

HOW SUSTAINABLE DEVELOPMENT GOALS (SDGs) AFFECT BANKS' PROFITABILITY IN MALAYSIA

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MALAYSIA

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

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PREFACE

This research project was carried out to examine how Sustainable Development Goals (SDGs) affect banks' profitability in Malaysia. With sustainability playing a bigger role in the banking sector, we sought to gain a better insight into whether the practice of green financing, corporate social responsibility and board independence can affect financial performance, as well as how the macroeconomic environment, including GDP and inflation can also impact the same.

We have learned a lot in the process of completing this study. During this project, we learned to understand the research methods, data collection, and data analysis as well as the critical thinking that is essential in the interpretation of findings. Another thing we also learned is that sustainability and profitability are not necessarily hand in hand particularly in the banking industry, wherein the long-term social and environmental objectives need to be factored and weighed by the short-term financial results.

We believe that the research work can be of use to students, researchers, practitioners in the banking sector, and policymakers interested in sustainable finance and banking performance in Malaysia. Despite the limitations of this research, we think it helps to understand better how practices related to SDGs can influence the future of the banking sector.

ABSTRACT

This study investigates the effect of Sustainable Development Goals (SDGs) on banks' profitability in Malaysia. The study examines the relationship between green financing, corporate social responsibility (CSR), board independence, GDP, inflation, and bank profitability measured by return on assets (ROA). A quantitative research design was embraced, and the secondary data gathered comprised of seven Malaysian commercial banks between the years 2011 and 2025. The analysis adopted panel data analysis and the Fixed Effect Model (FEM) was adopted to analyse the relationship between the variables. The results show that there is a positive significant relationship between GDP and ROA, and a negative significant relationship between inflation and board independence and ROA. Green financing and CSR were detected to be in positive but weakly significant correlation with profitability. These findings imply that sustainability-related and macroeconomic aspects determine the profitability of the banks in Malaysia. The present research is important in the context of the literature on sustainable finance as it leads to the empirical evidence of the Malaysian banking sector. The results can be used as a valuable guide by banks, policymakers, and future researchers in assessing the efficacy of SDG-related practices in enhancing financial results.

Keyword: Sustainable Development Goals (SDGs); Bank Profitability; Green Financing; Corporate Social Responsibility (CSR); Board Independence; FEM

Subject Area: HG1501-3550 Banking

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LIST OF ABBREVIATIONS

BI	Board Independence
BNM	Bank Negara Malaysia
BPLM	Breusch–Pagan Lagrange Multiplier
CCPT	Climate Change and Principle-based Taxonomy
CPI	Consumer Price Index
CSR	Corporate Social Responsibility
FEM	Fixed Effect Model
GDP	Gross Domestic Product
GF	Green Financing
INF	Inflation
OLS	Ordinary Least Squares
POLS	Pooled Ordinary Least Squares
REM	Random Effect Model
RM	Ringgit Malaysia
ROA	Return on Assets
ROE	Return on Equity
SDGs	Sustainable Development Goals
UNDP	United Nations Development Programme
VIF	Variance Inflation Factor

CHAPTER 1: RESEARCH OVERVIEW

1.1 Background of Study

This study examines how the application of the Sustainable Development Goals (SDGs) affects bank profitability. As sustainability becomes increasingly important, banks are expected to participate in SDG-related initiatives such as green financing, inclusive banking, and promoting diversity in leadership. At the same time, maintaining strong financial performance remains a core objective for these institutions.

United Nations approved SDGs which is a set of 17 global objectives, also known as the Global Goals in 2015 as a global challenge, to end the poverty, protect the environment and ensure everyone enjoys a world of peace and prosperity by 2030. (United Nations Development Programme, 2018). The SDGs emphasize collaboration among governments, corporations, and civil society to provide a sustainable approach to development that addresses current needs without harming future generations. Based on the official websites of United Nation Development Programme, Global Compact Network Tanzania (GCNT) organized meeting under United Nations Development Programme (UNDP) between private sector associations and civil society organisation to discuss the action implementation in Tanzania that can accelerate the SDGs (United Nations Development Programme, 2022).

Banks, as financial intermediaries, play a crucial role in channeling funds, managing risk and influencing the behavior individuals and corporations. Banks help to achieve the SDGs in many ways and one of the ways is promoting financial inclusion, which makes financial products accessible to those underprivileged groups (Grant, 2024). For example, it directly contributes to SDG 1 and SDG 10, by enabling low-income individuals improve their livelihoods and reduce their

vulnerability. Banks also contribute to the SDGs through their financing roles. Banks provide credit and investments on sustainable activities such as renewable energy (Ozili & Ndah, 2024). For instance, HSBC granted a green loan to Ampd Energy to install battery systems at building sites, supporting SDG 7 and SDG 13 (Audacy, 2025). Furthermore, the internal operations of bank include financial intermediation, sustainability integration and accountability strengthen stability and are aligned with the SDGs, particularly SDG 8 and SDG 16, as strong governance, accountability, and efficient financial intermediation promote sustainable economic growth and stronger institutions (Gambetta et al., 2021). For example, Standard Chartered Malaysia's SC WIN support women-led businesses, advancing SDG 5 (My, 2023).

Among the many possible measures of bank outcomes, profitability is selected as the most suitable dependent variable. Profitability is the measure of how efficiently a business converts its expenses into profits (Toshniwal, 2016). Healthy profitability levels support resilience and can support effective credit intermediation (Sababathy & Shaharuddin, 2019). Compared to other measures such as liquidity or market performance, profitability is a more direct and comprehensive indicator of a bank's overall success. For this study, the Return on Assets (ROA) ratio is used as it measures how efficiently a company uses its assets to generate profits. A higher ROA indicates that the company is efficiently managing its balance sheet to generate profit, a lower ROA suggests room for improvement (Hargrave, 2025).

In Malaysia, the banking industry is increasingly integrating sustainability strategies into operations, such as Bank Negara Malaysia's Climate Change and Principle-based Taxonomy (CCPT) (PricewaterhouseCoopers, 2021). CCPT is a framework introduced by Bank Negara Malaysia (BNM) that can let financial institutions identify and classify economic activity that support climate resilience (Bank Negara Malaysia, 2022). The CCPT framework can promote green projects by providing more funding to sustainable initiatives while discouraging harmful activities. For example, Bank Islam Malaysia Bhd has achieved RM4.8 billion in

green financing, exceeding their initial target in September 2024 and focusing it on investment that align with both the SDGs and CCPT guidelines (The Star, 2024).

Other than the regulatory framework, like CCPT, there are other conditions that will also affect the bank's profit, which are broader macroeconomic conditions. One of the most important factors among these is economic growth measured by gross domestic product (GDP) (Reserve Bank of Australia, 2025). By increasing the GDP, a stronger demand for credit and banking services will be created due to the businesses expanding and consumers spending more (Mian & Sufi, 2018). Banks may now offer more loans, lower the default risk, and earn more interest and fee-based revenue from this expansion. In other words, an economy that is healthy creates an environment that helps banks become more profitable (Klein & Weill, 2018). GDP growth is going to continue to be a significant factor influencing banking performance in Malaysia, as banks play a key role in supporting both company investment and household spending.

Inflation is another broader macroeconomic condition that will affect bank profitability, and its effect is more complicated. Inflation is a two-edged sword that can harm a bank's profit. According to Mohammed et al. (2014), the effect of inflation will lead the loan policy become worsen and it will reduce the bank performance. According to Karkowska et al. (2025), their research results indicate that an increase in inflation may positively affect interest income and non-interest income; however, the return on assets ratio will decrease due to higher operating and risk costs. Based on these two studies, inflation can either weaken or support profitability, depending on how banks manage their operations and risks in shifting economic conditions.

Besides external drivers like CCPT, global investors, and stakeholders' expectations for SDG-aligned action, internal bank motivations also play a crucial role. Banks are increasingly recognizing the value of sustainability in ensuring long-term profitability and enhancing brand reputation. This shift is partly driven by the

growing customer demand for more environmentally and socially responsible financial products (Infosys BPM, 2024). Additionally, research indicates that around 85% of investors now consider sustainability an important part of their investment strategy (Kiernan, 2020).

Past studies on bank profitability have primarily focused on economic factors, market conditions, and the impact of financial crises. For example, AlJanahi (2025) examined banks in the UAE, identifying capital adequacy, liquidity, and market structure as significant determinants of profitability, while Almeida and Sousa (2025) emphasized the role of interest rates and operational efficiency during a period of structural transformation in Portugal. At the macroeconomic level, Klein and Weill (2022) found that economic growth generally supports profitability, whereas Brkić (2025) highlighted how high inflation in the Euro area can constrain profits.

Policy and regulatory environments also play a critical role, with monetary policy demonstrated to influence bank profitability, while Altavilla, Boucinha, and Peydró (2018) found that prolonged low or negative interest rates compress net interest margins, with banks relying only partially on fee income and repricing to offset this effect. Together, these studies demonstrate how fiscal and monetary frameworks shape banks' capacity to sustain profitability. At the bank-specific level, several studies established the persistence of profitability over time. Pervan, Pelivan, and Arnerić (2015) reported strong evidence of profit persistence in Croatia, with larger, well-capitalized, and more efficient banks achieving stronger profitability. Dietrich and Wanzenried (2011) emphasized that the drivers of profitability, including capital, cost efficiency, size, and GDP, can shift considerably between stable and crisis periods. These findings indicate that profitability is not random but is strongly tied to firm-specific characteristics and management efficiency.

Other works concentrated on competition, governance, and market structure. Yuanita (2019) demonstrated that higher competition often compresses bank

margins, although outcomes vary depending on regulatory context. Ozili and Uadiale (2017) highlighted ownership concentration as a governance mechanism that can improve profitability through better monitoring, while also noting potential trade-offs associated with excessive concentration. At the systemic level, Ozili and Ndah (2024) showed that financial development generally supports profitability, although very deep markets may also intensify competition, limiting spreads. This stream of research shows that external market structure and governance features are essential in shaping profitability outcomes.

Technology and external shocks have also been studied as determinants. Lv, Du, and Liu (2022) examined fintech competition in China, finding that it pushed banks toward digital transformation and efficiency, though the profitability outcomes were mixed and depended on strategic adoption. Crisis-related studies, including those by Erfani and Vasigh (2018), Haider and Mohammad (2022), Hossain (2025), Nitescu and Anghel (2024), and Tewolde (2025), confirmed that profitability significantly weakens during the Global Financial Crisis and COVID-19 pandemic, with determinants shifting before, during, and after crisis periods. These works underscore that the external environment can profoundly reshape profitability determinants and levels.

In contrast to these past studies, this research takes a different approach by examining the impact of Sustainable Development Goals (SDGs) on bank profitability in Malaysia. While previous studies have mostly focused on traditional financial and economic determinants. This study explores how banks can enhance long-term profitability by aligning their operations with SDG-related initiatives, including green finance, corporate social responsibility (CSR), and board independence, alongside key macroeconomic factors like GDP growth and inflation. Unlike the conventional focus on financial fundamentals or crisis-driven analysis, this research highlights the integration of sustainability practices into banking strategies, an area that remains underexplored in much of the existing literature.

Additionally, this study provides a regional perspective by focusing on Malaysia, where the banking sector is actively incorporating SDG-related practices in response to regulatory efforts such as Bank Negara Malaysia's Climate Change and Principle-based Taxonomy (CCPT). This context allows us to investigate how aligning banking operations with sustainability goals influences profitability within a developing economy, offering insights that complement findings from studies conducted primarily in developed markets.

While past studies have played a critical role in identifying the economic and institutional factors that shape bank profitability, this research advances this understanding by embedding sustainability into the profitability framework. By focusing on how SDG-aligned strategies affect bank performance within the Malaysian context, this study offers a more holistic, forward-looking perspective on how banks can achieve financial success while contributing to long-term sustainable development.

1.2 Problem Statement

The international banking community is coming under growing research to promote the Sustainable Development Goals (SDGs) through investment ranging from renewable energy and infrastructure to social impact financing in health, education, poverty reduction, and gender equality programs. This is further driven by the requirement that banks remain profitable while contributing to global sustainability targets (Gazi et al., 2024). Bhattacharyya (2021) noted that Banks used green financing to fund clean energy, resilience measures, and eco-efficient infrastructure in urban areas, thereby aligning with SDG 7, SDG 9, SDG 11 and SDG 13. Banks' CSR activities have included financing poverty-reduction and financial inclusion schemes; advancing SDG 1; investing in health programs that strengthen SDG 3; and providing scholarships and targeted skills development that support SDG 4 (Razali et al., 2021). Dai et al. (2022) argue that CSR activities have shown that gender empowerment and support for marginalized populations directly connect to

both SDG 5 and SDG 10, and that capital directed toward renewable and resilient infrastructure furthers SDG 9 and SDG 11. Also, Kamaludin et al. (2022) further support board independence in Malaysian banks finds that a higher proportion of independent directors significantly improves SDG disclosures, which are directly linked to SDG 16. In Malaysia, Bank Negara Malaysia and Bursa Malaysia have promoted the banking industry to adopt green finance, corporate social responsibility (CSR), and improved governance, which are complementary to the UN Sustainable Development Goals (Hoque et al., 2024). Although these measures promote national sustainability goals, they also pose challenges for banks, which are required to link sustainability objectives to their profits through Return on Assets (Yang, 2023).

Banks are apparently supposed to integrate sustainable strategies in their activities, preserving the profit-oriented essence, which remains quantified through ROA (Chowdhury, 2023). But it would be too early to infer from such SDG-aligned initiatives, especially about green finance, whether they are profit-making or entail financial costs for banks as well. The investment and long-term development period of returns in green finance (e.g., renewable projects) confuse bank decision-making, as profits cannot be expected in the short term (Wang et al., 2023). The long investment periods these projects require do not align with the relatively short time horizons banks generally consider when assessing return on assets (Lalon et al., 2025).

Green finance is a significant concern, as banks invest in projects that may not yield immediate financial returns. According to Al-Kubaisi and Bashar Abu Khalaf (2023), green finance may not be profitable in the short run due to the high development costs involved, and implementing green finance programs can negatively affect bank profitability in the short run. This is mainly because the green finance projects needed very high upfront investments in technology, infrastructure, and adherence to environmental regulations and returns may not be offset immediately. Furthermore, a study by Yafie et al. (2024) suggests that the

development and implementation costs of green finance initiatives may reduce short-run profit margins. Additionally, Zhou et al. (2024) argue that green loan balances negatively affect bank profits when banks increase their green financing activities. Increased risk exposure and the complexity of managing green loans require for risk assessment, project monitoring, and compliance. Zhang et al. (2022) further support this by stating that green loans and projects can negatively affect profitability due to the complexity of bank operations, exposure to risk, and cost overruns as these projects often involve untested technologies and regulatory uncertainties.

In addition, Corporate Social Responsibility (CSR) spending and board independence also act as drivers that affect banks' profitability in Malaysia. Banks often engage in CSR activities to support communities, improve their image, and gain customer trust. Moreover, banks frequently struggle to balance their social responsibility with the need to maintain profitability (Santhirasegar et al., 2018). While CSR activities can contribute to society, they may also cost short-term profits, creating tension between achieving social and financial goals (Razali et al., 2021). Karim et al. (2020) noted that CSR spending in Malaysian banks can reduce profits in the short run, with some estimates showing a decline of 0.004 cents per RM1 of total assets committed to CSR. This issue leaves banks uncertain about how much CSR spending is optimal to balance both banks' profitability and social goals. Board independence may be more effective in assessing the strategic evaluation of risky long-term projects and in mitigating greenwashing through demanding more transparent disclosure (Cantero-Saiz et al., 2025). An independent board structure enhances the governance of green lending as evidenced by Rahayu et al. (2024) in their study on ASEAN banks where more independent directors contributed to stronger sustainable finance disclosure. However, it remains unclear to what extent board independence enhances the profitability of green finance, as most discussions focus on disclosure rather than financial outcomes (Ramly & Ramli, 2022). Economic growth typically increases demand for green loans while also enhancing repayment capacity, thereby augmenting financial returns for banks. On the other

hand, inflation raises the cost of capital and project execution, particularly curtailing the margins of long-term green projects (Lalon et al., 2025).

In conclusion, the main question the research seeks to answer is can the banks in Malaysia can manage the contradictory objectives of green financing in supporting sustainability and profitability while balancing the competing demands of CSR practices, governance frameworks, and macro-level factors. There is a gap that needs to be filled to understand the relationship within the context of Malaysia and to understand whether green loans really improve long-term profitability, or do they just increase costs and risks.

1.3 Research Questions

1. What is the impact of Green Financing on the profitability (ROA) of banks in Malaysia?
2. What is the impact of CSR Spending on the profitability (ROA) of banks in Malaysia?
3. What is the impact of board independence on the profitability (ROA) of banks in Malaysia?
4. What is the impact of GDP growth on the profitability (ROA) of banks in Malaysia?
5. What is the impact of the inflation rate on the profitability (ROA) of banks in Malaysia?

1.4 Research Objectives

1. To investigate the impact of Green Financing on the profitability (ROA) of banks in Malaysia.
2. To investigate the impact of CSR spending on the profitability (ROA) of banks in Malaysia.

3. To investigate the impact of Board independence on the profitability (ROA) of banks in Malaysia.
4. To investigate the impact of GDP growth on the profitability (ROA) of banks in Malaysia.
5. To investigate the impact of the Inflation rate on the profitability (ROA) of banks in Malaysia.

1.5 Significance of Study

The study explores the relationship between Sustainable Development Goals (SDGs) with bank profitability in Malaysia. As sustainability becomes a key part of corporate strategies and national development plans, it is important and timely to understand how factors related to the Sustainable Development Goals (SDGs) affect bank profitability. This research is significant in three main areas such as academic, industrial, and political perspectives.

Through an academic perspective, this research contributes to expanding the body of literature linking SDGs factors to financial outcomes. According to Friede et al. (2015b), numerous studies have shown that integrating sustainable strategies into business operations can improve financial performance. However, these studies focused more on the developed countries and had limited empirical data from the Malaysian banking context. This study aims to fulfill this gap by examining how SDGs can influence bank profitability in Malaysia. The findings offer empirical insights that guide econometric research and future theoretical frameworks in sustainable finance.

According to Jasani (2025), banks in Malaysia are facing greater pressure to adopt sustainable due to heightened expectations from customers, investors, and regulators, underscoring the growing importance to integrate ESG in shaping industry practices and strategic decision-making. Financial institutions are expected

to go beyond the traditional profit-driven goals and integrate sustainability into their strategies. This study provides the banking sector with an understanding of how aligning with SDGs can drive profitability through several key channels. KPMG and Hayes (2024) highlight that by taking a leadership role in supporting sustainable projects, banks can gain a competitive advantage and access new development opportunities.

At the policy level, this study provides valuable evidence to support the development of national frameworks that promote sustainable finance. Findings from this study can help policymakers refine sustainability-related regulations, incentives schemes, and reporting standards. This study helps to guide Malaysia's effort to integrate sustainable practices into national economic policies by providing data-driven insights into the financial benefits of SDG implementation.

CHAPTER 2: LITERATURE REVIEW

2.1 Theoretical review

2.1.1 Stakeholder theory in Green Finance, Board Independence, and CSR

The stakeholder theory, first introduced by R. Edward Freeman in 1984, explains how organizations are expected to be strategic in maximizing their value for all stakeholders and ensuring the protection of their long-term success and sustainability (Mahajan et al., 2023). In recent years, researchers have extended stakeholder theory to the field of green financing (Liu & Wu, 2023). According to Chandran et al. (2025), Stakeholder Theory emphasizes a positive relationship between how government, investors, and consumers influence green financing decisions. Moreover, the Stakeholder Theory mentioned by Jillani et al. (2024) shows that stakeholder influence mediates the relationship between green finance practices and banks' performance. Also, Sutrisno et al. (2024) mentioned that green credit has a positive effect on profitability in smaller banks. Smaller banks use green credit to attract new customers, sustainability investors, and government support. The green finance practice enhanced the profitability of banks by promoting bank responsibility on environmental issues and social standards by reducing capital costs and complying with government policy (Thu et al., 2024). In addition to financing practices, Stakeholder Theory is also part of corporate governance, particularly in terms to board independence. Independent board members represent as neutral decision-makers who ensure the board considers stakeholders' interests when making decisions (Liang, 2025). Research by Lalon et al. (2025) suggests that banks should focus more on appointing independent directors to their boards to enhance profitability by gaining trust from shareholders, customers, regulators, and society. Therefore, this theory is applicable on this study where green financing and board independence enable to influence the banks' profitability. The Stakeholder

Theory is also present within Corporate Social Responsibility (CSR) since it is the expression of the company obligation to meet customer, employee, regulator and society demands. Freeman and Dmytriiev (2017) mentioned CSR as supports stakeholder responsibilities by integrate social and ethical responsibilities. CSR practices such as responsible lending, transparency, and community outreach improves trust, legitimacy, and reputation of the banks (Lentner et al., 2015). Lentner, Szegedi, and Tatay (2015) acknowledge that these projects became the most important ones after the financial crisis, which means that socially responsible activities not only restore confidence but also contribute to financial stability. As such, CSR investments enhance stakeholder trust, leads to stronger customer loyalty, greater regulatory goodwill, and increased bank profitability (Freeman & Dmytriiev, 2017; Lentner et al., 2015). Therefore, Stakeholder Theory is applied on this study where CSR spending, green financing and board independence enable to influence banks' profitability in Malaysia.

2.1.2 Macroeconomic Theory of Financial Intermediation

Financial Intermediation Theory was first introduced by Gurley and Shaw in 1960 (Allen & Santomero, 1997). It was an approach of financial institutions to transfer funds from savers to borrowers by generating new financial assets and liabilities (Marty, 1961). This early view was later enhanced by Patrick (1966), who noted that the supply-leading and demand-following hypotheses, and by Levine (1990), who studied the pivotal role of financial structure in economic development, emphasizing how well-functioning intermediaries foster capital accumulation and GDP growth. Moreover, financial intermediation promotes the innovation and profitability of banks confirmed by King and Levine (1993). According to Levine (1997), the Financial Intermediation Theory has shifted to emphasize the critical role that financial intermediaries play in managing financial risks, directing capital towards profitable businesses, and generating savings, thereby strengthening the connection between financial development and economic growth. Also, the Financial Intermediation Theory has been linked to economic variables such as

GDP and inflation. For instance, Vejzagic and Zarafat (2014) analyzed Malaysian banks and found that real GDP growth was positively and significantly associated with bank profitability, whereas inflation had mixed effects across institutions. The role of intermediaries in mitigating macroeconomic fluctuations was also demonstrated by Nguyen (2023), showing that GDP growth inflation rate had a positive impact on banks' profitability. Furthermore, the profitability of banks is impacted by economic growth when it increases the supply of credit and encourages investment, which strengthens the financial intermediation process (Kumar et al., 2020). Therefore, this theory is applied on this study where GDP growth and inflation rate can influence the banks' profitability.

2.2 Literature Review

2.2.1 Bank Profitability: ROA

The profitability of a bank serves as a very important indicator in terms of the performance and efficiency, competitiveness of financial institutions. Among the commonly used profitability indicators, Return on Assets (ROA) is regarded as comprehensive measure because it reflects how well the bank utilizes the assets to generate earnings. This segment discusses recent articles that attempt to isolate the drivers of bank profitability based on ROA as the key dependent variable. According to Jewell et al. (2011), ROA is a widely used financial indicator that shows how effectively a company utilizes total assets to generate earnings. ROA is determined by dividing Net Income by Total Assets, showing the percentage of profit earned for every unit of assets employed. Several studies shows that ROA is a better measure of profitability than other indicator like Return on Equity (ROE). Majka (2024) stated that ROA is often considered a more reliable and conservative indicator of profitability due to the asset base, avoid leverage bias and focuses on efficiency. ROE is usually useful for shareholders, but it can be misleading if a bank boost equity returns by taking on excessive debt. Besides, several studies have used

ROA as their main indicators of profitability. Kawshala and Panditharathna (2021) uses ROA as profitability measure to study how internal banking factors influence the financial performance of Sri Lankan banks. Sajid and Glasgow Caledonian University (2014) also use ROA as the dependent variable to analyze how the industry-related factors, macroeconomic factors and bank-specific factors influenced the profitability of 73 UK commercial banks between 2006 and 2012 covering the period before, during and after the 2008 financial crisis.

In summary, ROA proves to be an informational and dependable indicator of bank profitability, providing the information on the level of resources usefulness used by banks to produce income. The fact that it has been used extensively in global studies is testimony to the fact that it is applicable in assessing effectiveness in terms of operations and financial performance of a bank.

2.2.2 Green Finance

The incorporation of United Nations Sustainable Development Goals (SDGs) into financial systems has reshaped banking strategies around the world. In Malaysia, financial institutions are actively embracing green financing as part of their contribution to SDG agenda. Lindenberg (2014) defines green financing the flow of financial investment into sustainable development projects and initiatives, environmental products and policies that support the growth of a more sustainable economy. Green financing does not only include climate finance but also various sustainability-related objectives, including pollution control and biodiversity conservation. Several samples have been utilized in several research to examine between the effect of green finance on bank profitability. For example, Mamun and Rana (2020) observed whether green finance contributes to the financial performance of commercial banks in Bangladesh.

The impact of green finance on bank profitability is inconsistent. Few studies have discovered positive relationship between these two variables. According to Ahmad

and Rahman (2024), banks that embrace in green financing today will achieve competitive advantage, customer loyalty and long-term financial sustainability in the Pakistani market. In additions, Hadi et al. (2023) stated green banking enhances profitability by reducing operating cost, improving customer retention and opening a new market opportunity. Mamun and Rana (2020) found a positive relationship between green financing and bank profitability. The author states increase in green finance will lead to higher returns for commercial banks in Bangladesh, and vice versa. The Bangladesh bank also take various initiatives to promote sustainable development in banking industry and country, which includes reduction in paper usage, promoting in-house green practices, and supporting environmental improvement through green projects.

However, there are also studies that indicate that green financing can negatively impact bank profitability. According to Chang (2021), green credit has a negative effect on profitability in Chinese banks because of the profitability gap between polluting industries and greener sectors. Zhou et al. (2024) stated that green finance currently reduces banks' profitability due to green loans are less profitable, costlier to manage and riskier than traditional loans. Furthermore, Mirovic et al. (2023) study on whether the presence of green loans in a bank's portfolio moderates the key determinants of bank profitability. The empirical results show the loan-to-deposit ratio negatively affects ROA only in cases of banks with green loans.

There is a study that found that green finance has no significant effect on bank's profitability. Curea et al. (2025) found that green finance, measured through SDG 7 disclosures, had no significant impact on Romanian banks' profitability in most cases. Disclosure under SDG 7.a and renewable energy consumption showed no short term impact on ROA, ROE or lending activity.

Based on the literature on green finance and profitability of banks, evidence is not clear. Other research projects report a positive effect and some report a negative or insignificant effect. These disparities are mostly due to the differences in

methodology, research setting, and regulatory frameworks giving greater intricacy to the interpretation of the results.

Therefore, this study will use the variable to determine its relationship to bank profitability with the following hypotheses.

H₁: There is a significant relationship between green financing and banks' profitability in Malaysia.

2.2.3 Corporate Social Responsibility

Although CSR is not new to the banking sector, it has become an attractive way of incorporating ethical values into banking in current economic times (My & My, 2022). CSR will impact the bank profitability and lead it to become inconsistent. The CSR and bank profit have positive relationship that prove with few studies. According to Ashraf et al., (2017), banks that actively invest in CSR initiatives tend to enjoy stronger financial performance compared to those that do not, reasoning that CSR is a component of banks' strategic planning that increases customer loyalty, reduces promotional expenses and supports their financial outcomes. Furthermore, according to Dimaala (2020), a commercial bank's profitability increases with the level of CSR disclosure. This is because complete CSR disclosure boosts stakeholder trust, brand reputation, and competitiveness, all of which improve financial performance. Shabir et al. (2024) have indicated it there is a positive relationship between CSR activities and banks' performance. This is because improved bank performance encourages banks to get more active in social activities. This result supports the slack resources theory, good governance, resource-based theory, and stakeholder theory.

However, there are a few studies that have indicated a negative impact of CSR and bank profit. My and My (2022) indicate that CSR activities involving human resources have a negative influence on bank profitability. This is because banks

must pay the cost before gaining the value from human resource-related activities that affect the bank's profitability. Additionally, Slama & Hamouda (2023) found that CSR practices have a negative impact on banks' financial performance. It is significant since it highlights the potential trade-offs banks may face when implementing CSR initiatives. Giannopoulos et al. (2024) looked at how CSR affected the UK banking sector's financial performance during a six-year period, from 2017 to 2022. The author identified an adverse relationship between CSR and profitability among UK-listed banks, which has significant effects for investors, regulators, and the larger economic environment. This is because they have to oversee all aspects of this connection in order to support sustainable economic growth, encourage ethical banking, and match financial success with the overall welfare of society. Besides the positive and negative impacts, a study shows an insignificant effect of CSR on bank profits. According to Adebisi & Fashola (2025), the financial performance of Nigerian listed banks is not impacted by corporate social responsibility spending. This indicates that the bank's earnings is not directly impacted by CSR.

Studies examining the relationship between CSR and bank profit use a variety of statistical frameworks. The methods as descriptive statistics, correlation analysis and multiple regression analysis have been used in previous study. It can avoid data misinterpretation, multicollinearity problems, omitted variable bias, and spurious conclusions (Akaa et al., 2025). Besides that, Sloven's formula is also used by Murasi & Osiemo (2024). The Panel Autoregressive Distributed Lag (ARDL) Model was employed by Boateng et al. (2025).

In summary, the existing literature has found different results due to the effect of CSR on bank profit. Existing literature shows that most of there is a significant effect, but some studies also give negative effects, while a study shows an insignificant effect between CSR and bank profit. The use of multiple approaches, control variable selection, and variability can lead to difficult data evaluation and

interpretation. Therefore, this result will determine the relationship to banks' profit with the following hypothesis.

H2: There is a significant relationship between CSR spending and banks' profitability in Malaysia.

2.2.4 Board Independence

Board independence plays an important role in corporate governance because it helps the board monitor managerial decisions and align them with stakeholders' interests. Based on agency theory, independent directors are expected to provide impartial views and to be unaffected by management, thereby enhancing the long-term sustainability of banks (Squires & Elnahla, 2020).

Several studies support this view. Belhaj and Farhan (2024) found that Indian banks with stronger board independence achieved higher ROA. Kandel (2024) also reported that Nepali banks with more independent directors recorded higher ROA and ROE, along with better efficiency. In Nigeria, Ali and Shadrach (2023) found that banks with more independent directors had superior ROA, suggesting that independence strengthened monitoring and profit growth. Similarly, Tulung and Ramdani (2018), studying Indonesia's regional development banks (2010–2014), found a positive relationship between the proportion of independent board members and bank performance, as measured by ROA and ROE. These findings are consistent with results from six Gulf Cooperation Council (GCC) countries between 2019 and 2023, where higher independent director presence was positively associated with ROA and ROE (Abiad et al., 2025).

However, not all results are positive. Fariha et al. (2022) analyzed 30 listed banks in Bangladesh and found a negative relationship between board independence and ROA. Arachchi (2024), in a master's thesis on Sri Lankan banks (2018–2022), also reported that higher board independence was linked to lower ROA and ROE. These

findings show that independence alone may not always improve bank profitability. In addition, Rahman (2024), studying 28 Bangladeshi banks using pooled OLS, fixed effects, and two-step GMM, found no significant association between board independence and either ROA or ROE, with the fixed effects model showing a negative coefficient for ROA.

Other studies highlight moderating factors. For example, Habtoor et al. (2024) found that in Saudi banks, independent directors initially had a negative effect on profitability, but when they also held ownership stakes, the relationship became positive. This suggests that independence is more effective when combined with ownership incentives, as directors are then more motivated to enhance performance.

The relationship between board independence and bank profitability has been explored using a wide range of econometric methods. A study by Belhaj & Farhan (2024) analysed Indian listed banks using panel data regression with fixed and random effects, along with 2SLS to account for endogeneity. The study found a positive association between board independence and the ROA of Indian-listed banks. By contrast, Rahman (2024), who employed pooled OLS, fixed effects, and two-step GMM, found no significant relationship between board independence and ROA. The use of GMM highlights that the link between board independence and profitability may be weaker or context-dependent, particularly in countries with weaker institutional frameworks.

To conclude, the existing literature shows that the result of board independence on bank profitability is inconsistent. Most studies report a positive relationship, while some find negative or insignificant effects. These mixed results may be due to differences in institutional contexts, ownership structures, and methodological approaches, making interpretation more complex. Therefore, this result will determine the relationship between banks' profit and the following hypothesis.

H3: There is a significant relationship between board independence and banks' profitability in Malaysia.

2.2.5 GDP

GDP, widely used as a measure of economic growth, is one of the most important macroeconomic factors influencing banks' profitability and performance. It is a sign of the overall health of an economy and a determining factor in the demand for financial services. In periods of economic boom, firms and households tend to borrow and invest more, which leads to a surge in loan demand, improved asset quality, and decreased default risk, thereby enhancing the profitability of banks (Klein & Weill, 2018). Different research works have shown the immediate connection between GDP growth and bank profitability. Ruxho and Beha (2024) proved that a 1% rise in the Central and Eastern European banks' return on assets (ROA) increases GDP growth by 0.534–0.625%, which is an indication of the virtuous banking profitability and economic growth cycle. Gul et al. (2011) also depicted that GDP growth significantly increases the profitability of the banks of Pakistan, and that enhanced economic activity creates a favorable environment for stronger balance sheets, higher returns on equity, and better lending prospects. Likewise, Moussa and Hdidar (2019) confirmed the same effect in Tunisia, depicting that macroeconomic expansion serves to provide financial stability and helps the banks to sustain their intermediation function. All these findings point to the fact that in the majority of circumstances, economic growth does not only augment banks' profit at present but also increases the stability and solidity of the banking sector in the long run.

However, some studies have shown that GDP may weaken bank profitability under certain conditions. Tan and Floros (2013) argued that rapid GDP growth in China reduced bank profitability due to accelerated credit growth, heightened competition, and falling interest margins. Similarly, Klein and Weill (2018) argued that while current profitability supports growth, historical profitability may discourage future

performance, illustrating the cyclical nature of the relationship. Moussa and Hdidar (2019) also noted that if growth is being accompanied by inflationary pressures, rising operating costs and higher risk exposures might offset the benefits of higher lending. These findings suggest that bank profitability is not always a guarantee of economic growth, especially in weak or poorly governed environments.

Besides the positive and negative effects, other studies have found that GDP has an insignificant effect on bank profitability. Kiganda (2014), in a case study of Kenya's Equity Bank, observed that GDP had no effect on profitability, suggesting that other macroeconomic or bank-specific factors can play a more driving role. Similarly, Kanwal and Nadeem (2013) discovered that economic growth in terms of GDP had insignificant effect on the profitability of Pakistani banks, highlighting the contribution of structural characteristics of the banking sector in leading the relationship.

Various statistical methods have been used in earlier research to examine the implication of GDP on bank profitability. For example, Klein and Weill (2018) utilized cross-country panel estimation, while Ruxho and Beha (2024) utilized econometric models when they tested causality in Central and Eastern Europe. Moussa and Hdidar (2019) utilized regression analysis with panel data for 18 Tunisian banks. Other studies such as Tan and Floros (2013) utilized Generalized Method of Moments (GMM) to account for profitability persistence in the Chinese banking sector. Therefore, this result will determine the relationship to banks' profit with the following hypothesis.

H4: There is a significant relationship between GDP growth and banks' profitability in Malaysia.

2.2.6 Inflation

The inflation level is one of the most important macroeconomic indicators that influences the banking sector's performance. It is an expression used in economics to describe an ongoing increase in the average level of prices for goods and services over time in an economy (Ali & Asfaw, 2023). The effect on bank profits of inflation rate has been in conflict. The study, which looked at 13 commercial banks in Palestine between 2013 and 2017, discovered that the rate of inflation significantly improved return on assets (ROA) at Palestinian banks (Bayyoud et al., 2025). This is because in a situation when inflation is strong, banks can declare bigger profits.

Tan & Floros (2012) found that the Chinese banking industry's profitability and inflation have a positive relationship, showing that inflation in China can be accurately forecast and interest rates can be changed accordingly. According to Kelliher (2022), the author found that inflation and bank performance in Malaysia, as determined by return on equity (ROE) and capital asset ratio (CAR), have a substantial positive long-term association. This is because banks can raise lending rates during inflation, and they can gain a benefit from it.

However, some studies prove that the inflation rate and bank profit have an adverse relationship. Budhathoki et al. (2024) indicate that the findings of the correlation matrix indicate that the base rate, unemployment rate, and inflation rate all have significant negative relationships with ROA, suggesting that these variables have a detrimental impact on bank profitability. This is due to the fact that an unexpected increase in inflation rates harms the borrowers' net cash flows, which raises the number of loan defaults and reduces overall profitability. Additionally, Akbari (2025) found that when the inflation rate increases, bank performance tends to decline, showing the negative impact of the inflation rate. This is because increasing inflation is frequently followed by an increase in interest rates, which raises borrowing costs and reduces credit demand. Razi (2024) analyzed the effects of macroeconomic variables and credit risk on Bangladesh commercial banks'

performance. The author identified a strong and negative relationship between Bangladesh's inflation rate and bank performance. This is due to the fact that inflation dilutes asset value, which lowers the return that banks may obtain from their assets. As a result, profit production and bank performance are negatively impacted.

In contrast, there is one study that shows an insignificant relationship between inflation rates and bank profits. Nawir et al. (2025) stated that their research demonstrates that inflation rates have a significant influence on banking performance using financial ratio measurements.

Different statistical techniques are used in various research to investigate the relationship between bank profit and the rate of inflation. First, is Bayesian approach has been used in previous studies. It enables a more flexible and realistic modelling framework, particularly when working with dynamic or time-varying data (Ngo & Trinh, 2025). Besides that, panel data regression analysis with Random Effects Generalised Least Squares (GLS) is also used by Alslaibi et al. (2025). The Historical Cost Model adjusted for the General Price Level was employed by Abubaker (2025).

In conclusion, depending on the situation, inflation has different effects on bank profitability. According to some studies, when inflation is appropriately forecasted and controlled, banks can profit from larger interest margins and higher nominal returns. Besides, there is also a negative or insignificant influence, as unexpected inflation boosts loan defaults, borrowing costs, and depreciates assets, lowering profitability. Overall, the results show that the predictability of inflation, banks' adaptation methods, and general economic conditions all have an impact on the link between inflation and bank performance. Therefore, this result will determine the relationship to banks' profit with the following hypothesis.

H₅: There is a significant relationship between inflation rate and banks' profitability in Malaysia.

2.3 Conceptual Framework

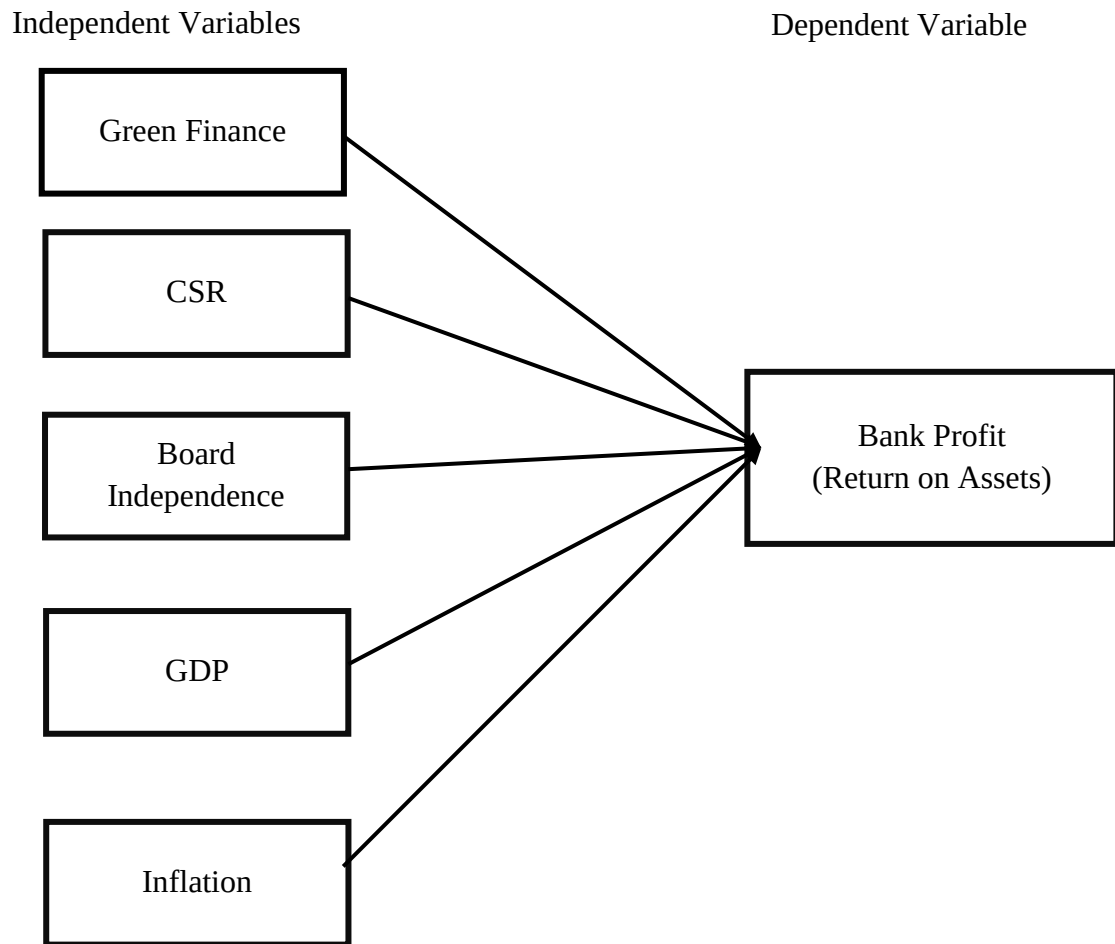


Figure 2.3 Conceptual Framework

CHAPTER 3: METHODOLOGY

3.0 Introduction

Chapter three presents the methodological framework of this study. It begins by outlining the research design and rationale for using the panel data analysis method. This is followed by a data-gathering method, along with the conceptual framework that guides this study. This is followed by the econometric model, highlighting the panel regression techniques suitable for this research. Finally, the chapter discusses the estimation methods adopted, including the use of the Fixed Effect Method (FEM), which is suitable for panel data analysis and helps control for unobserved heterogeneity across banks, thereby improving the reliability of the results.

3.1 Research Design

Research design is a blueprint of the entire research process by guiding how the study will progress up until the outcome (Abutabenjeh & Jaradat, 2018). This study adopts a quantitative research design method using secondary data to examine the impact of SDGs (Green Financing, CSR spending, and Board Independence) and macroeconomic variables (GDP and Inflation) on the profitability of Malaysian banks, measured by Return on Assets (ROA). Panel data is chosen because it captures both cross-sectional and time-series variation and increases estimation efficiency (Wooldridge, 2010).

3.2 Source of Data Collection

The data collection process in this study is conducted to support the analysis of the relationship between Sustainable Development Goals (SDGs) and the profitability of commercial banks in Malaysia. A 15-year observation period from 2011 to 2025

is employed, consistent with the SDG implementation timeline and like previous studies such as Nguyen (2023) in Vietnam and Akter (2025) in Bangladesh, which also used decade-long datasets to capture long-term financial and sustainability trends.

Table 3.1 List of Commercial Banks in Malaysia

Commercial Bank
Alliance Bank Malaysia Bhd
AMMB Holding Bhd
CIMB Group Holding Bhd
Hong Leong Bank Bhd
Malayan Banking Bhd
Public Bank Bhd
RHB Bank Bhd

Table 3.2 Sources of Dependent Variable and Explanatory Variables

VARIABLE	PROXY	UNIT MEASUREMENT	SOURCE OF DATA
BANK PROFITABILITY	Return on Assets (ROA)	Ratio (%)	Refinitiv Database
GREEN FINANCING	Environmental Pillar Score	Percentage (%)	Bank Annual Reports
CSR SPENDING	CSR Strategy Score	Percentage (%)	Bank Annual Reports
BOARD INDEPENDENCE	<i>No. of Independent Director Total Board Members</i>	Percentage (%)	Refinitiv Database
GDP	Annual GDP Change	RM in million	OpenDOSM
INFLATION	Consumer Price Index (CPI)	Percentage (%)	OpenDOSM

3.3 Economic Model

$$ROA_{it} = \beta_0 + \beta_1 GF_{it} + \beta_2 CSR_{it} + \beta_3 BI_{it} + \beta_4 GDP_t + \beta_5 INF_t + \mu_i + \varepsilon_{it}$$

(Equation 3.1)

Where:

ROA_{it} (Return on Assets) = Profitability of bank

GF_{it} (Green Financing) = Engaging in Financing environmentally friendly investments

CSR_{it} (Corporate Social Responsibility Spending) = Score on CSR activities

BI_{it} (Board Independence) = Proportion of independent directors

Macroeconomic Variables = - GDP_t (Gross Domestic Product)
- INF_t (Inflation)

3.4 Descriptive Analysis

A basic descriptive analysis was performed to concisely characterise the research dataset's main dimensions: Return on Assets (ROA), Green Finance, annual Corporate Social Responsibility (CSR) allocation, the proportion of Board Independence, GDP, and the inflation. Such an activity provides a clear overview of the underlying data distributions, highlights clear patterns, and allows for the evaluation of underlying assumptions ahead of the use of more strict estimating methods (Kemp et al., 2018).

3.5 Inferential analysis

3.5.1 Panel Data

It is also known as panel data, the data that has both cross-sectional and time-series features, and the same entities are often monitored at various time points. According

to Rüttenauer & Kapelle (2025), panel data can be used to overcome some of the fundamental problems with conventional cross-sectional analyses since it focuses on changes within units rather than the differences between units. The type of data needed in the research is panel data because the data contains a wide array of Malaysian banks, which were researched over years, and the analysis can be used to determine the change in the individual bank over time and the variation of banks. Panel data offer more information, more variability, less collinearity among variables, and can better control the unobserved heterogeneity compared with pure cross-sectional or time-series data (Hsiao, 2006). This makes panel data especially useful for banking research, since macroeconomic variables and bank-specific features may have an impact on profitability. For example, Cansu Unver-Erbas & Yilmaz (2026) are using panel data to investigate how macroeconomic and bank-specific variables affect bank profitability in the Turkish banking sector.

3.5.2 Multiple Linear Regression Model

The multiple linear regression model is used to examine the relationship between one dependent variable and several independent variables simultaneously (Uyanık & Güler, 2013). In this study, multiple linear regression is applied to analyse how Sustainable Development Goal (SDG) variables, namely Green Financing (GF), Corporate Social Responsibility (CSR), and Board Independence (BI), together with macroeconomic variables such as Gross Domestic Product (GDP) and Inflation (INF), influence bank profitability as measured by Return on Assets (ROA).

The general multiple linear regression model can be expressed as:

$$ROA_{it} = \beta_0 + \beta_1 GF_{it} + \beta_2 CSR_{it} + \beta_3 BI_{it} + \beta_4 GDP_t + \beta_5 INF_t + \varepsilon_{it}$$

(Equation 3.2)

Where:

ROA_{it} = Return on Assets for bank i at time t

GF_{it} = Green Financing

CSR_{it} = Corporate Social Responsibility

BI_{it} = Board Independence

GDP_t = Gross Domestic Product growth

INF_t = Inflation

β_0 = Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Regression coefficients

ε_{it} = Error term

For testing the relationship between the explanatory variables and the bank profitability, the hypotheses of the multiple linear regression model are as follows:

H₀: There is no significant relationship between Green Financing, Corporate Social Responsibility, Board Independence, GDP, and Inflation and bank profitability (ROA) among commercial banks in Malaysia.

H₁: There is a significant relationship between Green Financing, Corporate Social Responsibility, Board Independence, GDP, and Inflation and bank profitability (ROA) among commercial banks in Malaysia.

This model gives the fundamental analysis model on which the overall impact of a combination of explanatory variables to bank profitability can be determined. The dataset in this research is a cross-sectional and time-series data, hence the multiple linear regression framework is further modified to panel data estimation techniques, which include Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM) and Random Effects Model (REM).

3.5.3 Pooled Ordinary Least Squares Model (POLS)

A popular use of the baseline estimator is Pooled Ordinary Least Squares (POLS) which is utilized in numerous research studies. The OLS estimate is the best linear unbiased under the Gauss–Markov assumptions (Hallin, 2014).

In the context of the Pooled OLS regression model, several assumptions are imposed. These include the linearity of parameters, exogeneity of the explanatory variables, normality and constant variance of the error term, absence of autocorrelation, and absence of multicollinearity among the independent variables.

The suitability of the Pooled OLS model for the data in our study is evaluated using the Redundant Fixed Effect test and the Breusch-Pagan Lagrange Multiplier test. The Redundant Fixed Effects test is applied to determine whether the Fixed Effects Model (FEM) or the Pooled OLS model is a better fit for the data. The Breusch-Pagan Lagrange Multiplier test would help us to decide between the Random Effects Model (REM) and the Pooled OLS model that is appropriate when analyzing our data. EViews, which is a software programme, can be used to conduct all the tests.

3.5.4 Fixed Effect Model (FEM)

One of the methods for panel data regression that is used to evaluate the impact of individual characteristics on panel data outcomes is the Fixed Effects Model (FEM). FEM is useful to control the unobserved time-invariant individual effects that may bias the estimated results (Bröderl & Ludwig, 2014). Dummy variables can be added to this model to use it to capture unobserved individual-specific effects. The model is not directly observable by allowing each bank to have its own intercept, but it can capture time-invariant features that may affect bank profitability but are. In addition, time effects may also be included to control for period-specific shocks. For example, Agustini's (2011) study uses a time dummy variable to differentiate between the pre-crisis and crisis periods to examine the effects of the recent global financial crisis. To compare it with the Pooled Ordinary Least Squares Model (POLs) and Random Effect Model (REM), this study can use the Redundant Fixed Effects test and the Hausman test.

3.5.5 Random Effect Model (REM)

The Random Effects Model (REM) is another panel data regression that is used to analyse the relationship between explanatory variables and the dependent variable in panel data studies. REM will be useful when unobserved individual-specific effects exist, but the explanatory factors are random and uncorrelated (Schmidheiny & Basel, 2023). Based on this situation, the differences between banks can be considered as an error component rather than being captured as a separate intercept. According to the research showing REM is more efficient, which results in lower coefficient standard errors and more statistical power to identify effects compared to Fixed Effects Model (FEM) (Hsiao, 2022). In this study, we are using the Breusch-Pagan Lagrange Multiplier test to determine whether the Pooled Ordinary Least Squares Model (POLS) or Random Effect Model (REM) is a more suitable model. The Hausman test will be used to compare the Fixed Effect Model (FEM) and the Random Effect Model (REM).

3.6 Diagnostic Check

3.6.1 Redundant Fixed Effect Test

This study utilised the Redundant Fixed Effect test to figure out whether the Fixed Effects Model (FEM) or the Pooled Ordinary Least Squares (POLS) is better suited for the panel dataset.

H₀: Fixed effects are redundant; thus, the Pooled Ordinary Least Squares (POLS) model is the preferred choice in this study.

H₁: Fixed effects are not redundant; thus, the Fixed Effects Model (FEM) is the preferred choice in this study.

The p-value method of the Redundant Fixed Effects test is applied in this study. If the p-value is lower than the specified significance level, reject the H_0 , and it shows that FEM is the preferred choice compared with POLS in this study. On the other hand, if the p-value is greater than the significance level, do not reject H_0 , it suggests that the fixed effects are redundant and that the POLS model is suitable for this study. According to Thabani Nyoni's (2020) research, it shows that which stated that p value lower than the level of significance, reject H_0 and conclude that an efficient estimator is the FEM.

3.6.2 Breusch-Pagan Lagrange Multiplier (BPLM Test)

This study utilised the Breusch-Pagan Lagrange Multiplier (BPLM Test) to figure out whether the Random Effects Model (REM) or the Pooled Ordinary Least Squares (POLS) is better suited for the panel dataset.

H₀: There is no random effect; therefore, the Pooled Ordinary Least Squares (POLS) model is the preferred choice in this study.

H₁: There is a random effect; therefore, the Random Effects Model (REM) is the preferred choice in this study.

The p-value method of the Breusch-Pagan Lagrange Multiplier (BPLM Test) is applied in this study. If p value lower than the specified level of significance, then reject the H_0 , and it shows that there is a random effect, and the random effects model is preferable in this study. Otherwise, the p-value is greater than the significance level, do not reject H_0 , and it suggests that there is no random effect in the dataset and that the POLS model is more suitable for this study. This approach aligns with Aris et al. (2019) research, which states that a p-value less than the level of significance, H_0 can be rejected and shows that the random effects model is the more suitable model to be used in the study as compared to the Pooled OLS.

3.6.3 Hausman Test

This study utilised the Hausman Test to determine whether the Fixed Effects Model (FEM) and the Random Effects Model (REM) are better fits for the panel data of this study.

H₀: The Random Effects Model (REM) is the preferred choice in this study.

H₁: The Fixed Effects Model (FEM) is the preferred choice in this study.

The p-value method of the Hausman Test is applied in this study. If the p-value is lower than the specified level of significance, it shows that the FEM is more appropriate than the REM for the purposes of this study. Alternatively, if the p-value is greater than the significance level, the REM is more suitable for the execution of this study. This approach aligns with the Moradi and Turan Öndes (2017) research, who stated that if the p-value is less than the specified level of significance, it means H_0 must be rejected, and the Fixed Effect Model (FEM) is preferable to the Random Effect Model (REM).

3.6.4 Multicollinearity

Multicollinearity occurs when two or more independent variables in a regression model are highly correlated with each other (Vatcheva & Lee, 2016). This situation will heavily influence the reliability and accuracy of the estimated coefficients, and it will make it more difficult to separate the individual effect of each explanatory variable on the dependent variable. As a result, multicollinearity will weaken the statistical significance of the variables and decrease the accuracy of the regression estimations.

According to Kim (2019), there are a few methods to detect the multicollinearity problem, which are:

(a) Tolerance

Tolerance is the ratio of the amount of variation in one independent variable that is not accounted by the other independent variables in the model. It is calculated as:

$$\text{Tolerance} = 1 - R^2$$

(Equation 3.3)

A low value of tolerance means that the level of multicollinearity is high. Generally, in case the tolerance value is lower than 0.10, multicollinearity is regarded as a severe issue in the regression model.

(b) Variance Inflation Factor (VIF)

In case of correlation of the independent variables, the variance inflation factor is applied to measure the degree to which the variance of the predicted regression coefficient is inflated.

$$VIF = \frac{1}{1 - R^2} = \frac{1}{\text{Tolerance}}$$

(Equation 3.4)

Since tolerance is the inverse of the VIF, it shows lower the tolerance, the more multicollinearity among the variables. When $VIF = 1$, it means that there is no correlation between the independent variables. If the value of VIF is $1 < VIF < 5$, it indicates that there is a moderate correlation between the variables. VIF will identify as highly connected variables if its value falls between 5 and 10. There will be multicollinearity among the predictors in the regression model if $VIF \geq 5$ to 10, and if $VIF > 10$, the regression coefficients are poorly estimated when multicollinearity is present.

3.6.5 Autocorrelation

This study uses the Breusch–Godfrey Serial Correlation LM Test to examine whether autocorrelation exists in the regression model's error term. Autocorrelation takes place when there is a relationship over time between the residuals, and this will influence the effectiveness of the estimated coefficients and the validity in making a statistical inference (Kumar, 2023). According to Lim and Midi (2014), they stated that the Breusch-Godfrey test performs well in the detection of autocorrelation.

H₀: No serial correlation in the residuals.

H₁: Serial correlation in the residuals.

The p-value method of the Breusch–Godfrey Serial Correlation LM Test is applied in this study. If the p-value is lower than the specified level of significance, then reject H₀, indicating that there is serial correlation in the residuals. Otherwise, if the p-value is greater than the level of significance, then do not reject H₀, and it suggests that there is no serial correlation in the residuals.

3.6.6 Heteroscedasticity

This study uses the Heteroskedasticity Likelihood Ratio (LR) Test to examine whether heteroskedasticity exists in the regression model. When the variance of the error term changes across data, this is known as heteroskedasticity (Mills, 2014). This issue could make the determined coefficients less effective and lead to biased standard errors, which could result in inaccurate statistical results.

H₀: There is no heteroskedasticity in the residuals of the model.

H₁: There is heteroskedasticity in the residuals of the model.

The p-value method of the Heteroskedasticity Likelihood Ratio (LR) Test is applied in this test. If the p-value is lower than the specified level of significance, then reject the H_0 , and it shows that there is heteroskedasticity in the residuals of the model. Otherwise, if the p-value is greater than the specified level of significance, then do not reject H_0 , and it suggests that there is no heteroskedasticity in the residuals of the model. This approach aligns with the Khchoum and Bardi (2025) research, who stated that if the p-value is lower than the specified level of significance, there might be heteroscedasticity in the model.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter is focused on presenting the result of the research in chapter three which is methodologies. Secondly, the results are implemented using methodologies in chapter three that are Fixed Effect Model (FEM), will be discussed in chapter four. Hence, to measure the outcome, EViews student Lite version is applied. The model of this study are conducted to test the proposed hypotheses by analysing descriptive analysis, redundant test, multicollinearity analysis and heteroscedasticity test.

4.1 Descriptive Analysis

Table 4.1: Summaries Statistics of Variable

	GF	CSR	BI	GDP (RM in Million)	INF
Mean	53.332	61.927	58.999	1323112	118.905
Median	59.593	70.833	58.823	1346249	120.100
Maximum	91.541	99.718	88.888	1735647	134.625
Minimum	10.723	2.381	30	956730.9	103.200
Standard Deviation	26.102	30.463	12.883	227434.6	9.61731
Observation	105	105	105	105	105

The descriptive statistics of Green Finance, CSR, Independent Board Members, GDP and Inflation are shown in *Table 4.1* with 105 observations with a period of 2025 - 2011. The fact that all the variables have an equal number of observations means that this is a balanced dataset concerning the period under study.

Green Finance variable gives an average of 53.332% and a median of 59.593%. Its mean values lie within the 10.723% and 91.541% and the standard deviation is 26.102%. This shows that the performance of the sampled banks in relation to the green finance also varies among years and banks. The difference between the highest and potential values is also indicative of a high degree of variation in the green finance practices in the sample.

The mean, CSR is 61.927%, with the median of 70.833%. The mean value is 2.381% to 99.718% and the standard deviation is 30.463%. This indicates that there is no homogeneous participation in CSR amongst the sample. The low CSR are presented by some bank-year observations, and the high level of CSR commitment is evidenced by other ones. In comparison to Green Finance, CSR has a somewhat larger dispersion which indicates that CSR practices vary more.

The descriptive statistics used to establish the mean of the Independent Board Members was 58.999% and median 58.823%. The maximum is 88.888% and minimum is 30% and the standard deviation of 12.883%. This will imply that the board independence is comparatively stable as compared to the CSR and Green Finance variables. Close values of mean and median tell that the distribution of independence of the board is reasonably well balanced throughout the sample.

On GDP, RM million, the mean RM1,323,112 and median RM1,346,249. The minimum range of values is of RM956,730.9 to RM1,735,647, and standard deviation is RM227,434.6. This shows that there is observable fluctuation of the Malaysian macroeconomic environment during the sample period. The increasing trend of GDP is in line with transforming economic performance over the years that are part of the research.

In the case of Inflation, the mean is 118.905% and the median being 120.100%. The value of the variable goes between 103.200% and 134.625% and the standard

deviation is 9.617%. The spread of inflation is lower than that of the other variables which implies that inflation is quite stable during the study period.

Generally, the descriptive statistics demonstrate that CSR and Green Finance have a greater range throughout the sample, whereas the Independent Board Members and Inflation are more predictable. The changing time also presents itself in GDP which is a reason why it is a significant macroeconomic control variable. Overall, the statistics indicate that the variables have adequate variation in the panel regression analysis.

4.2 Inferential Analysis

According to the tests of the model selection, pooled OLS does not fit the study. Redundant Fixed Effects Test is also important p-value of 0.0046, which proves that there are cross-sectional effects. Besides that, there is also the Lagrange Multiplier test of random effects which is considerable since the p-value is 0.0078, indicating that a panel estimation can be used instead of pooled regression. Considering that there is a high cross-sectional across the banks, it is decided that the Fixed Effects Model is used as the model of choice since it effectively manages the unobserved factors of banks that can influence ROA.

4.2.1 Regression Analysis

$$ROA_{it} = 8.269001 + 0.00532GF_{it} + 0.00339CSR_{it} - 0.00861BI_{it} + 0.00000397GDP_t - 0.102 INF_t$$

(Equation 4.2.1)

Table 4.2.1: FEM Table

	Coefficient	t-statistics	Probability	Decision	Interpretation
Constant	8.269	(3.419)	0.0009*	Significant	Constant is significant
BI	-0.00861	(-2.151)	0.0341**	Significant	Negative significant effect on ROA
GDP	3.97E-06	(2.473)	0.0152**	Significant	Positive significant effect on ROA
INF	-0.102	(-2.701)	0.0082**	Significant	Negative significant effect on ROA
CSR	0.00339	(1.928)	0.0569***	Significant	Positive weak significant effect on ROA
GF	0.00532	(1.950)	0.0542***	Significant	Positive weak significant effect on ROA

Noted: * Indicate 1%, ** Indicate 5%, ***Indicate 10%

() Represent t-Statistics

Table 4.2.1 show the generated result of Fixed Effect Model, the general regression model is significant. It is indicated by the value of Prob(F-statistic) of 0.000016, which is less than the 5 percent level of significance. It shows that a combination of all independent variables is significant on the return on assets (ROA) of the sampled Malaysian banks. The value of R-squared of 0.350377 further indicates that independent board members, GDP, Inflation, CSR and Green Finance explain about 35.04% of variation in ROA with the rest of the variation of 64.96 % being explained by other factors not incorporated in the model.

The finding reveals that board independence has a negative and significant relationship with ROA. The coefficient stands at -0.008611, having a p-value of 0.0341 at the 5% significance level. This suggests that a one-unit increase in board

independence will cause a 0.008611% reduction in ROA, other things remaining unchanged. So, the higher the percentage of board independence, the lesser the profitability of the banks in this sample. Thus, this result is supported by Fariha et al. (2022), Arachchi (2024), and Habtoor et al. (2024) but at the same time, it contrasts with Rahman (2024), Kandel (2024) and Abiad et al. (2025) which explain that board independence is consistent with a positive relationship.

In addition, the outcome opens into the possibility that GDP affects ROA with a significant and positive impact. The correlation of the GDP is 0.00000397 and with a p-value of 0.0152, which is significant at the 5 percent level. This indicates that a one-unit increase in GDP increases ROA by 0.00000397 units, *ceteris paribus*. This implies that the level of GDP will work in Favor of the banks, making them more profitable. That is, where the economy is doing well, the banks have increased chances of earning high returns on their assets. The coefficient is small numerically but since GDP is a very huge amount. Thus, this result is proved Gul et al. (2011), and Moussa & Hdidar (2019) is consistent with positive and significant relationship, meanwhile it contrasts with Kanwal & Nadeem (2013), Kiganda (2014) and Tan & Floros (2013) which explain GDP is consistent with a negative and significant relationship.

Moreover, the ROA is negatively and significantly related to Inflation. The value of the coefficient is -0.102286, and the p-value is 0.0082, which is less than the 0.05 significance level. It means that a one-unit level of inflation will decrease ROA by 0.102286 units, all things being equal. This observation implies that an increase in prices or inflationary pressure can adversely impact the performance of banks. To conclude, this result is proved by Nawir et al. (2025), Budhathoki et al. (2024) and Akbari (2025) is consistent with negative and significant relationship, contrasts with the positive relationship of Bayyoud et al. (2025), Kelliher (2022) and Alslaibi et al. (2025) is a positive relationship.

The outcome further shows that the CSR correlates positively with ROA. The coefficient 0.003394 means an increase in CSR by one-unit will cause an increase in ROA by 0.003394 units. However, the p-value is 0.0569, so the variable is not significant at the 5 percent level but it is weakly significant at the 10 percent level. Hence, CSR has a weakly significant influence on bank profitability. Hence, this result is supported by Ashraf et al. (2017), Dimaala (2020), Shabir et al. (2024) and Murasi & Osiemo (2024) but at the same time, it contrasts with Boateng et al. (2025), Slama & Hamouda (2023) and Giannopoulos et al. (2024) which explain CSR is consistent with a negative relationship.

Other than that, there is a positive relationship between Green Finance and ROA. The coefficient stands at 0.005326, which states that a one-unit increment in Green Finance will increase ROA by 0.005326 units. The p-value of 0.0542 indicates that this variable is not significant at the 5 percent level but weakly significant at the 10 percent level. Therefore, the green finance positively affects the bank's profitability with a weak relationship. This result is supported by Mamun & Rana (2020) and Hadi et al. (2023), but contrasts with Zhou et al. (2024), Chang (2021), and Mirovic et al. (2023), who explain that Green Finance is consistent with a negative relationship

Overall, the outcomes of the FEM analysis indicate that the macroeconomic factors and determinants of bank profitability are GDP and Inflation whereas independent board members have a negative and significant impact on ROA. At the same time, CSR as well as Green Finance indicates the positive but weakly significant impacts on ROA. Hence, the results suggest that the significance of both governance and macroeconomic variables in the performance of the Malaysian banks is significant.

4.3 Diagnostic Checking

4.3.1 Multicollinearity Test

Table 4.3.1 Multicollinearity Test Result

Independent Variable	VIF	Tolerance
GDP	117.59	0.008504
Green Financing	1.70	0.586912
CSR	2.54	0.394459
Inflation (CPI)	116.32	0.008597
Board Independence	2.35	0.425555

A multicollinearity test is performed to identify whether multicollinearity exists in the model. According to *Table 4.3.1*, the value of VIF for GDP, green financing, CSR, inflation (CPI), board independence is 117.59, 1.70, 2.54, 116.32, and 2.35 respectively, while the value for tolerance is equal to 0.008504, 0.586912, 0.394459, 0.008597, and 0.425555 respectively. Green financing, CSR, and board independence do not indicate multicollinearity problem because the value of VIF is less than 10 and value of tolerance is more than 0.2. However, for GDP and inflation (CPI) indicates serious multicollinearity because the value of VIF is more than 10 and value of tolerance is less than 0.2. This implies that both variables may be capturing similar macroeconomic effects in the model. Such result may be reasonable as macroeconomic variables are often interrelated, as supported by Shiferaw (2023) and Atigala et al. (2022). Hence, multicollinearity exists in the regression model, particularly between GDP and inflation (CPI), while other variables show no multicollinearity problem.

4.3.2 Autocorrelation

Table 4.3.2 Breusch-Godfrey Serial Correlation LM Test Results

F- statistic	P- value
2.164	0.0646

Autocorrelation is a significant concern in panel data analysis. Since this study uses panel data, the Breusch-Godfrey Serial Correlation LM test is employed to determine whether autocorrelation is present. The null hypothesis indicates that there is no serial autocorrelation in the residuals, whereas the alternative hypothesis indicates that there is serial autocorrelation in the residuals. According to *Table 4.3.2*, the p-value is 0.0646, therefore null hypothesis cannot be rejected at 5% significance level. Hence, there is no autocorrelation problem occurs in the regression at 5% significance level.

4.3.3 Redundant Fixed Effect Test

Table 4.3.3 Redundant Fixed Effect Test Results

Effect Test	Statistic	d.f.	Prob.
Cross-section F	3.384	(6,93)	0.0046
Cross-section Chi-square	20.737	6	0.0020

Redundant fixed effect test was carried out to determine whether the pooled OLS model or fixed effect model is more suitable for the panel data analysis. The null hypothesis states that the cross-section fixed effects are redundant. According to *Table 4.3.3*, the results show that the p-value of cross-section F- statistic and cross-section Chi-square statistic is 0.0046 and 0.002 respectively. Since both p-values are below the 5% significance level, the null hypothesis is rejected. This implies

that the fixed effect model is more suitable than pooled OLS model for analyzing the relationship between the independent variables and ROA.

4.3.4 Heteroscedasticity

Table 4.3.4 Panel Heteroscedasticity LR Test Results

Test	Statistic	P-value
Cross-section heteroscedasticity	104.338	0.000
Period heteroscedasticity	108.461	0.000

Heteroscedasticity test is used to determine whether the variance of the residuals is constant or varies across cross-sections or time periods in panel data. The panel heteroskedasticity LR test was used, where the null hypothesis indicates that the residuals are homoscedastic. According to *Table 4.3.4*, the p-value is 0.000 for both cross-section and period effects which rejects the null hypothesis. Therefore, this indicates that presence of heteroscedasticity in the panel data.

CHAPTER 5: MAJOR FINDINGS, IMPLICATIONS AND CONCLUSIONS

5.1 Discussion of Major Findings

Table 5.1: Summary of FEM Regression Results

Dependent Variable	Independent Variable	Result
ROA	Board Independence	Negative and significant
	GDP	Positive and significant
	Inflation	Negative and significant
	CSR	Positive and weakly significant
	Green Financing	Positive and weakly significant

Our findings show that board independence has a negative and significant relationship with ROA. This means that a higher proportion of independent directors is associated with lower bank profitability. This result is consistent with Fariha et al. (2022) and Arachchi (2024), who also reported a negative relationship. This may suggest that, in our study, a more independent board strengthens monitoring and governance, but it may also lead to stricter control and slower decision-making. As a result, this can reduce flexibility in business operations and weaken short-term profitability.

Next, our findings indicate that GDP has a positive and significant relationship with ROA. This shows that when the economic level improves, bank profitability also

increases. This result is consistent with Gul et al. (2011) and Moussa and Hdidar (2019), who found that a stronger economic level supports bank performance. This is because economic expansion usually increases demand for loans, financing, and other banking services. At the same time, better economic conditions improve borrowers' repayment capacity, which helps banks generate higher returns.

Besides that, inflation has a negative and significant relationship with ROA. This means that rising inflation reduces bank profitability. Our result is in line with Budhathoki et al. (2024), Akbari (2025), and Razi (2024), who also found that inflation weakens bank performance. This may happen because inflation increases operating costs and financing costs, while also reducing customers' real purchasing power. When borrowers face greater financial pressure, repayment ability may decline, which then affects banks' earnings and overall profitability.

For the SDG-related variables, our findings show that CSR and green financing variable both have positive but weakly significant relationships with ROA. This suggests that CSR and green-related activities may show limited positive evidence, but their effects are still not strong in our study. Previous studies have also shown mixed results, where some found a positive relationship while others reported a negative one. This may be because the financial benefits of CSR and green finance are usually not immediate. These activities often contribute more to reputation, stakeholder trust, and long-term sustainability, but their short-term effect on profitability may still be limited. Therefore, in our study, both variables show some positive contribution, but the impact is still modest compared to the stronger effects of macroeconomic factors.

Overall, our findings show that macroeconomic factors and board independence have stronger short-term effects on bank profitability than SDG-related variables. GDP supports profitability, while inflation and board independence reduce it. Meanwhile, CSR and green finance appear to contribute positively, but their impacts are still modest in our study.

5.2 Implications of the Study

From an industry perspective, the findings of our study provide several practical insights about SDG integration in bank management. The positive relationship between green financing and profitability, although the effect is found to only be marginally significant. Banks are encouraged to gradually expand their involvement in green financing while considering its long-term benefits rather than short-term gains. Board independence shows a negative effect, implying that while stricter monitoring improves governance and reduces risk, it may also slow decision making, therefore a balance between control and flexibility is necessary. Corporate Social Responsibility (CSR) shows weak evidence of influencing profitability, this suggests that it should be treated as a long-term strategy, exactly like green financing. In addition, inflation negatively affects banks profitability. This highlights the need for banks to strengthen their risk management strategies to minimize losses during periods of economic uncertainty.

Secondly, policy makers should continue to support sustainable financing initiatives. As shown in our results, green financing shows a marginally positive relationship with bank performance. Policy makers should therefore encourage the development of green financing through appropriate incentives and regulatory support. In addition, economic growth (GDP) plays a crucial role when it comes to enhancing bank profitability. This highlights the need for policies that promote a stable yet expanding economy. At the same time, inflation negative impact on the profitability on banks indicates that the rise in price levels can bring a negative impact to the banking sector. Furthermore, governance regulations (board independence) should remain somewhat balanced to ensure that bank oversight does not become overly restrictive, which could hinder a banks' operational efficiency. In addition, policymakers such as BNM may further strengthen existing sustainability frameworks by introducing more standardized bank-level metrics or scoring mechanisms for CSR and green financing, while improving consistency in how banks report these variables.

Lastly, this study contributes to existing literatures by providing empirical evidence from Malaysia on the relationship between sustainability and bank profitability. The findings indicate that the effects of SDG-related variables are mixed, as our study shows that green financing and CSR show only limited influence, while board independence indicates a negative impact on banks' performance. This suggests that the integration of sustainability practices on whether it affects the profitability on banks may vary across different contexts. In addition, the significance of GDP and inflation highlights the importance of considering internal and external factors when examining the profitability of banks in future research.

5.3 Limitation

This study has some limitations that need to be mentioned. First, this study's exclusive focus on Malaysian banks limits the applicability of the findings. The results may not accurately reflect those of other financial institutions or banking systems in other countries, as the sample is limited to a small number of Malaysian banks. According to research, banking profitability may vary across countries due to differences in macroeconomic environments, tax policies, and institutional realities (Dietrich & Wanzenried, 2014). Therefore, this study is better suited to explaining the Malaysian context than the global context.

This study mostly uses secondary data from banks' annual reports and Refinitiv Workspace. This shows a weakness since the analysis is done based on the consistency, completeness, and openness of the information provided. The CSR spending, sustainability projects, and governance practices can be reported by different banks in various formats, definitions, or levels of detail. This may result in the data not being comparable across banks, which will affect the accuracy of the measurement and cause potential measurement error. Also, as the study relies on publicly disclosed information, any omission, underreporting, or discrepancy in disclosure can influence the validity of the results. Therefore, the results of this

study must be interpreted carefully since they may be influenced by differences in reporting practices across the bank.

5.4 Recommendations

There are several recommendations based on the limitations of this study. First, future research can expand the sample size by including more banks or extending the study beyond Malaysia. This would increase the findings' applicability and enable comparisons between various institutional, tax, and macroeconomic contexts. The results may be more appropriate for understanding the local banking context rather than the larger global banking industry because this study is mainly focused on Malaysian banks. Using a larger sample would offer a greater understanding of how Sustainable Development Goals (SDGs) impact bank profitability under different financial and economic conditions. Moreover, the increased size of the sample can be used to determine whether the correlation between SDG-related activities and profitability is constant or different across countries because of the difference banking systems and policy frameworks.

Second, rather than relying on bank annual reports and Refinitiv Workspace, future research should use a variety of detailed data sources. Other sources, such as sustainability reports, sustainability databases, central bank publications and other financial platforms can improve data consistency, completeness, and transparency. Besides, future researchers can also include qualitative research techniques like interviews or case studies to understand better the application of sustainability-related practices among banks.

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