisis in the year 2020 is lower than the period before the financial crisis by 32.86%, respectively, ceteris paribus.

Based on Table 4.15, the financial crisis in the year 2020 is significantly and negatively related to the bank stock return. The negative relationship between the variables is supported by Ahmad et al. (2021), who claim that the financial crisis will negatively impact the volatility of stock prices as people will tend to sell stocks which will cause them to lose money, and the

price of the stock will drop. Besides, the study done by Ali et al. (2012) proved that the financial crisis has a major negative influence on stock returns. Apart from this, the negative and significant relationship between financial crisis and bank stock return is supported by Sakthivel et al. (2014), who found that negative news has a bigger influence on volatility than positive news. Therefore, the global financial crisis will lead to increased volatility in the stock market, causing selling pressure of investors. As a result, the mean returns become lower.

4.3 Conclusion

In short, Chapter 4 explained the empirical results. The result conducted through Stata and EViews 12 shows that some of the independent variables, which include interest rate, exchange rate, non-performing loan ratio, and financial crisis, have a significant relationship with the dependent variable of bank stock return. Whereas, bank size and net interest margin are insignificant in explaining the bank stock return. Preliminary tests, such as unit root test and multicollinearity, and diagnostic checking, which are autocorrelation, heteroscedasticity, and normality, have been computed and discussed. The model of FGLS has been applied to adjust for econometric problems in this research. Further justification of variables will be presented in the following chapter. The implication of this research will also be further discussed, and some recommendations will be suggested to resolve the limitations.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

This chapter will summarize the entire research. The first part of the chapter will summarize the results of hypotheses testing. The discussion on major findings will be included to determine whether the objectives of this research have been achieved. After that, the implications of the research will be provided according to the research findings. Lastly, this chapter will be ended with the limitations faced during the research progress and some recommendations for the future researchers.

5.1 Discussions of Major Findings

Table 5.1:

Summary of Statistical Analysis Results

	Coefficients	p-value	Decision Making	Conclusion
Unit Root Test				
lnBSR	-	(0.0000)***	Reject H_0	Stationary at level
IR	-	(0.0000)***	Reject H_0	Stationary at level
lnER	-	(0.0234)**	Reject H_0	Stationary at level
lnSize	-	(0.0000)***	Reject H_0	Stationary at level

NIM	-	(0.0019)***	Reject H_0	Stationary at second difference
NPL	-	(0.0030)***	Reject H_0	Stationary at first difference
Multicollinearity				
VIF	-	-	-	All variables' VIF is less than 10, so there is no serious multicollinearity
TOL	-	-	-	All variables' TOL is greater than 0.1, so there is no serious multicollinearity
Diagnostic Checking				
Autocorrelation	-	(0.0878)*	Do not reject H_0	No autocorrelation (at 5% significance level)
Heteroscedasticity	-	(0.0047)***	Reject H_0	There is heteroscedasticity
Normality	-	(0.2743)	Do not reject H_0	Normally distributed
Feasible Generalized Least Square (FGLS)				
IR	-0.3755	(0.000)***	Reject H_0	Significant and negative
lnER	-0.4505	(0.001)***	Reject H_0	Significant and negative
lnSize	0.0265	(0.130)	Do not reject H_0	Insignificant and positive
NIM	-0.0695	(0.281)	Do not reject H_0	Insignificant and negative
NPL	-0.0281	(0.098)*	Reject H_0	Significant and negative

DCrisis	-0.3984	(0.001)***	Reject H_0	Significant and negative

Note. ***, **, and * denote significant level at 1%, 5%, and 10% respectively.

This research aims to identify the relationship between the macroeconomic and bank-specific factors on Malaysia's bank stock return. In this research, there are six independent variables comprised, which are macroeconomic variables, bank-specific variables, and dummy variable, in order to examine the determinants of bank stock return, which is the dependent variable. Macroeconomic determinants are interest rate (IR), and exchange rate (lnER) while bank-specific factors are bank size (lnSize), net interest margin (NIM), and non-performing loan ratio (NPL). Meanwhile, the dummy variable is the financial crisis (DCrisis). In this research, eight listed commercial banks in Malaysia are selected, comprising of ABMB, AFFIN, AMBANK, CIMB, HLBANK, MAYBANK, PBBANK and RHBBANK. The analysis of data comprises the period from 2011 to 2020. In order to obtain the research result with higher accuracy, the model is regressed by using Feasible Generalized Least Square (FGLS), which has the ability to solve the heteroscedasticity issue.

5.1.1 Interest Rate (IR)

One of the purposes of this research is to determine the relationship between interest rate and Malaysian bank stock return. According to the results obtained from FGLS regression, it indicates a significantly negative relationship between interest rate and bank stock return in Malaysia (See Table 5.1). This result is in line with the expectation of an inverse relationship between interest rate and bank stock return. It means that an increase in the interest rate will result in a fall in the return of the bank stock. There are many past studies indicating similar results, for instance, Arshad, Arshaad, Yousaf and Jamil (2015), Rjoub et al. (2017), and Endri (2020).

According to AL-Shubiri (2010), the negative relationship is due to the high-interest rate causes investors to face limited access to cash, subsequently reducing the investment. When the demand is lower, the bank stock return will decline afterwards. Besides, both Kasman, Vardar and Tunç (2011) and Rjoub et al. (2017) stated that the mismatch issue is the rationale for a negative relationship between interest rate and bank stock return. Generally, banks have a longer average duration period in assets than liabilities. Hence, an unpredicted rising interest rate will adversely impact the bank's balance sheet. From another point of view, the increase in interest rate will worsen the borrowers' cash flow, consequently affecting the bank's balance sheet by damaging the asset quality and decreasing the bank's capital.

The findings of a negative relationship are further supported by Tu (2012), Mugambi et al. (2016) and Septanti et al. (2016). Deposits and money market instruments, such as treasury bills, are considered alternative investments to the stock market. When the interest rate increases, people tend to invest in deposits and money market instruments, which are relatively attractive compared to the stock market. Stock demand will decline, and the price will fall. Since the investors' required return on stocks is higher, the bank has to increase its cost of capital to attract the investors, and therefore the bank stock return declines (Awwad & Tursoy, 2016). Furthermore, the rising treasury bill rate will also force the banks to lift the deposit rates to make customer deposits more attractive. Nevertheless, the higher interest rate expenses will lower the bank profitability. It is undesirable to the investors, decreasing the demand for bank stock and hence the bank stock return Mugambi et al. (2016).

5.1.2 Exchange Rate (lnER)

Another objective of this research is to find out the relationship between exchange rate and Malaysian bank stock return. According to the result that is generated from FGLS regression, it expressed that there is a significantly negative relationship existed between the exchange rate and the bank stock return. It indicates that when the Ringgit Malaysia depreciates, the stock market will be hit by an adverse impact from the change in the exchange rate. The result is highly supported by numerous literature from different researchers (Kasman et al., 2011; Saeed & Akfter, 2012; Mehta, 2019; Rafiq et al., 2019; Chucks et al., 2021). Depending on the bank's net foreign position contemporaneously, if the foreign currency-denominated liabilities surpass the foreign currency-denominated assets, the decline in the value of the home currency will make the bank suffer from translation losses. The losses may damage the banks' monetary records and deteriorate the bank equity, leading to a decline in bank share price (Mohsin, Naiwen, Rehman, Naseem & Baig, 2020).

The main rationale for the negative relationship between exchange rate and bank stock return is explained by Haq and Jawaid (2012), the weak currency extinguished the interest of investors in the domestic stock market due to the fall in the value of investment portfolio. Thus, it is logical when the Ringgit Malaysia is depreciated against the US dollar. Investors would withdraw from the domestic stock market, and invest the money outside of Malaysia or the foreign exchange market with an expected higher return, exerting downward pressure on both the bank stock index and Ringgit Malaysia due to decreased capital of investing in Malaysia. In addition, the depreciation of a country's home currency, therefore, possessed a negative impact on the country's banking share returns. In fact, the researchers stated that the reasons behind this circumstance happened are not easily determined as it could have several possible explanations. One could be that the depreciated home currency signals the high borrowing cost when the

banks intend to raise new foreign debt for overseas expansion. Increasing borrowing cost negatively influences the bank's future earnings, resulting in lower share price (Prakt & Larsson, 2012).

5.1.3 Bank Size (lnSize)

One of the purposes of this research is to identify the relationship between bank size and Malaysian bank stock return. Based on the outcome of FGLS regression, it revealed that the bank size is insignificantly and positively related to the stock return of the Malaysian banks. The findings discovered are in line with the hypotheses stated in the previous chapter, but it shows an insignificant result. The majority of the existing journals also pointed out that the bank size will bring a positive impact on the bank stock return, where the higher the bank size, the higher the bank return (Abdullahi, 2020; Bhattarai, 2018; Rjoub et al., 2017). Rjoub et al. (2017) suggested that large banks gained more profitability than smaller banks, and higher-earning capabilities can attract more investors, thus the price going up. Bhattarai (2014) also added his view in explaining the positive relationship that the large bank stocks are relatively less volatile and actively traded by risk-averse investors. The high liquidity and marketability nature of large bank stock eventually increase the price of the stock. The large bank also enjoyed economies of scale and scope, thereby improving the overall bank efficiency (Lestari et at., 2021).

In this research, the regression outcome realized that bank size has a limited effect on bank stock return. Although the insignificant result is taking a stand against many researchers' literature, there is still conformity with some previous studies, which also indicated a positive but insignificant relationship between bank size and bank stock return (Ardiansyaha et al., 2020; Bhattarai, 2014; Silwal & Napit, 2019). The introduction of additional

capital regulations by BNM after the 2008 financial crisis has diminished the impact of bank size. The additional requirement, including the introduction of reformed Basel III, higher tier 1 and tier 2 capital ratios, and short term Liquidity Coverage Ratio, provided a basis for faith in reinforcing buffer absorbing losses and enhanced banks' resilience against adverse shocks. When all the banks are well-regulated, investors can freely choose their preferred bank stock, despite the bank size (Muhammad, Chia & Yahya, 2015). Moreover, in a highly regulated environment like Malaysia, the banking industry is striving to survive. The smaller banks are found to grow faster than their larger rivals since there were diseconomies of scale, monopoly rents and political costs setting back the growth of the large bank (Benito, 2008). With stagnant future growth, investors did not invest their money in a large bank, resulting in a lower share return.

Based on the dataset obtained from Bloomberg over the past ten years, HLBANK stock has the best performance among its competitors, where the stock return is the highest among the listed banks in Malaysia, followed by PBBANK and MAYBANK. As of the end of 2020, the total asset owned by MAYBANK is RM856,859,514,000, several times of total assets of RM221,277,917,000 of HLBANK. The investors are believed to be gravitated to the HLBANK stock because of its firm fundamentals. HLBANK has always been keeping its financial records strong, and its asset quality is only second to the PBBANK. Numerous commitments and efforts from management in realising the digitalized transformation are bearing profits for the bank, translating into a superb operating margin. The research also revealed that a conservative management team of HLBANK with sustainable interest income makes the bank share preferable over others. It has been proven that the bank size did not have a significant effect on the bank stock return (Ying, 2018). There are still many factors that shaded the bank size's impact, including future earning capability, corporate governance, bank efficiency, management team, and so on.

5.1.4 Net Interest Margin (NIM)

This research is aimed to explore how the net interest margin (NIM) is related to the Malaysian bank stock return. The result obtained from FGLS regression shows that the relationship between NIM and bank stock return is negative and insignificant. It indicates that the changes of NIM are not capable of explaining the variation of bank stock return, and similar results are supported by a few previous studies, such as Indiani et al. (2016), Nurazi et al. (2016), Hurschler, Figeac, Lipchev and Dietrich (2017), and Sumantri (2020). Both studies completed by Wijayanti (2010) and Endri (2020) found that there is a significant and negative relationship between the NIM and bank stock return. This is because a high NIM may indicate that the bank is inefficient and vice versa. Due to the increased operating cost, the bank performance descends, consequently reducing the bank stock price and return. On top of that, when the NIM, one of the earnings ratios, elevates, it signals that the bank interest income will grow, directly reflecting the rising loans and advances provided to the customers. The more tremendous amount of loans implies a lower proportion of the bank capital, therefore the lower bank stock return (Rani & Zergaw, 2017).

Apart from this, the findings computed by Indiani et al. (2016) identified that NIM did not significantly relate to the bank stock return. A high NIM does not guarantee a high profit for the bank due to the presence of high operational costs, so NIM does not provide the investors with valuable information on their investment decisions. In addition, the limited effect of NIM on the bank stock return is primarily caused by the large interest rate fluctuation due to the economic shock or financial crisis (Nurazi et al., 2016). There are still some remaining impacts of the financial crisis, for example, the global financial crisis in 2008. Thus, the banks are now still facing difficulties in their management of the net interest income as well as the earning assets.

5.1.5 Non-performing Loan Ratio (NPL)

One of the research objectives is to verify how the non-performing loan ratio (NPL) is related to the Malaysian bank stock return. After carrying out the data analysis, the results obtained provide solid evidence to prove the objective of this research, in which the NPL has a significant and negative relationship with the bank stock return. It suggests that when NPL increases, the bank stock return will decrease. The result is in conformity with previous studies by Sujarwo (2015) and Poudel (2017), which also realized a significant negative relationship. This can be explained when NPL is one of the crucial indicators for asset quality. It is one of the most important signals to analyze the bank's overall situation because it has the function of measuring the loan quality of the bank, which also discloses the bank earnings. A bank will encounter cash flow problems when they own too many non-performing loans on its balance sheet since it is no longer earning income from its credit business (CFI, 2022a). Hence, the smaller NPL indicates the healthier condition of the bank and vice versa. Under such circumstances, the bank can generate better earnings, and investors will invest more in those well-performing banks, and hence leading to an increase in the share price as well as the stock return.

These results are also in line with the research of Rjoub et al. (2017), which found that NPL is significant and negatively related to the bank stock price. This is because poor bank management can lead to wrong lending decisions, hence increasing the NPL. As a result, the banks need to use provisions expenses to cover losses or bad debt, which will lower the bank profitability as well as bank performance. In this scenario, a low bank performance will damage the investor confidence, and thus, they tend to invest less in those low-performance banks.

5.1.6 Financial Crisis (DCrisis)

This research is intended to investigate the relationship between the financial crisis and Malaysian bank stock return. Based on the computed result of FGLS, the financial crisis has a negative and significant impact on the bank stock return. This signifies that when the financial crisis occurs, the stock return of the bank will be unfavourably impacted. It also means that the bank stock return during the financial crisis is lower compared to the time without the financial crisis.

Such a result is supported by Sakthivel et al. (2014) and Ahmad et al. (2021). These researchers stated that when there is a financial crisis, it will create instability in the stock market. The financial crisis and bank stock return are significantly negatively related to each other due to the reason that when the financial crisis occurs, it will have a direct impact on the bank stock return, which leads to the shrink of the bank stock return. According to Ali et al. (2012), they declared that bad news will have a more enormous impact on volatility rather than good news. Therefore, the financial crisis is considered as bad news, which will lead to the bank stock return becoming lower. In addition, Ahmad et al. (2021) also stated that when there is an unstable in the volatility of stock price, people will tend to sell the stocks, which will cause the investors to lose money. As a consequence, this leads to the price of that particular stock falling in drops.

5.2 Implications of the Study

This research emphasizes in analyzing the macroeconomic and bank-specific determinants of bank stock return in Malaysia. The outcomes of this research provide a myriad of valuable information to the government, bank management,

investor, as well as academicians to understand better the determinants of bank stock return and the environment of the financial market in Malaysia. Therefore, the implication and function of this research will be included in this section.

5.2.1 Government and Policy Makers

This research provides some informative insights to the government and policy makers that help to fulfil the objective of BNM, which is to promote financial stability. Since BNM's and the bank's performance are one of the important factors to enhance the growth of the country's economy, it is vital for the government to understand more regarding how the internal and external factors affect the bank stock return and propose suitable policies to keep the financial system stable. Bank stock prices are heavily influenced by three types of risk which are interest rate risk, counterparty risk, and regulatory risk due to the majority of bank assets and liabilities are interest-rate sensitive ("What Factors Are the Primary Drivers of Banks' Share Prices," 2020). Apart from that, a bank's interest rate position will indirectly affect its foreign exposure since interest rates and exchange rates often move simultaneously (Twin, 2021).

Hence, the outcomes of this research provide government and policy makers a better understanding of how these factors affect the bank stock return by taking into consideration on the macroeconomic variables, such as interest rate and exchange rate. This is because the two variables will bring a great impact on the overall performance and the stock return of the commercial banks. Based on the empirical result of this research, both interest rate and exchange rate bring a negative and significant impact on the bank stock return, which is also in line with the previous studies. By knowing well how these factors interact with each other, the policy makers could improve the stability of the financial system by implementing or manipulating the policy

tools such as fiscal and monetary policy. For instance, the government can lower the interest rate by using expansionary monetary policy to increase the money supply, and hence stimulate consumer spending and boost economic growth. As a result, people will be less likely to save and more likely to spend or invest in the market since the deposit rate in banks is low. Moreover, the exchange rate of Ringgit Malaysia can be manipulated through Open Market Operations by the government. The policy makers can regulate the supply of Ringgit Malaysia via selling securities and withdrawing the money from circulation, appreciating the home currency and thereby increasing the bank stock return (Hayes, 2022). In addition, the government also can raise the value of the currency through selling foreign assets and purchasing its own currency (Suranovic, 2010). In this case, it would be beneficial to the bank, heightening its bank stock price as well as stock return.

Furthermore, the financial crisis has also been considered in this research. Based on the empirical result, the financial crisis significantly and negatively affects the bank stock return. In simple words, the bank stock price will decline during the financial crisis due to the economy's instability, leading to uncertainty and panic selling from investors. Under such circumstances, the government may deploy various regulatory and supervisory methods to give additional operational capacity to banks so as to prepare itself better to respond to the financial crisis as well as manage it more effectively. For instance, the policy makers could impose several earlier planned measures to improve the overall consistency of the capital and credit risk management frameworks as well as enhance the capacity of banking institutions to support economic activity. There are several real examples imposed by BNM to support operational capacity for banking institutions during the crisis, including decreasing the banks' regulatory reserves held against expected losses to 0%, allowing banks to a drawdown of the capital conservation buffer of 2.5%, as well as enable banks to carry out the operation that is lower than 100% of the minimum liquidity coverage ratio. Additionally, the government could defer the timelines for several

supervisory initiatives to facilitate banks to better manage their resources during the financial crisis (BNM, 2020b).

5.2.2 Bank Management

This research also contributes to bank management in terms of performance evaluation by determining some critical factors such as asset quality, profitability ratio, bank size and economic factors that could affect the bank stock return. Since the bank stock return is an important indicator to determine the bank's overall strength or performance, therefore, it is crucial for the bank management to have a better understanding of the factors that will affect the bank stock return. As a result, they could gain higher competitive advantages than others in the industry.

Asset quality has been taken into consideration in this research since it is important to examine the bank condition because it indicates the bank loan quality, reflecting the bank earnings. Meanwhile, the non-performing loan ratio (NPL) has been used as the indicator of asset quality. Based on the research results, NPL brings a negative and significant impact on the bank stock return. By knowing well how the NPL affects the bank stock return, the bank management can define whether the bank is facing credit risk or not. For instance, a rise in NPL indicates that the bank has a poor performance either in internal management, credit risk management, or both. If the bank owns too many non-performing loans, it will encounter cash flow problems. At the same time, high provisions expenses could be incurred to cover the losses or bad debt, lowering the bank profitability. This will greatly affect the decision of bank management in terms of the allocation of the fund. NPL becomes an essential signal for bank management to take precautionary action in this situation. For instance, the bank management could tighten the credit-control system and the loan approval requirement to

reduce the risk of bad debts. Additionally, the bank management needs to establish a well underwriting process and sound lending policies to ensure the quality of the borrowers to reduce the possibilities of default loans (Ashar, 2019). In short, the effectiveness of bank management can be reflected in NPL. Thus, the bank executives should pay close attention to the bad loans and seek a viable solution to solve the problem to retain bank profitability. Therefore, this research can act as guidelines for the bank management to make appropriate financial decisions and utilize the bank resources efficiently.

Furthermore, net interest margin (NIM) has been included in this research as it measures the profitability of banks and financial institutions, which is also one of the most essential indications for investors when making an investment decision. Theoretically, a higher NIM would raise the bank stock return since a positive NIM indicates that the bank earns more. However, the empirical results of this research show a slight deviation from the theoretical viewpoint, in which the NIM insignificantly and negatively affects the bank stock return. Hence, this research could provide an additional viewpoint to bank management in the sense that a high NIM score does not imply that the bank is profitable due to huge operating costs incurred, which will impact the banking performance as well as its share price. Furthermore, this research also could provide bank management with a better understanding of the importance of cost management. Even the bank's NIM is high, if the bank fails to manage its cost wisely, it could impact its overall performance. Hence, the high NIM ratio is insufficient to provide investors with a signal to make any investment decisions. In short, the bank not only needs to maintain its interest income, but also needs to consider the interest expenses and non-interest expenses in order to maintain the overall strength and competitiveness advantages of the bank.

Apart from that, this research also looked into the impact of bank size on bank stock return. The empirical result of this research revealed that bank

size and the bank stock return have a positive but insignificant relationship. This can be explained by the implementation of additional capital regulations by BNM has diminished the impact of bank size, and thus, investors can invest in the bank stock freely despite the bank size. Hence, this research could provide additional information to the bank management that the importance of managing their capital wisely at the same time also needs to comply with the regulation imposed by the government. For instance, the bank management could focus on the adequacy of capital ratio. If the bank finds it difficult to comply with the capital requirement, they may look for additional funding through several ways such as share capital, debt finance, leasing, overdraft, and term loans (CFI, 2022b). Nonetheless, if a bank fails to comply with the minimum requirement, it will be subjected to mandatory supervision, and they are not allowed to perform any risky investment. Hence, the growth of the bank will be affected, and this will reduce the confidence level of investors. Thus, it is crucial for a bank to be well-capitalized.

5.2.3 Investors

The outcome of this research can be used to provide extra information for the investors and shareholders. For instance, the investors could reduce their investment in those banks, which have a high non-performing loan, as it reflects poor management, which will decrease the performance of the banks. Furthermore, this research also provides investors with a better perception of how government policies, macroeconomic conditions as well as bank-specific factors relate to bank stock return. By deliberating well how the internal and external factors affect the bank stock return, the investors may make their decision tactfully via investing with fewer risks and less uncertainty to rake in a desirable return.

On top of that, this research could also increase the awareness of investors in diversifying their portfolios, especially during the economic downturn such as the financial crisis. It is evident that the bank stock return is negatively affected by the financial crisis owing to the instability economy leading to panic selling by local as well as foreign investors. Hence, investors have to diversify their portfolios based on asset classes, sectors, or even geographical areas in order to minimize losses (Maverick, 2022). For instance, the investor should allocate their funds based on different asset classes such as bonds, stocks, and warrants based on their risk appetite instead of just holding one stock or several stocks that are in a similar industry. Furthermore, the investors could invest in an investment fund such as unit trust and exchange-traded fund to get a diversified portfolio.

5.2.4 Academicians

Last but not least, this research is able to deliver further comprehension to undergraduate students for their academic purpose. On top of that, this research also can act as useful and practical references to those future researchers, who target to conduct the research on the macroeconomic as well as bank-specific determinants of the bank stock return.

5.3 Limitations of the Study

There are some limitations encountered in this research. At the beginning of this research, the Overnight Policy Rate (OPR) was planned to use as a proxy for the interest rate. However, a multicollinearity problem is detected throughout the test among the variables, which are OPR and financial crisis. That being the case, the 3-months treasury bill rate was decided to be employed as the interest rate proxy in order to overcome the multicollinearity issue.

In addition, eight selected local commercial banks from the year 2011 to 2020, with annual data, are used to conduct this research. The limitation is that the monthly data is unable to be acquired since some of the data, for instance, non-performing loan ratio (NPL), net interest margin (NIM) and bank size, are obtained from Bloomberg, which is based on the annual report. Therefore, the availability of the data is restricted to a yearly basis only in this research.

Aside from that, one of the limitations of this research is the functionality of EViews 12. This research applied panel data in order to derive more informative results. Nevertheless, EViews 12 is more user friendly to time series data analysis than panel data analysis. EViews 12 is able to perform better when running for time series data analysis instead of panel data analysis. In this event, EViews 12 is not the primary data analysis tool used for data analysis in this research.

Lastly, due to the COVID-19 pandemic becoming more severe day by day, students are not encouraged to return to the university campus for safety reasons. Thus, students are unable to physically visit the university library in order to search for some related information. In addition to that, students yet cannot meet face to face to discuss the progress of this research. This is one of the limitations since one of the methods to look for additional information is overlooked.

5.4 Recommendations for Future Research

After discussing the limitations, some recommendations have been suggested to help future researchers, who plan to carry out a similar research area. First and foremost, future researchers are recommended to search for other proxies of interest rates such as government bond yield, treasury bill rate, OPR, lending rate, deposit rate, and so on before computing for the test. Therefore, the researchers can use another proxy if one of the proxies provokes the issue of multicollinearity. Besides, the researchers can also choose to employ another model, which is appropriate to solve the problem and conduct the data analysis.

Furthermore, the researchers are suggested to apply monthly or quarterly data in future studies, rather than using annual data. This is because collecting a larger sample size can produce more reliable and precise results, and also reduce the likelihood of the model encountering any issues, such as heteroscedasticity, multicollinearity, autocorrelation or normality problems. Therefore, future researchers are proposed to gather more sample sizes to ensure precise results from the model.

Moreover, future researchers have to be familiar with a variety of data analysis techniques. Stata can be an alternative to EViews 12, and Stata is the software that is recommended for future researchers to carry out the panel data analysis. This is because Stata has a large number of panel analytic procedures, comprising fixed and random effects models, as well as one-and-two-way random and fixed effects models, which can handle both balanced or unbalanced panels. Although EViews 12 can also help to solve the data analysis, EViews 12 is more beneficial to time series data analysis compared to Stata. Thus, the researchers are advised to learn different types of data analysis techniques and applications, and adopt the most appropriate method for the research.

Last but not least, there are other numerous methods to look for information during this COVID pandemic period. For instance, the researchers can explore the materials through online journals or via the university's online library. In addition, the groupmates can have the meeting via Microsoft Team, Zoom, Google Meet and other similar online platforms to discuss the progress and the issues faced. Even though the team members are unable to meet face to face, the problems can still be resolved if there are well-organized online discussions with each other.

5.5 Conclusion

The goal of this research is to verify macroeconomic as well as bank-specific determinants of stock return of eight publicly listed Malaysian banks from the year 2011 to 2020. This research employed the Feasible Generalized Least Square (FGLS) regression, which can help to obtain more efficient estimators. After deriving the data analysis, the results indicated that four out of six variables have a significantly negative relationship to the bank stock return, and the variables are interest rate, exchange rate, non-performing loan ratio (NPL), and financial crisis. Meanwhile, there are two variables that revealed an insignificant relationship with the bank stock return, where the bank size is insignificantly positively related to bank stock return while net interest margin (NIM) is insignificantly negatively associated with bank stock return. In a nutshell, this research has achieved all six objectives in examining the relationship between the macroeconomic and bank-specific determinants of the stock return in the banking sector.

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APPENDICES

Appendix 4.1: Raw Data of Dependent and Independent Variables for Eight Listed Commercial Banks in Malaysia from 2011 to 2020

Period	Bank	lnBSR	IR	lnER	lnSize	NIM	NPL	DCrisis
2011	ABMB	0.29	2.92	1.16	17.40	2.16	3.50	0
2012	ABMB	0.14	3.04	1.12	17.49	1.9	2.50	0
2013	ABMB	0.14	3.00	1.19	17.59	1.88	2.10	0
2014	ABMB	0.01	3.12	1.25	17.69	1.83	1.40	0
2015	ABMB	-0.24	3.11	1.46	17.79	1.77	1.00	0
2016	ABMB	0.08	2.76	1.50	17.83	1.74	1.30	0
2017	ABMB	0.13	2.90	1.40	17.81	1.69	1.00	0
2018	ABMB	0.02	3.23	1.42	17.80	2.04	1.40	0
2019	ABMB	-0.38	3.13	1.41	17.85	2.04	1.10	0
2020	ABMB	0.10	2.02	1.39	17.93	1.96	2.00	1
2011	AFFIN	0.04	2.92	1.16	17.80	2.18	2.84	0
2012	AFFIN	0.16	3.04	1.12	17.84	1.95	2.28	0
2013	AFFIN	0.22	3.00	1.19	17.91	1.84	1.98	0
2014	AFFIN	-0.25	3.12	1.25	18.02	1.59	1.82	0
2015	AFFIN	-0.20	3.11	1.46	18.03	1.45	1.90	0
2016	AFFIN	0.06	2.76	1.50	18.05	1.51	1.67	0
2017	AFFIN	-0.01	2.90	1.40	18.06	1.91	2.53	0
2018	AFFIN	-0.01	3.23	1.42	18.15	1.77	3.25	0
2019	AFFIN	-0.16	3.13	1.41	18.04	1.37	3.00	0
2020	AFFIN	0.01	2.02	1.39	18.06	1.3	3.52	1
2011	AMBANK	-0.14	2.92	1.16	18.50	2.4	3.30	0
2012	AMBANK	0.17	3.04	1.12	18.54	2.31	2.50	0
2013	AMBANK	0.09	3.00	1.19	18.66	2.24	2.00	0
2014	AMBANK	-0.05	3.12	1.25	18.70	2.16	1.90	0
2015	AMBANK	-0.33	3.11	1.46	18.71	1.83	1.80	0
2016	AMBANK	-0.01	2.76	1.50	18.71	1.53	1.90	0

2017	AMBANK	0.06	2.90	1.40	18.72	1.43	1.86	0
2018	AMBANK	0.02	3.23	1.42	18.74	1.45	1.70	0
2019	AMBANK	-0.05	3.13	1.41	18.88	1.34	1.59	0
2020	AMBANK	-0.05	2.02	1.39	18.95	1.38	1.73	1
2011	CIMB	-0.11	2.92	1.16	19.52	2.88	5.11	0
2012	CIMB	0.05	3.04	1.12	19.64	2.8	3.80	0
2013	CIMB	0.04	3.00	1.19	19.73	2.68	3.20	0
2014	CIMB	-0.29	3.12	1.25	19.84	2.65	3.10	0
2015	CIMB	-0.19	3.11	1.46	19.95	2.56	3.00	0
2016	CIMB	0.04	2.76	1.50	20.00	2.46	3.30	0
2017	CIMB	0.41	2.90	1.40	20.04	2.51	3.40	0
2018	CIMB	-0.10	3.23	1.42	20.10	2.18	2.90	0
2019	CIMB	-0.05	3.13	1.41	20.17	2.12	3.10	0
2020	CIMB	-0.15	2.02	1.39	20.22	2.06	3.60	1
2011	HLBANK	0.23	2.92	1.16	18.80	1.64	2.20	0
2012	HLBANK	0.33	3.04	1.12	18.88	2.18	1.70	0
2013	HLBANK	0.01	3.00	1.19	18.91	1.92	1.40	0
2014	HLBANK	0.00	3.12	1.25	18.95	1.91	1.20	0
2015	HLBANK	0.02	3.11	1.46	19.03	1.82	0.80	0
2016	HLBANK	0.04	2.76	1.50	19.06	1.7	0.79	0
2017	HLBANK	0.26	2.90	1.40	19.09	1.82	0.96	0
2018	HLBANK	0.21	3.23	1.42	19.13	1.78	0.87	0
2019	HLBANK	-0.14	3.13	1.41	19.15	1.63	0.78	0
2020	HLBANK	0.08	2.02	1.39	19.21	1.53	0.61	1
2011	MAYBANK	0.08	2.92	1.16	19.93	2.37	1.90	0
2012	MAYBANK	0.15	3.04	1.12	20.02	2.24	1.09	0
2013	MAYBANK	0.13	3.00	1.19	20.14	2.27	0.95	0
2014	MAYBANK	-0.03	3.12	1.25	20.28	1.96	1.04	0
2015	MAYBANK	-0.02	3.11	1.46	20.38	1.95	1.43	0
2016	MAYBANK	0.04	2.76	1.50	20.42	1.88	1.60	0
2017	MAYBANK	0.24	2.90	1.40	20.46	1.88	1.58	0
2018	MAYBANK	0.03	3.23	1.42	20.51	1.73	1.28	0

2019	MAYBANK	-0.03	3.13	1.41	20.54	1.87	1.33	0
2020	MAYBANK	0.04	2.02	1.39	20.57	1.58	1.10	1
2011	PBBANK	0.07	2.92	1.16	19.34	2.44	0.90	0
2012	PBBANK	0.23	3.04	1.12	19.43	2.26	0.70	0
2013	PBBANK	0.21	3.00	1.19	19.54	2.15	0.70	0
2014	PBBANK	0.00	3.12	1.25	19.66	2.08	0.60	0
2015	PBBANK	0.04	3.11	1.46	19.71	2.02	0.50	0
2016	PBBANK	0.09	2.76	1.50	19.76	2.02	0.50	0
2017	PBBANK	0.08	2.90	1.40	19.80	2.06	0.50	0
2018	PBBANK	0.20	3.23	1.42	19.86	2.01	0.50	0
2019	PBBANK	-0.21	3.13	1.41	19.89	1.91	0.50	0
2020	PBBANK	0.08	2.02	1.39	19.93	1.74	0.40	1
2011	RHBBANK	-0.12	2.92	1.16	18.84	2.4	3.60	0
2012	RHBBANK	0.06	3.04	1.12	19.06	2.15	2.99	0
2013	RHBBANK	0.05	3.00	1.19	19.07	2.06	2.81	0
2014	RHBBANK	-0.02	3.12	1.25	19.21	1.87	2.03	0
2015	RHBBANK	-0.25	3.11	1.46	19.24	1.72	1.88	0
2016	RHBBANK	0.11	2.76	1.50	19.28	1.73	2.43	0
2017	RHBBANK	0.08	2.90	1.40	19.25	1.72	2.23	0
2018	RHBBANK	0.09	3.23	1.42	19.31	1.73	2.06	0
2019	RHBBANK	0.13	3.13	1.41	19.37	1.62	1.97	0
2020	RHBBANK	-0.02	2.02	1.39	19.42	1.38	1.71	1

Appendix 4.2: Descriptive Statistics. Adapted from EViews 12.

	LNBSR	IR	LNER	LNSIZE	NIM	NPL
Mean	0.025948	2.923506	1.329183	19.07320	1.944750	1.887500
Median	0.038556	3.016521	1.395607	19.10976	1.910000	1.810000
Maximum	0.413688	3.230500	1.500961	20.56878	2.880000	5.110000
Minimum	-0.379911	2.021000	1.117843	17.40103	1.300000	0.400000
Std. Dev.	0.150170	0.329713	0.131196	0.874182	0.349600	0.998489
Skewness	-0.315462	-1.948055	-0.401310	-0.152989	0.426688	0.608129
Kurtosis	3.379215	5.883311	1.596678	1.958358	2.918614	2.945418
Jarque-Bera	1.806227	78.31050	8.711706	3.928799	2.449579	4.940883
Probability	0.405306	0.000000	0.012831	0.140240	0.293819	0.084548
Sum	2.075850	233.8804	106.3347	1525.856	155.5800	151.0000
Sum Sq. Dev.	1.781532	8.588126	1.359769	60.37132	9.655395	78.76150
Observations	80	80	80	80	80	80

Appendix 4.3: Unit Root Test: Levin-Lin-Chu Test. Adapted from Stata.

```
. xtunitroot llc lnBSR

Levin-Lin-Chu unit-root test for lnBSR
------------------------------------------

Ho: Panels contain unit roots                Number of panels  =      8
Ha: Panels are stationary                    Number of periods =     10

AR parameter: Common                         Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 6.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t        -9.9444
 Adjusted t*         -6.8182        0.0000
------------------------------------------------------------------------------
```

```
. xtunitroot llc IR, trend

Levin-Lin-Chu unit-root test for IR
---------------------------------------

Ho: Panels contain unit roots               Number of panels  =      8
Ha: Panels are stationary                   Number of periods =     10

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 6.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -14.8021
 Adjusted t*         -4.2706        0.0000
------------------------------------------------------------------------------
```

```
. xtunitroot llc lnER , trend

Levin-Lin-Chu unit-root test for lnER
---------------------------------------

Ho: Panels contain unit roots               Number of panels  =      8
Ha: Panels are stationary                   Number of periods =     10

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 6.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t        -5.4138
 Adjusted t*         -1.9888        0.0234
------------------------------------------------------------------------------
```

```
. xtunitroot llc lnSize

Levin-Lin-Chu unit-root test for lnSize
---------------------------------------

Ho: Panels contain unit roots               Number of panels  =      8
Ha: Panels are stationary                   Number of periods =     10

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 6.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t         -6.4918
 Adjusted t*          -5.4959        0.0000
------------------------------------------------------------------------------
```

```
.  xtunitroot llc DD.NIM

Levin-Lin-Chu unit-root test for D2.NIM
---------------------------------------

Ho: Panels contain unit roots               Number of panels  =      8
Ha: Panels are stationary                   Number of periods =      8

AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 6.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t         -7.1143
 Adjusted t*          -2.8958        0.0019
------------------------------------------------------------------------------
```

```
. xtunitroot llc D.NPL

Levin-Lin-Chu unit-root test for D.NPL
------------------------------

Ho: Panels contain unit roots                   Number of panels  =      8
Ha: Panels are stationary                       Number of periods =      9

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 6.00 lags average (chosen by LLC)
```

	Statistic	p-value
Unadjusted t	-6.4061	
Adjusted t*	-2.7488	0.0030

Appendix 4.4: Multicollinearity. Adapted from Stata.

```
. correl lnBSR lnER lnSize NIM NPL Dcrisis IR
(obs=80)
```

	lnBSR	lnER	lnSize	NIM	NPL	Dcrisis	IR
lnBSR	1.0000						
lnER	-0.2659	1.0000					
lnSize	0.0409	0.1560	1.0000				
NIM	0.0737	-0.5128	0.2873	1.0000			
NPL	-0.1184	-0.2681	-0.1375	0.3901	1.0000		
Dcrisis	-0.0313	0.1543	0.0811	-0.3152	-0.0181	1.0000	
IR	-0.0940	-0.1545	-0.0577	0.2539	-0.0258	-0.9182	1.0000

```
. estat vif
```

Variable	VIF	1/VIF
Dcrisis	7.00	0.142783
IR	6.60	0.151555
NIM	2.34	0.427112
lnER	1.61	0.620412
lnSize	1.47	0.681024
NPL	1.33	0.750615
Mean VIF	3.39	

Appendix 4.5: Autocorrelation: Wooldridge Test. Adapted from Stata.

```
. xtserial lnBSR lnER lnSize NIM NPL Dcrisis IR

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       7) =      3.931
           Prob > F =      0.0878
```

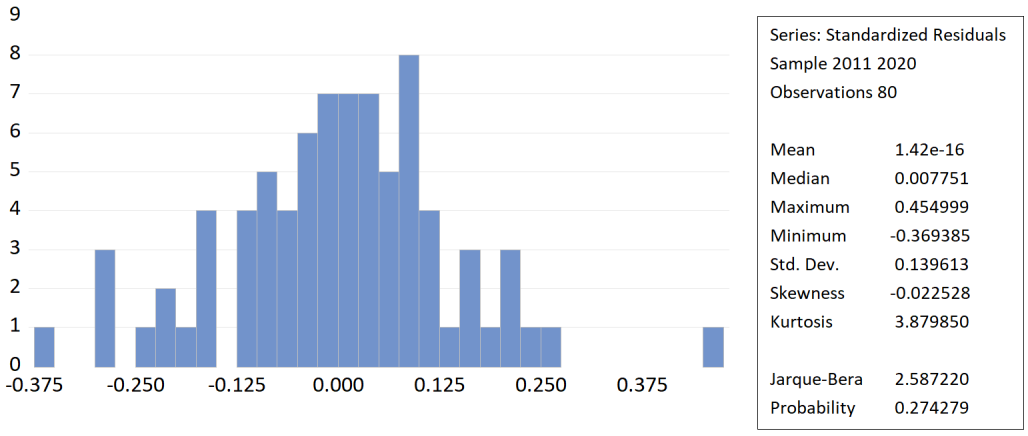
Appendix 4.6: Heteroscedasticity: Breusch-Pagan / Cook-Weisberg Test. Adapted from Stata.

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of lnBSR

         chi2(1)      =     7.98
         Prob > chi2  =   0.0047
```

Appendix 4.7: Normality: Jarque-Bera Test. Adapted from EViews 12.



Appendix 4.8: Feasible Generalized Least Square (FGLS). Adapted from Stata.

```
. xtgls lnBSR lnER lnSize NIM NPL Dcrisis IR, panels(hetero)

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   no autocorrelation

Estimated covariances      =         8          Number of obs      =        80
Estimated autocorrelations =         0          Number of groups   =         8
Estimated coefficients     =         7          Time periods       =        10
                                                Wald chi2(6)       =     28.31
                                                Prob > chi2        =    0.0001
```

lnBSR	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lnER	-.4505236	.1347483	-3.34	0.001	-.7146255	-.1864217
lnSize	.0264809	.0174758	1.52	0.130	-.0077711	.0607328
NIM	-.0695119	.0645266	-1.08	0.281	-.1959817	.056958
NPL	-.0280521	.0169486	-1.66	0.098	-.0612707	.0051666
Dcrisis	-.3984497	.1155532	-3.45	0.001	-.6249299	-.1719695
IR	-.3755345	.1007373	-3.73	0.000	-.5729759	-.1780931
_cons	1.4403	.4640974	3.10	0.002	.5306856	2.349914