

The relationship between sustainability reporting and banks financial performance



*A research report submitted to the Faculty of Commerce, Law and Management,
University of the Witwatersrand, in partial fulfilment of the requirements for the
degree of Master of Management in Finance and Investments*

Thokozani Msimanga

Student Number: 813085

Research Supervisor: Dr. Euphemia Godspower-Akpomiemie

Date: 28 February 2023

DECLARATION

I, Thokozani Msimanga, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in Finance and Investments at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

THOKOZANI MSIMANGA



Signed at.....Rivonia.....

On the28th... day ofFebruary 2023.

ABSTRACT

Sustainability reporting, which involves environment, social, governance (ESG) is about reporting non-financial information regarding a company. It explains how the three sustainability components affect a company. ESG has gained significant popularity in the last ten years as new risk factors for investors are introduced by global sustainability concerns such as climate change, growing regulatory constraints, and social transformations.

There is limited ESG-related research in South Africa, hence the aim of this study is to empirically evaluate whether sustainability reporting, improves financial performance and value for investors and other stakeholders. This has created a knowledge gap that may be investigated and used to start a discussion about the relationship sustainability has with financial performance from a South African banking perspective.

This study's data covered a 16-year period being, 2006 – 2021, across the six largest locally controlled banks listed on the JSE; Absa, Capitec, FirstRand, Investec, Nedbank, and Standard Bank. To examine for a statistical association, panel data regression analysis is used in this study. Multiple methods of estimation were considered, ultimately various diagnostic tests conducted concluded the fixed effects model as the most robust.

A negative relationship with financial performance was found. Two models, Return on Equity and Tobin's Q model showed a negative and significant relationship with the performance of banks. The Return on Assets model also indicated a negative relationship, but it was not statistically significant. This indicates that an increase in sustainability reporting, leads to a decline in financial performance from both an accounting and market perspective.

Key words: Environmental, Financial Performance , Governance, Return on Assets, Return on Equity, Sustainability, Social ,Tobin's Q.

ACKNOWLEDGMENT

I would like to thank God for guiding me and enabling me to complete this report.

“When the time is right I, the Lord, will make it happen.”- Isaiah 60:22

To my supervisor, Dr. Euphemia Godspower-Akpomemie , I express my sincere gratitude for the continued support, guidance, and patience. Your insights have been invaluable.

To my family, I am who I am because of all you have done for me. Your support has enabled me to pursue my dreams. Thank you for the continuous reminder to never give up.

Finally, to my friends thank you for the support and encouragement.

DEDICATION

This one is for me.

Contents

Chapter 1. Introduction	1
1.1. Context of the study	1
1.2. Motivation for the study and problem statement	2
1.3. Aim and Objectives	3
1.4. Research Question	3
1.5. Hypothesis Development	4
1.6. Significance of the Research	4
1.7. Paper Outline	5
Chapter 2. Literature Review	6
2.1. Introduction	6
2.2. Theoretical Framework	6
2.3. Sustainability Development	6
2.4. Sustainability Reporting	7
2.5. Sustainability Reporting in the Banking Sector	9
2.6. Sustainability reporting in the South African banking sector	10
2.7. ESG Scores	12
2.8. Bank Sector Financial Performance	14
2.9. ESG and Financial Performance of Banks	17
2.10. Previous Research	17
2.11. Chapter Summary	19
Chapter 3. Methodology	20
3.1. Introduction	20
3.1. Research Design	20
3.2. Population and Sample Size	20
3.3. Data collection and sources	22
3.4. Variable Description	22
3.5. Data Analysis	25
3.6. Panel Data Models	26
3.7. Panel Data Diagnostic Tests	27
3.8. Regression Model	30
3.9. Ethical Considerations	31

3.10.	Validity and Reliability	31
3.11.	Chapter Summary	32
Chapter 4.	Data Analysis and Discussions	33
4.1.	Introduction	33
4.2.	Descriptive Statistics	33
4.3.	Correlation.....	37
4.4.	Econometric Model Estimation Results.....	39
4.5.	ROA Diagnostic Tests.....	40
4.6.	ROA Regression Discussion	42
4.7.	ROE Diagnostic Tests.....	45
4.8.	ROE Regression Discussion	46
4.9.	Tobin's Q Diagnostic Tests	49
4.10.	Tobin's Q Regression Discussion.....	51
4.11.	Hypothesis Discussion	53
Chapter 5.	Conclusion and Recommendations	55
5.1.	Introduction	55
5.2.	Summary of findings	55
5.3.	Conclusion	57
5.4.	Policy Implications.....	58
5.5.	Contributions to literature	59
5.6.	Recommendations to future research	59
Chapter 6.	References	61
Chapter 7.	Annexures	65
7.1.	ROA -Model Outputs	65
7.2.	ROE Model Outputs	66
7.3.	Tobin's Q-Model Outputs	67

LIST OF TABLES

<i>Table 1: Comparison between financial and sustainability reporting</i>	<i>9</i>
<i>Table 2:MSCI ESG Research score scale</i>	<i>13</i>
<i>Table 3: Classification of variables and their definition</i>	<i>23</i>
<i>Table 4: Descriptive Statistics</i>	<i>33</i>
<i>Table 5:Diagnostic tests on the Return on Assets model.</i>	<i>40</i>
<i>Table 6:Regression output on the Return on Assets model</i>	<i>42</i>

<i>Table 7:Diagnostic tests on the Return on Equity model.</i>	45
Table 8:Regression output on the Return on Equity model.....	46
<i>Table 9:Diagnostic tests on the Tobin's Q model</i>	49
Table 10:Regression output on the Tobin's Q model.....	51
Table 11:Summary of regression models	55

LIST OF FIGURES

Figure 1: Asset and Deposit Market Share	22
--	----

LIST OF EQUATIONS

<i>Equation 1:Econometric Mode</i>	30
<i>Equation 2:Model with variables added</i>	30

ABBREVIATIONS

ESG - Environmental, Social, Governance

ROA - Return on Asset

ROE - Return on Equity

TQ - Tobin Q

GFC - Global Financial Crisis

RGDP- Real Gross Domestic Product

JSE- Johannesburg Stock Exchange

Chapter 1. Introduction

1.1. Context of the study

A disclosure philosophy known as sustainability reporting focuses on creating future value through business strategy. An organization's environmental, social, and governance (ESG) impacts are discussed in a sustainability report, which also provides non-financial information about the company. This report contains the firms' principles, models, and values through, which sustainability performance of an organization is communicated. Additionally, the report demonstrates the company's strategic commitment to sustainability (Buallay et al., 2020).

The term ESG was initially proposed in June 2004, as part of the UN Global Compact's "Who Cares Wins" initiative, which focuses on the importance of responsible investing (WWF, 2014). This term has its origins in Socially Responsible Investing (SRI), which dates back more than four decades. SRI was utilized for a long time to allow investors to avoid companies they disliked for ethical and value-based reasons. In recent years it has been argued that although negative screening is useful, it may be too restrictive (Commonfund, 2013). Whereas ESG analysis takes on a broader view and examines whether the inclusion of its three components is material to a company's financial performance. This study is crucial because a company's principal goal is to maximize shareholder value.

ESG has grown considerable traction in the past decade as global sustainability challenges such as climate change, increased regulatory pressures and social shifts introduce new risk factors to investors. This has led investors to require more transparency regarding ESG participation and risk management as part of a company's value proposition. Consequently, ESG has been incorporated into investment analysis and decision-making processes (SSE, 2015). According to Buallay et al. (2020) from 2012 to 2016, the average yearly growth rate for all socially responsible investments worldwide was 15%. ESG incorporation is anticipated to rise because of the United Nations' recommendation that businesses declare their ESG policies by 2030.

The financial sector is under investigation due to the increased interest in sustainability reporting among businesses worldwide. Financial institutions are in charge of transmitting and allocating monetary resources, which gives them a key position in the global economy (Bătae et al., 2021; Crespi & Migliavacca, 2020). The 2008 global financial crisis diminished trust in financial services institutions, as such understanding the ESG impacts is crucial (Azmi et al., 2021). Consequently, the current drive for sustainability may be redemption for this sector rebuild their reputation and credibility as this will display their commitment to creating sustainable business practices (Crespi & Migliavacca, 2020; WWF, 2014).

To ensure and promote long term financial stability and economic development, “banks need to adhere to the international best practices in corporate governance, risk management and compliance standards” (WWF, 2014). If a bank is run inefficiently and becomes bankrupt, it could require a government bailout as a measure of systematic risk because a failure of a bank could trigger instability within the economy. After the 2008 global financial crisis multiple governments bailed out their banks. In South Africa, the reserve bank utilized the principles of the “Financial Stability Board of the Group of 20 (G20)” major economies to bail out African Bank in 2014 (Wiseman, 2014). ESG activities and sustainability reporting may be seen as a contribution to those governance structures, which prevent bank failures due to unsustainable banking practices.

1.2. Motivation for the study and problem statement

The significance of environmental, social, and governance (ESG) has inspired academics to carry out empirical studies, leading to an expanding body of literature examining the impact that ESG activities have on businesses (Buallay et al., 2020). Given the stakeholder’s theory, a firm’s core objective is to maximize shareholders value. There are limited studies based on the relationship ESG activities have on the financial performance (Garcia et al., 2017; Johnson et al., 2019). Some existing studies found a strong and positive relationship between financial performance and ESG activities in sustainability reporting (Uddin Ahmed et al., 2018).

Majority of these studies have been in the developed market context (Buallay et al., 2020; Cremona & Passador, 2019; Johnson et al., 2019; Weber et al., 2015). The information may not be generalized to developing economies despite the fact that empirical research on banks reported in

developed markets is extremely comprehensive and mostly emphasizes a positive relationship (Duque-Grisales & Aguilera-Caracuel, 2019). Developed markets have stricter regulatory restrictions and ESG disclosures vary across firms, sectors, and countries (Buallay et al., 2020; Duque-Grisales & Aguilera-Caracuel, 2019). This variance is enhanced by ESG data not yet having a standardized disclosure requirement (Buallay et al., 2020). A further expense related to ESG activity is agency fees (Azmi et al., 2021).

Research on this relationship in emerging markets is rare but it could prove to be most useful in those markets because emerging markets have been identified as major contributors to the global sustainability gap (Buallay et al., 2020). Conducting a study in an emerging market would allow for the examination of the relationship in markets where financial regulations are still in the developing stage, with rapidly changing demographics and developing environment policies and ESG activity inclusion could provide banks more value (Azmi et al., 2021).

In South Africa there is still limited ESG activities related research, with majority of research focusing on corporate governance, engaging with all three ESG components is crucial to ensuring a complete grasp of the connection between sustainability reporting and financial performance (Johnson et al., 2019). This has left a gap in knowledge that can be explored and pioneer the conversation of the relationship between sustainability reporting and financial performance within the South African banking context.

1.3. Aim and Objectives

The aim and objective of this study is to empirically investigate whether sustainability reporting, which is determined by the ESG disclosure score, results in better financial performance and value for investors and all stakeholders within the South African banking industry.

1.4. Research Question

To achieve the aim and objective of this study, the following questions were addressed.

- What is the relationship between Environmental, Social, Governance (ESG) and a Bank's Financial Performance (FP)?

- Does sustainability reporting increase shareholder value?

1.5. Hypothesis Development

H_0 : Sustainability reporting, which is determined by the ESG disclosure score, results in better financial performance and value for investors and all stakeholders

H_1 : Sustainability reporting, which is determined by the ESG disclosure score, results in the reduction of financial performance and value for investors and all stakeholders

1.6. Significance of the Research

Sustainability challenges threaten the longevity of a bank, and it has become more apparent that banks need to acknowledge these challenges and manage the environmental, social, governance risks. Banks's credibility has been under more scrutiny since the 2008 global financial crisis and will be under more scrutiny given the Covid-19 pandemic.

With the global trends of sustainability reporting, our findings could be a guide to banks in emerging markets looking to implement environmental, social, governance activities and risk management. The research is of significance to the senior management and executives within banks that are responsible for strategy development and sustainability. This research will assist in making better informed decisions that best maximise shareholders' interests while ensuring the sustainability of the bank.

For academics, this study makes an addition to the literature on holistic sustainability reporting that includes all three components of sustainability: environment, social, governance and the relationship with financial performance of banks in developing countries. This research may be significant to policymakers ensuring regulatory change that is in line with international best practice. Policy makers might find the outcome helpful in understanding the ESG risk factor consideration. Including stakeholders concerned with the impact of ESG in the banking sector, such as existing clients, future clients, and potential investors.

1.7. Paper Outline

The first chapter of this research gives a background of the topic and establishes a problem statement within the topic. The motivation of the study is elaborated, and a research question is formed along with the objectives of this study.

The second chapter provides an in-depth understanding into the concepts discussed in this study along with a theoretical overview of the topic being studied. The chapter will give a better understanding of current research. The aim is to summarise and analyse previous research and highlight any gaps that may exist to date.

Chapter three details the methodology used to address the research questions. It outlines the sequences followed to collect the data, along with the statistical techniques used for analyses. It offers precise evaluation of the study's reliability.

Chapter four performs diagnostic tests to select the robust model. The regression model was run, and the results of the analysis are presented. Further to that the chapter empirically analysed the findings in accordance with the research questions.

Chapter five is the final chapter, which provides concluding remarks regarding the study's findings along with recommending what future researchers could investigate.

Chapter 2. Literature Review

2.1. Introduction

This chapter provides a comprehensive analysis of the existing knowledge and literature regarding sustainability reporting, in addition to the theories that underpin bank performance. This chapter establishes a solid conceptual foundation.

2.2. Theoretical Framework

Although there are various hypotheses that explain why a company would want to disclose sustainability data, legitimate reasons for reporting sustainability data are often linked to: standards, laws, and stakeholders (Buallay, 2019). The stakeholder theory, based on the work of Freeman, 1984 as stated in Azmi et al. (2021) argues that a business has an ethical and moral responsibility towards its stakeholders, which include the clients, suppliers, employees, regulatory authorities and public society and not just the shareholders. Stakeholder theory states that business can be understood as a set of relationships among the groups that have a stake in the business, and how they jointly interact to create value, where there is a conflict of interest between stakeholders, management must find solutions and trade-offs that improve all sides.

2.3. Sustainability Development

Sustainability development is a policy concept that has its origins in the “United Nation’s World Commission on Environment and Development (WCED)” report of 1987 (Kuhlman & Farrington, 2010). According to the WCED study, sustainable development is defined as "development that satisfies current demands without compromising the capacity of future generations to satisfy their own needs" (Lisene, 2015). The report was concerned with creating a better future, particularly with irreplaceable natural resources as opposed to living for the present (Kuhlman & Farrington, 2010).

Authors such as Lisene (2015) and Busco and Sofra (2021) argue that the term may have been left undefined as the vague nature of the WCED definition created many definitions as the provided definition simply implies “continuous evolution” but the concept does not lack meaning. This is

where other meanings of sustainability development came from, as the concept keeps improving and changing over time (Lisene, 2015). It is crucial to contextualise the meaning of sustainability development for this study. This study is based on the definition of sustainability development provided by Johnson et al. (2019) “ sustainable development considers the effects of our current generation’s actions on the environment, society and the manner we govern our companies”.

In 1992 there was a follow up on the WCED with the intention to establish practical initiatives that could make the planet more sustainable (Lisene, 2015). The most commendable part about the follow up summit was the encouragement in a global effort for companies to contribute towards sustainability on all levels and not just the social component (Johnson et al., 2019; Lisene, 2015). Since then there has been many initiatives to incorporate all aspects of sustainability, especially towards the 21st century as companies faced many different challenges such as climate change and the shortage of natural resources (Johnson et al., 2019).

Sustainability became the blanket term for companies efforts to “do better” the primary focus has been on the social aspect (Johnson et al., 2019). Initiatives such as Socially Responsible Investing (SRI) were enforced, which integrates personal values and societal concerns with investment decisions (Commonfund, 2013). SRI is a form of negative screening according to ethical guidelines; however, it is quite subjective (Busco & Sofra, 2021). The phrase "corporate social responsibility," or CSR, also refers actions taken by businesses to address social issues (Johnson et al., 2019; Mefford & Johnston, 2016).

When businesses realized there were advantages beyond preserving a positive corporate image, they grew more engaged. Benefits including improved quality and productivity, lower expenses, employee motivation, risk mitigation, and higher sales (Mefford & Johnston, 2016).

2.4. Sustainability Reporting

Sustainability is a worldwide business issue, and practically every firm makes sustainability commitments to stakeholders (Lisene, 2015). Which is why the “2030 Agenda”, for sustainable development was a milestone for sustainability with crucial and unprecedented agreements by the international community (Busco & Sofra, 2021).

A sustainability report provides non-financial data about a company and details the influence it has on environmental, social, and governance (ESG) issues (SSE, 2015). The report addresses the pertinent ESG information requirements of investors and stakeholders (Buallay et al., 2020; SSE, 2015). A sustainability report provides stakeholders with “non-financial” information required to understand the industry and the ESG impacts (WWF, 2014). A sustainability report incorporates the accepted governance models and exhibits a company's connection between its “strategy and its commitment to a sustainable global economy” according to Buallay et al. (2020) and Thaslim and Antony (2016). The report communicates the sustainability performance allowing the company to set goals and manage change more effectively.

This report has become more important and necessary over the years within various industries (WWF, 2014). The total annual growth rate of worldwide investments in socially responsible and sustainable practices from 2012 to 2016 was 15% (SSE, 2015). According to Buallay et al. (2020), that is predicted to rise because of the “2030 Agenda”. Investors and asset managers are also preferring sustainable investments (Buallay et al., 2020). Besides the increasing interest from an investors perspectives companies, this is not a new concept however it has been popularised due to the rising concerns of sustainability (Johnson et al., 2019; Thaslim & Antony, 2016).

Preliminary studies suggest that implementing sustainability reporting into the investment analysis has significant impact on the investment performance (SSE, 2015). Thaslim and Antony (2016) argues that sustainability reporting doesn't have a standardized disclosure method unlike financial reporting, which makes it difficult to compare. Lisene (2015) states that although guidelines are provided by the “Global Reporting Initiative (GRI)” each organization chooses what to report.. According to Buallay et al. (2020) and Lisene (2015) sustainability reporting is subjective since there is no standard framework for sustainability reports and no published examples of sustainability performance indicators. This complicates business sustainability reporting measurement and monitoring.

Information regarding an entity's financial position, operating outcomes, and cash flows is provided to stakeholders in financial reports (Buallay et al., 2020). Authors such as Buallay (2019); Garcia et al. (2017) and Weber et al. (2015) discuss that financial reporting alone is not enough to

assess investment opportunities, additional sustainability reports are required. Although this knowledge is required for decision-making processes, it may not be adequate for making sound investment decisions. Continuously, stakeholders want more data on the ESG implications of an entity's operations (WWF, 2014). Sustainable Development Goals and the reinforcing of the significance of ESG trends will equate financial success with sustainability (Crespi & Migliavacca, 2020).

Table 1: Comparison between financial and sustainability reporting

	Financial Reporting	Sustainability Reporting
Information	Financial data	Non-financial data
Year Focus	Backward looking	Backward and forward looking
Focus	Direct issues related to the organization	Issues and initiatives of sustainability
Target	Shareholders and investors	Shareholders and investors
Industry Customisation	Low	High
Regulation for Guidelines	Financial Accounting Standards Boards, General Accepted Accounting Procedures (GAAP) or IFRS	Global Reporting Initiative (GRI)

Source: Thaslim and Antony (2016)

2.5. Sustainability Reporting in the Banking Sector

Long term financial stability requires participation from banks given how they impact economic development, including voluntarily reporting their strategies and actions taken towards sustainability (Buallay et al., 2020; WWF, 2014). According to Crespi and Migliavacca (2020) and Cremona and Passador (2019), banks provide credit to various economic participants and allowing the overall economy to continue the growth cycle. Given this reason, it is therefore evident that banks need to factor in Environmental, Social, Governance (ESG) related risks as it may have an overarching detrimental effect. Failure of banks to address ESG concerns would endanger the viability of the firms they fund, putting their own financial stability at risk (Uddin Ahmed et al., 2018).

The deterioration of the economy coupled with significant banking scandals have contributed to the challenging environment financial institutions find themselves (Buallay, 2019; Cremona & Passador, 2019). According to Cremona and Passador (2019), the 2008 GFC further reinforced the needs for banks to review sustainability strategies and using ESG aspects as an important tool for rebuilding their reputation and creditability within the market and the public at large. This statement is further supported by Crespi and Migliavacca (2020), who claims that "sustainable finance rating addiction" is now a well-known issue in the banking sector.

Banks that were able to survive after the 2008 global financial crisis are banks that operated in a sustainable manner and focused on ESG components, thus in order for banks to survive they must have holistic, integrated strategies (Buallay, 2019; Matemané & Wentzel, 2019). Embracing sustainability practices has reputational benefits and may incentivise current and potential clients to align their own businesses in a sustainable manner to acquire financing from banks (Cremona & Passador, 2019; Crespi & Migliavacca, 2020).

In the beginning of the 21st century, sustainability practices primarily focused on industries that had a direct visible impact, such as manufacturing and mining are more likely to harm society and the environment because they are routinely fraught with “social taboos, moral conflicts, and political pressures” (Garcia et al., 2017). As such, Buallay (2019) states that as the reason banks incorporated sustainability practices at a later stage.

2.6. Sustainability reporting in the South African banking sector

The South African banking sector is oligopolistic and dominated by the “Big Four”, which are also the four largest banks in Africa by assets and capital (Ifeacho & Ngalawa, 2014; Nedbank, 2021). “Absa Group, FirstRand, Nedbank, and Standard Bank” are among them. Their market capitalisation and revenue increased from R1.4 trillion in 2003 to nearly R5 trillion in 2014, with the "Big Four" banks accounting for 85 percent of listed banks market capitalisation (Kumbirai & Webb, 2010). Ifeacho and Ngalawa (2014) states that banks are the third biggest employer, employing more than 10% of the nation's workforce, and contributing more than 20% of the country's real gross domestic products. The South African banking sector has an important role in

enhancing economic growth. As a result, it is evident that knowledge of the banking sector's operations and the variables affecting its performance is required in order to develop and execute successful policies (Ifeacho & Ngalawa, 2014).

Since South Africa became a constitutional democracy in 1994, the banking sector has seen significant regulatory and technological developments. These advancements have also aided in the development of a mature, well-regulated banking system, which is supported by a competent legal framework (Ifeacho & Ngalawa, 2014; Kumbirai & Webb, 2010).

Through effective monitoring and oversight of the banking industry during the 2008 GFC, the sector was largely protected from the crisis' direct effects, which may be attributed to the system's effectiveness (Lisene, 2015; Matemane & Wentzel, 2019). Although the South African banking system was not directly affected, the negative contagion effects of the crisis had a severe impact on bank's balance sheet and the national economy (Lisene, 2015). Despite this insulation the banks have had their own challenges. An example of these challenges is the African Bank bailout when the South African Reserve Bank used the principles of the "Financial Stability Board of the Group of 20 (G20)" to rescue African Bank in 2014 (Wiseman, 2014). Due to the severe implications of a bank failure to its surroundings and the importance of the banking industry to the economic prosperity of the nation, the bailout of banks aims to reduce systematic risk (Matemane & Wentzel, 2019). The Nedbank Group Integrated Report 2020 states the following, "despite the Covid-19 crisis, conditions in the South African banks remain well capitalised and liquid with the key ratios well above the minimum regulatory levels" (Nedbank, 2021).

The interest in sustainability has increased in emerging markets, however there is still limited ESG-related research, according to Johnson et al. (2019), there is even more limited research specifically within the banking sector. Although the 2008 GFC crisis did not have an adverse impact on South Africa's banking sector, it remains a significant economic participant (Matemane & Wentzel, 2019).

The G component has more research, despite the entire ESG having a knowledge deficit. South Africa is unique amongst emerging economies and is considered as a pioneer in corporate

governance and reporting (Matemane & Wentzel, 2019). According to Lisene (2015) and Johnson et al. (2019) there is established corporate governance framework, which is known as the Kings code IV for corporate governance and according to it South African companies should, report their sustainability in line with the GRI. This has led to majority of local researchers studying corporate governance however to holistically study sustainability all three components must be analysed (Johnson et al., 2019; Matemane & Wentzel, 2019).

In the end, South Africa's progress toward sustainable development has had some notable high points, such as its own set of sustainability reporting criteria, known as the JSE SRI, which are primarily for JSE listed companies. These served as a foundation for the King IV and GRI (Lisene, 2015).

2.7. ESG Scores

ESG scores represent the depth and breadth of a company's environmental, social and governance performance (SSE, 2015). There are various guideline themes that fall under each pillar:

Environment

The environment pillar looks at business's actions towards environmental responsibility, looking at the extent in, which the business management practices avoid environmental risk (Crespi & Migliavacca, 2020; Duque-Grisales & Aguilera-Caracuel, 2019). This pillar is dependent on carbon emissions and climate change susceptibility. Also evaluating the company's efforts to environmentally safe resources and processes (Crespi & Migliavacca, 2020).

Social

The social pillar shows how a business cares about the region in which it operates. This reflects the company's reputation, which is important in establishing a company's capacity to create long-term value (Duque-Grisales & Aguilera-Caracuel, 2019). The pillar indicates a company's sensitivity to human capital and incorporates its ability to provide opportunities within the community, and to defend the rights of people (Crespi & Migliavacca, 2020).

Governance

The ability of the board to apply governance and corporate ethics is represented by the governance pillar. This entails putting an emphasis on diversifying the board of directors and eliminating the gender pay gap while fostering general transparency to benefit the firm's shareholders over the long term (Crespi & Migliavacca, 2020).

MSCI, which is an international recognized investment firm give a summary of general issues faced under each pillar, while acknowledging that these are not generic to every industry.

Table 2: MSCI ESG Research score scale

Pillars	Themes	Key Issue	
Environment	<i>Climate Change</i>	Carbon Emissions Product carbon footprint	Financing environmental impact Climate change vulnerability
	<i>Natural Resources</i>	Water stress Biodiversity and land use	Raw material sourcing
	<i>Pollution and waste</i>	Toxic emission and waste Packaging materials and waste	Electronic waste
	<i>Environmental opportunities</i>	Opportunities in clean tech Opportunities in green building	Opportunities in renewable energy
Social	<i>Human capital</i>	Labour management Health and safety	Human capital development Supply chain labour standards
	<i>Product liability</i>	Product safety and quality Chemical safety Financial product safety	Privacy and data security Responsible investment Health demography risk
	<i>Stakeholder opposition</i>	Controversial sourcing	
	<i>Social opportunities</i>	Access to communications Access to finance	Access to healthcare Opportunities in nutrition and health
Governance	<i>Corporate Governance</i>	Board pays	
	<i>Corporate Behaviour</i>	Business ethics Anti-competitive practices Tax transparency	Corruption and instability Financial system instability

Source: Crespi and Migliavacca (2020)

2.8. Bank Sector Financial Performance

Financial performance is the subjective measure and analysis of a company's financial objectives over a certain period. Measuring financial performance offers invaluable information to allow management to measure their progress towards their objectives and find room for improvement (Jahan & Islam, 2020). Typically, the performance of a bank mirrors the resources employed to meet the bank's goals (Jahan & Islam, 2020; Tomuleasa & Cocriș, 2014). Researchers have been looking towards performance metrics that will encompass all parts of a company's performance, but no exact criteria has been proposed yet that measures every financial aspect of a company's performance (Jahan & Islam, 2020).

In the previous decade managers, researchers, investors, and academics have been concerned about bank performance. There has always been an interest in bank performance to measure corporate profits, and given the role banking institutions play the economy's potential growth (Azmi et al., 2021). Bank failures and the 2008 GFC, led to increased study from academics and business, and are responsible for the present rise in interest in bank performance (Tomuleasa & Cocriș, 2014). The collapse of a bank affects more than its shareholders and customers, but also the other banks in the system and companies, because banks control a major amount of money circulation and so have a big effect on the economy in which it operates (Al Karim & Alam, 2013; Crespi & Migliavacca, 2020).

The concept of "performance" has been handled in several studies and analyses throughout the years, and is related with the concept of "profitability" in academic literature (Tomuleasa & Cocriș, 2014). Banks own the most financial assets in most nations, making them an essential component of the real economy, which is why business cycles have a considerable impact on their performance and vice versa. This is related to the ability of firms and households to service their debt, which is critical for bank stability (Crespi & Migliavacca, 2020). Bank performance is predicted to follow a procyclical trend, with banks' lending more while the economy is doing well than when it is in trouble (Ifeacho & Ngalawa, 2014). Lending is a basic part of what commercial banks do, and the interest they get from those loans is a substantial source of income. However, if the loans are not repaid on time, the bank may suffer financially (Kumbirai & Webb, 2010).

According to Jahan and Islam (2020) internal factors such as bank size, asset management, leverage ratio, portfolio composition all have an impact on the accounting and market performance. Previous literature by Kosmidou and Zopounidis (2008) states that the external drivers of performance are represented in the economic conditions the bank is operating in, as well as the legal regulations placed on banks. The same conclusions are reached by Kumbirai and Webb (2010), who also believe that the factors will have an impact on how banks operate and function as evidenced by their financial statements.

There are many ways to assess the financial performance of a bank, as observed in previous research, Jahan and Islam (2020) suggests the most suitable methods can be characterized as accounting based measurements and market based measures. These two methods don't necessarily generate comparable results due to the nature of information utilized to calculate the different measures.

1. The accounting-based measure.
2. Market based measure.

Accounting- based measure

The accounting measures of performance focus more commonly on the business's profitability, which primarily uses financial ratios. Ratio analysis generally utilises the financial statements, these ratios help highlight areas of excellent and bad performance and assist management in identifying their strengths and weaknesses (Al Karim & Alam, 2013). Three measures are frequently employed in studies to analyse the profitability conditions of banks: "return on assets (ROA), return on equity (ROE), and net interest margin (NIM)" (Ifeacho & Ngalawa, 2014; Tomuleasa & Cocriş, 2014). Since ROA evaluates the profit produced per dollar of assets and effective use of resources, it is a significant performance metric that is directly tied to the profitability of banks (Kosmidou & Zopounidis, 2008). ROE on the other hand is a measure of growth, Ifeacho and Ngalawa (2014) states that when a company's ROE is positive, it indicates that the bank has met or exceeded its previously set earnings projections.

Kumbirai and Webb (2010) studied banks in South Africa from 2005 to 2009, with the use of financial ratios. The findings show that overall bank performance, as measured by, "profitability, liquidity, and credit quality indexes", had been increasing. According to Jahan and Islam (2020)

these measures are preferred for the purposes of analysing the credit worthiness and ability to meet their obligations as a going concern.

Market based measure

Market based performance measures are grounded on the stakeholder theory, which looks at a firm's long term goal of creating wealth for its shareholders through maximising the market price of its shares and successfully meeting its financial goals (Azmi et al., 2021). The market performance measures used are generally "Tobin's Q, market value added, market to book value and stock return" (Jahan & Islam, 2020). These measures are forward looking and reflect the shareholders expectation for value growth.

Tobin's Q is a common indicator of long-term performance (Azmi et al., 2021). The market's perception of some business activities, such as the absorption of ESG is reflected in Tobin's Q, which is less susceptible to profits management and more precisely represents market value (Azmi et al., 2021; Cremona & Passador, 2019). Furthermore, a high Q ratio indicates that the firm has successfully leveraged its investment to produce a company that is valued higher in terms of its market value compared to its book value (Jahan & Islam, 2020).

Numerous academic studies have examined banks' performance from a variety of angles. Most of the work makes use of the accounting approach, choosing a financial ratio that is appropriate for the goals of the individual study.

Al Karim and Alam (2013) study looked at listed banks in Bangladesh, they argued that to have a comprehensive analysis, performance analysis should employ forward looking market measures and not only accounting. In their analysis, they used Tobin's Q to evaluate market success and ROA to measure internal performance. Al Karim and Alam (2013) findings were similar to those of Jahan and Islam (2020) who looked at Islamic banks reported that operational efficiency and bank's size have a significant positive relationship on the ROA. The authors addressed their concerns about the findings, which revealed that internal measures of banking performance were superior to market-based metrics. This suggests that the bank's underlying value of assets is not reflected in market value or the stock market.

2.9. ESG and Financial Performance of Banks

Stakeholder theory states the following, “a company’s ethical obligation is to maximize shareholder value”, hence financial performance is important (Azmi et al., 2021; Cremona & Passador, 2019). All activities a firm partakes in should maximize value for the firm. Hence understanding the effect of increased ESG towards financial value is imperative (Buallay, 2019; Cremona & Passador, 2019).

According to Crespi and Migliavacca (2020) this relationship has been studied across industries; however, research that specifically targets the financial industry is more dispersed and produce varied results (Azmi et al., 2021; Buallay, 2019; Crespi & Migliavacca, 2020). The underlying reason for the mixed results on sustainability reporting is the absence of standardized reporting (Azmi et al., 2021). According to Crespi and Migliavacca (2020), academic research is increasingly using ESG ratings from data companies such as MSCI. Hopefully, as this is used more frequently, a uniform data collection mechanism will emerge. However, given that each ESG rating varies greatly, there is still ongoing discussion on the consistency and usefulness of ESG indicators according to Buallay (2019).

Other research examines the three sustainability criteria holistically to consider the complete impact ESG has on financial success. Some studies examine the three factors independently to determine which factor has the greatest impact on financial performance. Several studies have discovered both positive and negative links between ESG and financial success.

2.10. Previous Research

The study by Uddin Ahmed et al. (2018) explored commercial banks in an emerging economy, the findings show a positive relationship between performance and sustainability reporting. ROA increased by 5.8% for every unit higher ESG score. The findings were similar to work by Mohammad and Wasiuzzaman (2021) where an increase in ESG by 1 point led to approximately 4% increase in performance, this further supports the stakeholder theory. Interestingly research by Azmi et al. (2021) which employed 44 emerging nations found low ESG levels had a better increase on financial performance, whereas higher levels of ESG demonstrate declining returns to

scale. The return on total assets increased by 5.8% for every unit higher ESG score. Azmi et al. (2021) accredits the non-linear positive relation to the costs of implementing social and governance activities, which dampen the return.

Multiple studies have found that environmental activities affect financial performance the most (Azmi et al., 2021; Bătae et al., 2021). Even if they don't include the other two ESG factors, their lending practices are found to be less risky and conduct business with more innovative companies. This is because financing environmentally friendly initiatives limits the lending that can be allocated to environmentally harmful industries (Bătae et al., 2021; Uddin Ahmed et al., 2018). The impacts of an environmental efficiency go beyond financial benefits as it also enhances the banks reputation without the bank partaking in social projects (Bătae et al., 2021).

Focusing on emerging economies as an area of study enables academics to evaluate banks in areas where regulatory limits are minimal and sustainability reporting might have a greater influence (Azmi et al., 2021; Buallay et al., 2020). The concern is that the financial cost to implement ESG in certain emerging countries is not offset by the return. Hence, diverting resources into activities that are not offset by the return lead to value reduction (Duque-Grisales & Aguilera-Caracuel, 2019).

There has been more research done in America and Europe regarding sustainability reporting and it must be noted that majority of studies do not yield conclusive results (Buallay et al., 2020; Cremona & Passador, 2019). A study by Bătae et al. (2021), which was done across 39 European banks post the global financial crisis does not support the inclusion of all three components of sustainability to increase financial performance, it found that only the environmental components, more specifically for carbon emission policies has a positive impact however a negative relationship with social and governance factors.

The inconclusive nature of all the studies indicates that sustainability reporting is very much subjective to the country and its results may not be generalized everywhere, this creates a research gap within the industry that needs to be explored further. This relationship has not reached conclusive results in the financial sector, either (Crespi & Migliavacca, 2020). In South Africa

most studies have focused have research corporate governance in an isolated manner due to South Africa's advanced King's Code (Johnson et al., 2019). This research is unaware of any comparable in South Africa that previously studied the holistic relationship between sustainability reporting as measured by ESG rating and a bank's financial performance.

2.11. Chapter Summary

This chapter provided the theoretical framework for the topic. Through providing a comprehensive analysis of the existing body of knowledge. This allowed the researcher to unpack and understand sustainability, financial performance it's impact within the scope of our research along with understanding the work conducted by previous researchers.

Chapter 3. Methodology

3.1. Introduction

This chapter describes and defends this study's research design and methods. The chapter also discusses the sample, data collecting, data analysis, ethical concerns, validity, and reliability connected with the research design.

3.1. Research Design

This research focuses on South African banks' participation in sustainability reporting. In line with previous studies, this study is quantitative and uses secondary data (Buallay, 2019; Buallay et al., 2020; Johnson et al., 2019).

The process of processing numerical data that can be quantified and compared to support and test a hypothesis is a key component of quantitative research, which is a methodical and empirical examination of events using statistics and mathematics (Basias & Pollalis, 2018). This method is preferred when studying a tangible financial performance relationship because the results are numerical and not influenced by personal feelings or opinions.

3.2. Population and Sample Size

According to Branco and Rodrigues (2008), the ability to distinguish between several categories of financial services companies has grown challenging. Financial service providers have progressively widened their business operations throughout time, entering a variety of industries, including the following, “commercial banking, investment banking, asset management, and insurance”. In general, banks are categorized as financial intermediaries since they receive deposits from both individuals and businesses and then use the money to finance loans (Lisene, 2015). This study focuses on banks that are classified as “commercial, retail banks”. Regardless of their size, most banks operate here, where there is a need for a network of branches to service consumers. The South African Reserve Bank's list of all banks that have been registered under the rules of the “Banks Act 94 of 1990” served as the source of the population for this study. On the list are mutual banks, foreign bank branches, foreign bank representatives, foreign-controlled banks, and foreign-

owned banks, this ultimately provides a list of 65 banks. The list contains the latest information available to Prudential Authority and may differ from that of banks that have not yet complied with certain legal requirements (SARB, 2020).

This study's data covered a 16-year period, which includes the following periods: 2008 GFC and the Covid-19 pandemic. The period covered was 2006 – 2021, across the six largest locally controlled banks listed on the JSE, "Absa, Capitec, FirstRand, Investec, Nedbank, and Standard Bank". The complete sample consists of 6 banks from South Africa from 2006 to 2021 with a total of 96 observations.

Only 6 banks were chosen due to the oligopolistic nature of the banking industry, where majority of the banking market share is held by the banks mentioned above (Ifeacho & Ngalawa, 2014). The SARB,2020 states the following "The banks collectively hold 89,4 % of the South African total assets market share".

These banks offer a comprehensive variety of services, whereas the other banks occupying the remaining market share, tailor to niche markets or are limited by geographic operations (Kumbirai & Webb, 2010). The selected banks also have 91,1% of the deposit market share as of 2020, which is an important indicator of a franchise strength (Nedbank, 2021).

The following is the summary of the criteria:

- Bloomberg ESG disclosure score available from 2006 onwards.
 - Bloomberg offers ESG disclosure data dating back to 2006, and the data for the independent variable (ESG disclosure score) was collected on the Bloomberg platform. This was also a decision factor for the time frame selected.
- Data availability.
- Banks listed on the JSE.
- Locally controlled South African Banks.
- Top 6 banks based on total assets.
- Top 6 banks based on deposit market.

Bank figures as of 31 December 2020

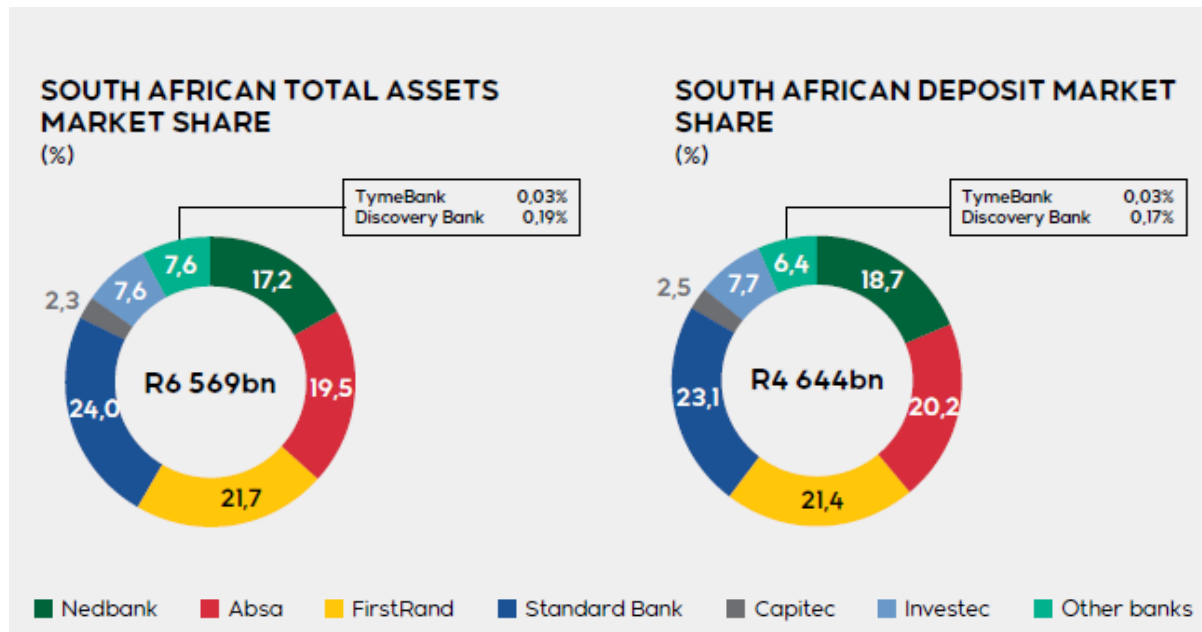


Figure 1: Asset and Deposit Market Share

Source: (Nedbank, 2021)

3.3. Data collection and sources

The data was collected from Bloomberg Terminal, which is a reputable software that has financial market data from across the world. Bloomberg terminal collects, scrubs, verifies, and continually updates its data (Azmi et al., 2021).

3.4. Variable Description

Variables			
Dependent variables: (Financial Performance)			
Name	Abbreviation	Description	Source
Return on Assets	ROA	Formula: “Net income divided by total assets”	
Return on Equity	ROE	Formula: “Net income after taxes divided by total equity”	
Tobin’s Q	TQ	Formula: “Market value of equity plus total liabilities plus preferred equity plus minority interest) divided book value of assets”	

<i>Independent variable</i>			
ESG disclosure score	ESG	Bloomberg: “standardized as reported ESG data which covers 80% of company operations and workforce making it representative of its operational impact. Bloomberg index which combines the ED, CGD and CSRD. The index is based on 120 variables, selected depending on industry’s characteristics”.	Bloomberg
<i>Control variables :Bank specific</i>			
Leverage	Lev	<i>Formula:</i> “Total liabilities divided Total Equity”	Bloomberg
Liquidity	Liq	<i>Formula:</i> “Total deposit divided Total assets”	
Bank size	Size	<i>Formula:</i> “Natural logarithm of banks’ market capitalization”	
<i>Control variables: Country specific</i>			
RGDP	RGDP	Real Gross Domestic Products	Bloomberg
Inflation	CPI	Measures the annual change in prices paid.	
<i>Control Variables: Dummy</i>			
Global Financial Crisis	GFC	Dummy variable ,which takes the value of 1 for the years 2008-2010. For all other years it’s 0.	
Covid-19 Pandemic	Covid	Dummy variable ,which takes the value of 1 for the years 2019 -2020. For all other years it’s 0.	
<i>Table 3: Classification of variables and their definition</i>			

Dependent Variables

1. Return on Assets

Return on Assets (ROA) measured as “percentage of net income to total assets” indicates how much net income is generated per the value of assets. It measures how efficient and profitable the bank’s manages to utilize its total asset to generate profit (Bătae et al., 2021; Johnson et al., 2019). It also assists the bank in measuring the use of resources and their financial strength (Johnson et al., 2019). The higher the ROA, the more the profitable the bank (Kumbirai & Webb, 2010). It is used a proxy for the bank’s operational performance. The ROA formula is presented below:

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Total Assets}}$$

2. Return on Equity

Return on Equity (ROE) measured as “percentage of net income to total equity. It measures the amount of a company’s income that is returned as shareholder equity”. A higher ROE generally represents efficiency in income generation internally (Khoza, 2020). According to Kumbirai and Webb (2010) it is seen as an important indicator of a company’s growth potential as this ratio is commonly used by shareholders to measure their return on investment. The ROE formula is presented below:

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Total Equity}}$$

3. Tobin’s Q

Tobin's Q, measures the relationship between the bank's market performance and the value of its assets (Cremona & Passador, 2019). When Tobin’s Q is greater than one, it means the stock is overvalued, less than one means the stock is undervalued, equal to one means the stock is fairly valued (Jahan & Islam, 2020; Jahan & M, 2020). The market's perception of ESG operations is reflected in Tobin's Q, which is less susceptible to earnings management and more precisely represents the effect (Azmi et al., 2021; Cremona & Passador, 2019). For the purposes of this study we calculated Tobin’s Q in the following manner, which has been used in previous studies by Buallay et al. (2020) and Buallay (2019) looking at a similar topic. The Tobin’s Q formula is presented below:

$$\text{Tobin's Q} = \frac{(\text{market value of equity} + \text{total liabilities} + \text{preferred equity} + \text{minority interest})}{(\text{book value of assets})}$$

Independent variables

The ESG disclosure score will be utilized as a measure of sustainability reporting to empirically analyse the relationship with financial performance (Buallay, 2019; Johnson et al., 2019).

Bank Specific Control Variables

This study's control variables include proxies for bank leverage and size, as the profitability of banks may vary based on these characteristics. To identify the distinctive effect of ESG ratings to company financial performance, these factors were accounted for. The size of a company is determined by the logarithm of its market capitalization (Uddin Ahmed et al., 2018). According to Duque-Grisales and Aguilera-Caracuel (2019) leverage refers to banks' investing methods of employing borrowed money to build shareholder value and is calculated as "total liabilities divided by total equity". Liquidity indicates the ability to meet short term financial repayments in a timely and effective manner, it also accounts for risk management of credit institutions (Bătae et al., 2021).

Country Specific Control Variables

According to Bătae et al. (2021), The business cycle can have a variety of effects on bank performance. In an economic downturn, banks tend to lend less, and the quality of loans may deteriorate and with a possible risk of defaults, creating credit losses, which could turn to reduction in banks profit. Therefore, banks are considered to be procyclical due to RGDP growth as the demand for lending rises and falls across the various cycles (Buallay et al., 2020). Therefore, this study controls for RGDP growth because it is an indicator of macroeconomic dynamics. Given that this study focuses on African banks, inflation has been added as a country specific variable, which is in line with the variables utilized in previous studies investigating bank profit.

Dummy Variables

Dummy variables are important, to analyse the effects the occurrences above on the overall model. This study captured the effects of the 2008 GFC and the COVID-19 pandemic. These are two remarkable events within the period investigated. The number one is assigned in the years of these two events, and the number zero otherwise.

3.5. Data Analysis

This study used panel data regression analysis. This data, combines cross-sectional data and time series data, has been used in several previous bank studies (Bătae et al., 2021; Buallay, 2019). The advantages of panel data are as follows:

1. It makes the assumption that the banks under investigation are heterogeneous, whereas cross sectional and time series cannot account for heterogeneity and frequently provide biased conclusions (Certo & Semadeni, 2006; Marozva, 2017).
2. It provides more information by providing more data points. This decreases the collinearity amongst the independent variables and in turn increases the degrees of freedom and more efficiency (Bătae et al., 2021; Park, 2011).

As such panel data is suitable for this research as it examines banks over a 16-year period.

3.6. Panel Data Models

There are multiple methods that can be used to estimate the panel data regression method. For the purposes of this study, we explored three models however only the most suitable model based on the diagnostic tests was utilized and discussed in the results section.

1. Pooled OLS Model

This model pools together two types of data being cross sectional and time series data and combines them into a single regression. This pooling of the different data sets allows for improved detection of effects that may not have been seen in regressions where the data set is not combined. The main criticism of this model is that the independent variables may be included into the error term, which could potentially result in the correlation between the variables and ultimately lead to inconsistent coefficients (Certo & Semadeni, 2006; Marozva, 2017). As such this method ignores the time dimension of the panel data. Fixed effects models take these issues into account and address the problem of connecting the independent variables and error terms. As such the pooled OLS technique was not proffered for the purposes of this study.

2. Fixed Effects Model

The fixed effect model assumes the sample size and its parameters is not randomly selected. Fixed effects are included to assist in controlling for the bias that comes with omitted variables (Marozva, 2017). This gives understanding that each bank is significantly different and not randomly selected. This model is primarily used to account for the differences when evaluating an economic relationship (Certo & Semadeni, 2006). Fixed-effects models use dummy variables to estimate this

panel-level error factor, which is constant throughout time. According to Park (2011) this approach avoids bias by doing the following, “considers correlations between the error term and the independent variables, unlike the pooled OLS method”.

3. Random Effects Model

This model assumes the sample size is randomly selected. Models with random effects presume that the error term varies with time and include cross-sectional and time-specific effects as error terms, as such it may yield conflicting and inconsistent findings when individual random effects are correlated with regressors (Park, 2011).

3.7. Panel Data Diagnostic Tests

The below discusses the panel data tests conducted to determine the best estimation model for this research:

1. Chow Test

This test examines cross-sectional effect validity (Purba & Bimantara, 2020). This analyses which of two regression lines fits a divided set of data most closely (Certo & Semadeni, 2006). This study period has two break points being the GFC and the Covid-19 Pandemic. The test was important to establish if the data is poolable and assess if the slopes are different for the independent variables. This test allowed us to decide, which model will be suitable between the fixed effects and the pooled OLS.

Results interpretation:

H_0 : The model follows Pooled OLS.

H_1 : The model follows Fixed effects

If the F-statistic probability value is smaller than the significance level of 5% then we reject hypothesis. If the F-statistic is greater than the 5% significance level, then we accept the hypothesis.

2. Breusch Pagan's Lagrange multiplier (LM) test

To select the best model, the Lagrange Multiplier Test is used in deciding between pooled OLS or random effects. This examines if the variance of the random effects is zero to determine whether random effects are important in the panel data models.

Results interpretation:

Ho: Random effects are insignificant

H₁: Random effects are significant

If the probability is less than 5%, the null hypothesis is rejected, indicating strong random effect in the panel data and that the random effect model is better at handling heterogeneity than the pooled OLS model (Park, 2011).

3. Hausman test

This determines the choice between fixed or random effect model. As said, the random effects model implies the estimated panel error factor is uncorrelated with the independent variables. The Hausman test aids in evaluating this condition (Certo & Semadeni, 2006).

Results interpretation:

Ho: The preferred model is random effects.

H₁: The preferred model is fixed effects.

The null hypothesis is accepted if the probability is more than 5% and rejected if it is less than 5%.

4. Heteroskedasticity test

One of the key assumptions in linear regression is that error terms are equally distributed. Panel data can lead to analytical issues in the form of heteroskedasticity in the error terms; this situation causes the error terms' variation since they are not equal. To prevent biased standard errors, this test is crucial.

Results interpretation:

Ho: Error terms are homoscedastic

H₁: Error terms are heteroskedastic

The null hypothesis is accepted if the probability is more than 5% and rejected if it is less than 5%.

5. Cross sectional dependence tests

Cross sectional dependence tests were done using the Frees test proposed in 1995 and the CD test Pesaran proposed in 2004. Panel data sets may have high cross-sectional dependency due to common shocks and unseen components in the error term. According to De Hoyos and Sarafidis (2006); Zach (2019) this test is important “when the time dimension (t) of the panel is larger than the cross-sectional dimension (n)” as is for this study.

Results interpretation:

Ho: Cross sectional are not interdependent.

H₁: Cross sectionals are interdependent.

We reject the null hypothesis if the likelihood is less than 5%. We accept the null hypothesis if it is more than 5%. If the tests indicate cross sectional are interdependent it will be corrected by using Driskoll and Kraay Standard Errors Estimator (Hoechle, 2007).

6. Multicollinearity

The VIF estimates how much the variance of a regression coefficient is inflated due to multicollinearity in the model. According to Duque-Grisales and Aguilera-Caracuel (2019); (Zach, 2019) a value between 1 and 5 indicates moderate correlation however this is not seen as being severe enough. If the value is greater than 5 this may represent severe correlation meaning the coefficient estimates and probability values in the regression output may be unreliable.

3.8. Regression Model

The basic model is presented as follows where $FP_{i,t}$ (Financial Performance) is the endogenous variable as measured by three models.

Equation 1: Econometric Mode

$$Y_{i,t} = \alpha Y_{i,t} + \beta W_{i,t} + \gamma X_{i,t} + \delta Z_{i,t} + (\mu_i + v_{i,t}) \dots \dots \dots 1$$

Where:

$Y_{i,t}$ = “Financial performance of bank I in year t , measured by $FP_{i,t}$ ”

$W_{i,t}$ = “ESG disclosure score of banks i in year t ”

$X_{i,t}$ = “Vector of bank specific variables”

$Z_{i,t}$ = “Vector of country specific variables”

μ_i = “Fixed effects in bank ”

$v_{i,t}$ = “Error term”

Equation 2: Model with variables added

$$FP_{i,t} = \alpha FP_{i,t} + \beta ESG_{i,t} + \gamma XLevLiqSize_{i,t} + \delta GDP_{i,t} + (\mu_i + v_{i,t}) \dots \dots \dots 2$$

Abbreviation Explanations

- FP: Financial Performance, represented by “ROA, ROE, and Tobin’s Q”
- ESG: Environmental, Social, Governance index score
- Lev: Leverage percentage
- Liq: Liquidity
- Size: Size of the bank
- RGDP: Real Gross Domestic Products
- CPI: Consumer Price Index – Inflation.
- Dummy: Dummy variable being one or zero for the applicable years.

This research has 3 equations being analysed:

$$ROA_{i,t} = \alpha ROA_{i,t} + \beta ESG_{i,t} + \gamma XLevLiqSize_{i,t} + \delta GDP_{i,t} + Dummy_{i,t} + (\mu_i + v_{i,t}) \dots\dots\dots(1)$$

$$ROE = \alpha ROE_{i,t} + \beta ESG_{i,t} + \gamma XLevLiqSize_{i,t} + \delta GDP_{i,t} + Dummy_{i,t} + (\mu_i + v_{i,t}) \dots\dots\dots(2)$$

$$Tobin's Q_{i,t} = \alpha Tobin's Q_{i,t} + \beta ESG_{i,t} + \gamma XLevLiqSize_{i,t} + \delta GDP_{i,t} + Dummy_{i,t} + (\mu_i + v_{i,t}) \dots\dots\dots(3)$$

3.9. Ethical Considerations

Ethical considerations guided this investigation, this study's participants are corporations, which are legal entities with rights and should be treated with respect (Lisene, 2015). This research involves obtaining secondary data from a reputable source, Bloomberg. Extreme care was taken not to misrepresent and manipulate the data obtained to reach biased results. The researcher used the data in an ethical manner and in accordance with the ethical requirements of the University of the Witwatersrand.

3.10. Validity and Reliability

Using a trustworthy secondary source of data helps to assure the validity and reliability of the study. The study's whole secondary data set was gathered from a reliable source. The data was captured and edited with caution to ensure human error does not occur. With the use of the statistical package Stata the results are modelled and multiple diagnostic tests were performed on the data as per the requirements of quantitative research providing results that are numerical (and is therefore often considered objectively, fact-based, measurable and observable (Basias & Pollalis, 2018). To further reinforce the results, data analysis methods used in this study have been used in previous studies when panel data is utilised (Buallay, 2019; Marozva, 2017; Purba & Bimantara, 2020).

3.11. Chapter Summary

This chapter presented the study's design and methods. Analysis of ESG disclosures in the banking industry will be conducted as part of this quantitative study. The key variables for the measurement of financial performance along with bank specific variables were identified and explained. The chapter also explains the ethical issues to be considered during the research process. This study aims to contribute to the practice of sustainability reporting in the banking industry. The following chapter will look at the data analysis.

Chapter 4. Data Analysis and Discussions

4.1. Introduction

This chapter summarizes the findings of the analysis done using the methods provided in Chapter 3. This chapter evaluates the presented study topics experimentally and gives the results of the regression models.

4.2. Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std Dev	Skewness	Kurtosis	Jarque-Bera	Observations
ROA	2,08	1,26	11,21	0,37	2,09	2,34	8,24	210,08	102
ROE	26,33	24,52	48,82	6,61	10,50	0,20	2,29	2,83	102
TQ	1,14	1,05	2,33	0,00	0,34	1,01	7,36	98,34	102
ESG	43,15	45,59	62,19	0,00	15,16	-1,27	4,54	37,52	102
LEV	10,01	10,47	16,54	0,96	3,48	-0,94	3,39	15,66	102
LIQ	0,61	0,58	0,82	0,26	0,14	-0,06	1,98	4,45	102
SIZE	4,72	4,99	5,58	3,19	0,68	-0,98	2,53	17,32	102
RRGDP	2,03	2,23	5,60	-6,28	2,87	-1,18	4,85	38,09	102
CPI	5,42	4,99	10,95	3,28	1,74	1,72	6,46	100,80	102

Table 4: Descriptive Statistics

Dependent Variables

The higher the ROA, the more profitable the bank as this shows how well the bank can manage its resources to generate profit. The average ROA over the study period, as shown in the table above, was 2.08%. The range between the minimum and highest was 0.37% and 11.21%, respectively. This variation between the two values is to be expected considering the GFC of 2008 and the Covid-19.

The same applies with ROE, which experienced a minimum of 6.61% and maximum of 48.82% within the period. This variance is a consequence of the GFC and a decline in domestic economic performance (Kumbirai & Webb, 2010), which is attributable to the low ROA and ROE in the period of the study. These results are similar with the Tobin's Q variable with the minimum being 0%. The maximum 2.33% indicating the market value of banks is greater than their asset size.

The kurtosis of the ROA was 8.24% and the Tobin's Q was 7.36% this was above 3%, which is the normal kurtosis value and indicates the values were further from the mean showing the data is not normally distributed and has certain performance outliers during the study period. The lack of normality is further reinforced with the Jarque Beras that are further from zero and indicates lack of normality. When the standard deviation is factored in the ROA it has 2.09% and the Tobin's Q 0.34% this indicates that there is a low divergence from the average return, which is generally favourable from an investment perspective.

The ROE kurtosis is less than 3 indicating normality that most observations fall within the predictability band along with a Jarque Bera of 2.83%. When it is paired with the high standard deviation of 10.50%, which shows the highly volatile nature for ROE, which is the most important indicator of a growth potential. As it is the rate of return to shareholders this means there is increased uncertainty on a period-to-period basis.

Independent Variable

The independent variable being analysed is ESG as a proxy for sustainability reporting participation. The descriptive statistics for the independent variable indicates the following:

The mean was 43.15% with the minimum being zero indicating lack of ESG participation at certain periods in the study from some of the banks studied. When the data was analysed individually it was evident that not all the banks initiated the ESG participation in the beginning of the period analysed. The maximum was a 62.19% bank participation of ESG.

The skewness is at -1.27% indicates the ESG participation is negatively skewed and distributed symmetrically around the mean and that they may be more negative outliers in the ESG participation's which has 4.54%, which indicates that not all ESG falls within the predictability band and hence is more than 3% and this lack of predictability in participation is further reinforced by the higher standard deviation to the norm of 15.16% of ESG, which represents extreme variances and no normality. The same interpretation applies to the Jarque Bera, which is at 37.52% and deviates from the normality distribution.

Bank Specific Variables

The bank specific variables are leverage, liquidity, and bank size. All three variables have a low standard deviation with the highest standard deviation being the leverage at 3.48%. Banks leverage ratio was 16.54% for the period, generally indicates that a company's' growth has been debt financed. This volatility can also be seen in the return measurements of the bank.

The liquidity ratio, which looks at the ability to meet financial obligation for the purposes of the study the ratio was measured as total deposits over total assets. This indicated that all the banks were able to meet their deposit obligation with the average ratio being 0.58% this generally indicates the liquidity of the banks.

The bank size mean was 5.72% with the maximum 5.58% and the minimum 3.19%. This indicates values that are in a similar range, which represents the bank market of south Africa with the banks in the study having the majority market share in asset size. The standard deviation for bank size is

also low at 0.68% as an indication of minimal variations within the sizes of the banks .Overall all the variables are negatively skewed with more negative outliers in the bank variables than symmetrical distribution.

Country Specific Variables

The country specific variables analysed are the RGDP and CPI as a measure of inflation. The RGDP growth maximum in the time frame was 5.60% with the minimum at -6.28% this is a representation of the economy shrinking drastically. The study included the COVID-19 pandemic years, which is when the RGDP levels drastically reduced as the market shrunk, however this will be accounted for with the dummy variables. The RGDP is negatively skewed and not normally distributed as represented by the kurtosis and Jarque Bera.

The CPI average is 5.42% ,which aligns with the Reserve bank maintenance levels that are between 3% and 6% however it was at its highest in the period observed during 2008 as caused by the global financial crisis, the GFC was accounted for with the use of a dummy variable. The skewness of -1.18% indicates that the data is negatively distributed. kurtosis and Jarque Bera values also infer that the data is not normally distributed around the me

4.3. Correlation

Variables	ROA	ROE	TQ	ESG	LEV	LIQ	SIZE	RGDP	CPI
ROA	1,000								
ROE	0,4340***	1,0000							
TQ	0,7751***	0,2171**	1,0000						
ESG	-0,4348***	-0,5887***	-0,1792*	1,0000					
LEV	-0,8333***	-0,0761	-0,7577***	0,1166	1,0000				
LIQ	-0,1590	-0,1507	0,0573	0,2870***	-0,0139	1,0000			
SIZE	-0,2563***	0,1911*	-0,0895	0,2732***	0,1609	0,4844***	1,0000		
RGDP	0,1691*	0,3990***	-0,0296	-0,4191***	0,1345	-0,1838*	-0,1295	1,0000	
CPI	0,0371	0,1196	-0,0368	0,0187	0,1383	-0,2541**	-0,1160	0,1561	1,0000

*Significant at the 0.01% **

*Significant at the 0.05%***

*Significant at the 0.001%****

When variables are strongly correlated it leads to multicollinearity, which makes it difficult to understand the impact of an independent variable has on a dependent variable. A correlation matrix provides understanding of the strength of the correlation between variables.

Positive and statistically significant correlation exists between the dependent variables (ROA, ROE, Tobin's Q). This correlation is expected because these are all measures of performance. Although they do not measure performance in the same way there is similarity within the three different methods.

The independent variable, ESG portrays a negative and significant correlation between all three of the dependent variables. The correlations amongst the independent variables were not greater than 7, which indicates that there wasn't a problem of multicollinearity. Extreme multicollinearity tends to overestimate the calculated coefficient's standard errors. This was further supported by the VIF test, where each independent variable's VIF test statistic was less than 5, indicating that the models do not have significant collinearity issues.

Further associations of interest are that RGDP was significantly negatively correlated with ESG, while liabilities and bank size were significant and positively associated with ESG. Liabilities and bank size were negatively associated with leverage, while inflation was positively associated with leverage.

Correlations are not causal or relationships, hence the study applies further inferential statistical methods to establish the relationship. It is crucial to validate multicollinearity between the dependent and independent variables prior to running the inferential models.

4.4. Econometric Model Estimation Results

There are several regression models that can be utilised to estimate a panel data. This study explored three panel estimation models being the fixed effects model, random effects, and pooled OLS model.

The next section presents the diagnostic tests that were conducted to determine the most appropriate model. The Hausman test ultimately determined the fixed effects model as the most appropriate estimation technique. As such the analysis will be based on the fixed effects model.

This study employed 3 equations as listed below and will be discussed in that order:

$$ROA_{i,t} = \alpha ROA_{i,t} + \beta ESG_{i,t} + \gamma XLevLiqSize_{i,t} + \delta GDP_{i,t} + Dummy_{i,t} + (\mu_i + v_{i,t}) \dots\dots\dots(1)$$

$$ROE = \alpha ROE_{i,t} + \beta ESG_{i,t} + \gamma XLevLiqSize_{i,t} + \delta GDP_{i,t} + Dummy_{i,t} + (\mu_i + v_{i,t}) \dots\dots\dots(2)$$

$$Tobin'sQ_{i,t} = \alpha Tobin'sQ_{i,t} + \beta ESG_{i,t} + \gamma XLevLiqSize_{i,t} + \delta GDP_{i,t} + Dummy_{i,t} + (\mu_i + v_{i,t}) \dots\dots\dots(3)$$

4.5. ROA Diagnostic Tests

Statistical Test	Test Statistic	P - value	Conclusion
Chow Test $H_0: \alpha_1 = \alpha_2 = \dots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \dots \alpha_{N-1} \neq 0$	F= 28.91	0.0000	Cross-sectional individual effects are valid. Therefore, the fixed effects is most appropriate as opposed to the pooled OLS model
Breusch Pagan LM test $H_0: \delta_{\mu}^2 = 0$ $H_A: \delta_{\mu}^2 \neq 0$	Chi2 = 3.03	0.0409	Random effects are present, which indicates the . Random effects model may be better equipped to handle heterogeneity than the pooled OLS.
Hausman test $H_0: E(\mu_{it} X_{it}) = 0$ $H_A: E(\mu_{it} X_{it}) \neq 0$	Chi2 = 262.49	0.0000	Fixed effects model is most appropriate.
Heteroscedasticity $H_0: \delta_i^2 = \delta \text{ for all } i$ $H_0: \delta_i^2 \neq \delta \text{ for all } i$	Chi2 = 0.69	0.3251	Error terms are equally distributed.
Cross-sectional dependence tests $H_0: \rho_{ij} = \rho_{ji} = \text{cor}(\mu_{it}, \mu_{jt}) = 0$ $H_A: \rho_{ij} \neq \rho_{ji} = 0$ Pesaran CD test Frees CD test	CD = 5.260 F = 1.098	0.0000 $\alpha = 0.10 : 0.1521$ $\alpha = 0.05 : 0.1996$ $\alpha = 0.01 : 0.2928$	Cross sectionals are interdependent.
VIF – Test for multicollinearity	Mean VIF= 1.78		Independent variables are not highly correlated using a threshold of 5.

Table 5:Diagnostic tests on the Return on Assets model.

The validity of the cross-sectional effects and the poolability or individual effects were both tested using the first test. Given that Table 5's findings demonstrate the validity of cross-sectional effects, the model adopts fixed effects. The first test was to see if there were any differences in the regression coefficients for structural breaks over the volatile period.

The results of the second test, the test for random effects, show that random effects are invalid, i.e., that there is a significant random effect in the panel data, and therefore the random effect

model may be used to manage heterogeneity better than the pooled OLS.

The third test's results, which were used to select between the fixed effects model and the random effects model, indicate that the fixed effects model is the most appropriate.

The fourth test that was performed indicated that the error terms were homoscedastic since it failed to reject the null hypothesis for heteroskedasticity.

The findings of the fifth test, which looked at cross-sectional dependency, revealed that the banks under investigation were strongly correlated and hence interdependent. Cross sectional interdependence issues were resolved using the Driscoll and Kraay Standard Errors estimator (Hoechle, 2007).

The sixth test was the Variance Inflation Factor (VIF) test, and all the values were below 5, showing that multicollinearity was not a problem.

4.6. ROA Regression Discussion

Variables	Fixed Effects
ESG	ROA -0.00178 (0.00554)
Size	-2.299*** (0.260)
Lev	-0.118* (0.0455)
Liq	1.982** (0.717)
RGDP	0.0876*** (0.0219)
CPI	-0.0103 (0.0398)
GFC_Dummy	-0.160 (0.190)
COVID_Dummy	-0.746*** (0.208)
cons	12.38*** (0.932)
N	102
Groups	6
R²	0.697
F-Stats/ Wild Chi2	22.28***
Hausman Test	262.49***
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	

Table 6:Regression output on the Return on Assets model

The results showed that ESG is negatively and insignificantly related ROE. Implying that the higher the ESG participation the lower the ROA. ROA is an accounting performance measure of the bank's operational performance, this directly relates to the profitability of banks because it evaluates the profit made per dollar of assets and indicates how successfully management utilizes resources to make profits (Kosmidou & Zopounidis, 2008). According to the stakeholder theory, a corporation has a duty to maximize the value of all shareholders, which is why a company's financial success is important (Azmi et al., 2021; Cremona & Passador, 2019).The empirical

results counter the theory as the increase of ESG participation has a negative relationship, although insignificant.

Although the relationship was negative, these results differ from those of Buallay (2019); Buallay et al. (2021); Duque-Grisales and Aguilera-Caracuel (2019) in that they did not demonstrate any statistical significance to determine whether there is a causal relationship.

The results indicate a negative and significant relationship between bank size and leverage in terms of the bank-specific factors. With regards to bank size, the results implies that banks are failing to optimize the cost reduction that comes along with the economies of scale. These findings are similar to the works by Al Karim and Alam (2013); Jahan and Islam (2020) who contend that as a bank grows in size, the phenomena of diseconomies of scale may occur because it becomes more difficult for management to undertake oversight and because a bank's profitability suffers as administration levels rise.

The leverage ratio is a measure of how much borrowed money banks use in their investments to boost profits for shareholders. The negative results are unexpected because highly leveraged corporations often perform better as discussed in Munangi and Sibindi (2020), the authors' research on, "The effect of credit risk on the financial performance of 18 South African banks" produced comparable findings, which they attributed the negative relationship to increased leverage generally means higher interest payments, which could diminish profitability of banks.

The only positive and significant bank variable is the relationship between liquidity and ROA, which shows that banks perform better when operational management, asset quality, and liquidity levels are improved. These results are consistent with earlier theory (Ifeacho & Ngalawa, 2014).

Two country-specific variables were used. The RGDP and ROA exhibited a positive and significant relationship, implying that as RGDP rose, ROA also rose. These findings are in agreement with the empirical data presented by a number of other research (Buallay et al., 2020; Xiazhi & Shabir, 2022).

Contrary to several research conducted in developing and developed economies, which have concluded that the inflation rate has a substantial influence on ROA, inflation had a negative and insignificant relationship with the ROA equation (Xiazi & Shabir, 2022). Our findings, nonetheless are not uncommon as Ifeacho and Ngalawa (2014) were the authors used financial ratios to analyse the South African banking industry's financial performance, they discovered that inflation was negative and had no impact on ROA.

Two dummy variables were added to account for the structural breaks that could be caused by the two events. The first dummy variable was COVID-19, which had a negative and significant relationship, similar to Xiazi and Shabir (2022). This shows that the COVID-19 outbreak has substantially reduced the operational profitability of the banking sector because businesses and households are unable to service their debt. A consequence of this is non-performing loans, which cause revenue loss and ultimately impacting the bank's performance.

The GFC variable had a negative relationship however insignificant with ROA, this result was expected given that during the 2008 GFC crisis the South African banking sector was insulated from the direct impacts of the crisis through appropriate monitoring and supervision, which can be arguably accredited to the efficiency of the system (Lisene, 2015; Matemane & Wentzel, 2019).

4.7. ROE Diagnostic Tests

Statistical Test	Test Statistic	P - Value	Conclusion
Chow Test $H_0 : \alpha_1 = \alpha_2 = \dots \alpha_{N-1} = 0$ $H_A : \alpha_1 \neq \alpha_2 \neq \dots \alpha_{N-1} \neq 0$	F = 8.73	0.0000	Cross-sectional individual effects are valid. Therefore, the fixed effects is most appropriate as opposed to the pooled OLS model
Breusch Pagan LM test $H_0: \delta_{\mu}^2 = 0$ $H_A: \delta_{\mu}^2 \neq 0$	Chi2 = 0.15	0.3475	There are no random effects present. Which indicates the pooled OLS model is better suited.
Hausman test $H_0: E(\mu_{it} X_{it}) = 0$ $H_A: E(\mu_{it} X_{it}) \neq 0$	Chi2 = 47.57	0.0000	Fixed effects model is most appropriate.
Heteroscedasticity $H_0: \delta_i^2 = \delta \quad \text{for all } i$ $H_A: \delta_i^2 \neq \delta \quad \text{for all } i$	Chi2 = 0.46	0.4955	Error terms are equally distributed.
Cross-sectional dependence tests $H_0: \rho_{ij} = \rho_{ji} = \text{cor}(\mu_{it}, \mu_{jt}) = 0$ $H_A: \rho_{ij} \neq \rho_{ji} = 0$ Pesaran CD test Frees CD test	CD = 1.641 F = 0.237	0.1008 $\alpha = 0.10 : 0.1521$ $\alpha = 0.05 : 0.1996$ $\alpha = 0.01 : 0.2928$	Cross sectionals are independent and do not exhibit interdependency.
VIF – Test for multicollinearity	Mean VIF= 1.78		Independent variables are not highly correlated using a threshold of 5

Table 7: Diagnostic tests on the Return on Equity model.

The Chow test as reported in table 7 indicates that cross sectional effects are valid, and the model therefore follows the fixed effects approach and the pooled OLS method is not preferred.

The results of the second test for random effects show that random effects are invalid, indicating that pooled OLS should be used instead of random effect models to handle heterogeneity.

The results of the Hausman test, which was used to distinguish between the fixed effects model and the random effects model, demonstrate that the fixed effects model is the most appropriate.

The fourth test, which was carried out was the test for heteroskedasticity and the null hypothesis was rejected, implying that the error terms were homoscedastic. The fifth test that was carried out was for cross sectional dependence and the results showed that banks under consideration were weakly correlated and independent. The last test was VIF and all the variables were below 5, indicating no problems of multicollinearity.

4.8. ROE Regression Discussion

Fixed effects	
	ROE
ESG	-0.218**
	(0.0656)
Size	8.423***
	(2.078)
Lev	2.647***
	(0.539)
Liq	-6.756
	(8.491)
RRGDP	0.548*
	(0.259)
CPI	0.385
	(0.471)
GFC_Dummy	-5.375*
	(2.253)
COVID_Dummy	-2.907
	(2.469)
_cons	12.07
	(11.05)
<i>N</i>	102
<i>Groups</i>	6
<i>R</i> ²	0.575
F-Stats/Wild chi2	13.09***
Hausman test	47.57***
Standard errors in parentheses	
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	

Table 8: Regression output on the Return on Equity model

The second measurement of bank performance utilized in this study was Return on Equity (ROE). Ultimately the fixed effects model was selected for analysis given the diagnostic tests.

ROE is an important indicator of financial growth potential. The findings for ESG and ROE showed that ESG is negatively and significantly related ROE. Implying that the higher the ESG participation the lower the ROE. As discussed above with the ROA equation results this counters stakeholder theory as the firm is increasing ESG however that leads to a reduction in ROE.

A company's primary goal is to generate value for its stakeholders, and any goals not linked to its financial growth will reduce the effectiveness of the company by driving up expenses and impairing financial performance. Organizations with higher ROE are often stronger at producing cash internally and generating returns for shareholders (Khoza, 2020). However the expense associated with implementing ESG initiatives may be the cause of the negative association, which means that when banks spend heavily on ESG, they may shift cash flow for operations towards additional ESG investment, which would lower ROE (Duque-Grisales & Aguilera-Caracuel, 2019).

These findings differ from the finding by El Khoury et al. (2021), which sought to examine the influence of “ESG on bank performance in the Middle East, North Africa, and Turkey”. Financial performance was measured through the same variables and the results found that ESG seems to be positively related to financial performance at a lower level, but it interestingly becomes value eroding at higher levels of investments as the costs begin to exceed the benefits for ROE.

The results were similar to that of Buallay (2019) where the study looked at the same topic, with ROE being one of the measurements of financial performance in 80 countries and 530 banks. According to some studies, investors are hesitant to fund sustainability-related projects because they conflict with business strategies and reduce competitive advantage. As a result, sustainability reporting may have a detrimental effect on shareholder satisfaction, which is reflected in the company's equity investment. Moreover these findings are consistent with empirical findings of Buallay (2019); Duque-Grisales and Aguilera-Caracuel (2019).

Leverage and bank size exhibited a positive and significant relationship with ROE among the bank-specific variables. This means as the bank size and leverage increases so does ROE.

The bank size relationship was expected because larger banks can generally access more resources and attract cheaper capital (El Khoury et al., 2021; Johnson et al., 2019). These findings were different from Munangi and Sibindi (2020), where the authors did not find any conclusive results regarding the relationship, in the context of South African banks, as the estimated results were statistically insignificant. The positive and significant leverage relationship indicates the strength of banks which are highly profitable, well capitalised, and have good ROE as highly leveraged firms generally perform better (Buallay, 2019; Ifeacho & Ngalawa, 2014).

Liquidity had a different result, showing a negative relationship with ROE however the relationship was statistically insignificant to determine its effect. Liquidity however had a negative relationship with ROE however insignificant, according to Buallay et al. (2020) this may relate to the bank having free cashflow, which is not being utilized to maximise financial performance and return for shareholders.

With regards to country specific variables the RGDP was positive and significant in the ROE model. Meaning a direct positive relationship between RGDP and ROE. For this reason, banks are procyclical because credit demand rises and falls with the cyclical upswings. This assumes a direct link between economic success and bank profitability based on economic growth and banking sector profitability literature (Buallay et al., 2020; El Khoury et al., 2021). However, inflation is positive but insignificant to quantify the causal relationship.

With regards to the two dummies used they both had a negative relationship with the ROE equation. The COVID-19 dummy is insignificant and this differs from the study by Xiazi and Shabir (2022) who found a significant and negative relationship with ROE for bank performance. However only the GFC variable had a significant relationship. This means the GFC had a negative impact on the ROE of banks. Di Tommaso and Thornton (2020) investigated “The impact ESG has on banks risk and value for 19 European Countries and 81 banks”. In their study they included the GFC as a dummy variable and the results indicated that the GFC made banks riskier as this

was a period of bad bank management of banks with the attempt to better the balance sheet of investing stakeholders in the bank and this reflected through the ROE although South Africa was not heavily impacted by the GFC there shareholders. Though mainly the developed economies of the American and European continents were heavily impacted, the GFC also still had some impact on developing economies all over the globe (Ifeacho & Ngalawa, 2014).

4.9. Tobin's Q Diagnostic Tests

Statistical Test	Test Statistic	P - Value	Conclusion
Chow Test $H_0: \alpha_1 = \alpha_2 = \dots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \dots \alpha_{N-1} \neq 0$	F= 9.10	0.0000	Cross-sectional individual effects are valid. Therefore, the fixed effects is most appropriate as opposed to the pooled OLS model
Breusch Pagan LM test $H_0: \delta_{\mu}^2 = 0$ $H_A: \delta_{\mu}^2 \neq 0$	Chi2 = 0.00	0.9999	There are no random effects present. Which indicates the pooled OLS model is better suited.
Hausman test $H_0: E(\mu_{it} X_{it}) = 0$ $H_A: E(\mu_{it} X_{it}) \neq 0$	Chi2 =50.72	0.0000	Fixed effects model is most appropriate.
Heteroscedasticity $H_0: \delta_i^2 = \delta \text{ for all } i$ $H_A: \delta_i^2 \neq \delta \text{ for all } i$	Chi2 = 1.44	0.2297	Error terms are equally distributed.
Cross-sectional dependence tests $H_0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $H_A: \rho_{ij} \neq \rho_{ji} = 0$ Pesaran CD test Frees CD test	CD= 1.626 F= 0.451	0.1040 $\alpha= 0.10 : 0.1521$ $\alpha= 0.05 : 0.1996$ $\alpha= 0.01 : 0.2928$	Cross sectionals are independent and do not exhibit interdependency.
VIF – Test for multicollinearity	Mean VIF= 1.78		Independent variables are not highly correlated using a threshold of 5

Table 9:Diagnostic tests on the Tobin's Q model

The results from Table 9 ,test one, show that cross-sectional effects are valid, so the model uses the fixed effects approach and the pooled OLS method. This test was done to determine the joint validity of cross-effects, which examines whether the regression coefficients are different for structural breaks within the data caused by periods of turbulence.

The second test indicate that the random effects are not valid, indicating that the pooled OLS model should be used as this model will handle heterogeneity better than the random effect model.

To determine whether to utilize the fixed effects model or the random effects model, the Hausman test was used as the third test. The results demonstrate that the fixed effects model is the best choice. The fourth test, which was carried out was the test for heteroskedasticity and null hypothesis was not rejected , implying that the error terms were homoscedastic.

The fifth test that was carried out was the test for cross sectional dependence and the results showed that banks under consideration were weakly correlated and independent.

The Variance Inflation Factor (VIF) test was the 6th and last test, and the results for all variables were below 5 meaning there was no problem of multicollinearity.

4.10. Tobin's Q Regression Discussion

Fixed Effects	
Variables	TQ
ESG	-0.0154*** (0.00202)
Size	0.0889 (0.0949)
Lev	-0.0808*** (0.0066)
Liq	0.867** (0.262)
RGDP	0.00618 (0.00800)
CPI	0.000797 (0.0145)
GFC Dummy	0.0690 (0.0695)
COVID Dummy	-0.0441 (0.0762)
cons	0.319 (0.341)
N	102
Groups	6
R ²	0.227
F-Stats/ Wild Chi2	2.84**
Hausman Test	50.72***
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	

Table 10: Regression output on the Tobin's Q model

The relationship between Tobin's Q and ESG was discovered to be statistically significant and negative. This indicates that the Tobin's Q drops as ESG involvement increases. Tobin's Q is a performance metric that is less susceptible to earnings management. It depicts how the market sees these operations and more properly captures their influence (El Khoury et al., 2021).

According to a study by Azmi et al. (2021), ESG has a positive effect on bank value, however high ESG levels result in diminishing returns. These findings indicate that neither the trade-off theory

nor the stakeholder theory fully explain the connection between ESG, and bank value as assessed by Tobin's Q. A percentage of the ESG expenditures would be absorbed by stakeholders, which, up to a certain point, might result in ESG spending beyond a profitable threshold. It was also shown that ESG is beneficial at lower levels of investment but becomes value eroding at greater levels. Due to the importance of market value to stakeholders, these effects must be carefully considered to maintain stakeholder satisfaction and market perception.

The implications of the above results could indicate that the banking sector has not yet adopted the appropriate sustainability policies that would have a favourable influence on their operational performance and investor confidence. These results cast doubt on the economic sustainability of ESG enhancements.

Regarding bank variables, the bank size and liquidity were found to be positive however only the liquidity variable was seen as significant. This means when size and liquidity increases so does the TQ, however only the liquidity is statistically significant. Al Karim and Alam (2013) found that bank size has significant effect on the value of TQ, which could be attributed to the manner in, which TQ is calculated. Our results however are similar to those of Jahan and Islam (2020) found that bank size are positive their relationship with TQ is statistically insignificant. With regards to the liquidity, the relationship with TQ was positive and significant. El Khoury et al. (2021) looked at the TQ as one of the measures of financial performance and one of the bank variables analysed were liquidity the relationship was found to be positive however statistically insignificant these results are corroborated by the findings of Azmi et al. (2021) that liquidity enhances the profitability of banks from a market perspective however not enough to draw a statistical relationship.

There was a negative and statistically significant relationship between leverage and TQ. This means as leverage increases TQ will reduce meaning there is a negative relationship between the two. These findings were similar to those of Buallay (2019) regarding the TQ model, the research also concludes that highly leveraged firms prefer to disclose less on sustainability reporting as they are aware of the market perception.

Macroeconomic variables for the country were determined to be positive but not statistically significant. This indicates that as RGDP and inflation go up so does TQ however there is not enough statistical significance to deduce a relationship. These findings were different to those of Buallay et al. (2020) who found the RGDP is positive and significantly correlated to the TQ model. Interestingly El Khoury et al. (2021) found the RGDP positively and significantly affects accounting measures of performance however negatively and significantly affects market measures of performance. With regards to inflation Jahan and Islam (2020) found inflation to be negative however statistically insignificant, which draws the conclusion that from a market performance measurement inflation changes do not statistically affect market performance.

The two dummy variables utilized both had a positive relationship with TQ however neither were statistically significant. This means the GFC, and the pandemic positively affected the bank performance, from a market perspective. Bătae et al. (2021) accredited this positive relationship to TQ being a measure of the banks' ability to generate profit for the shareholders based on their replacement cost of assets. El Khoury et al. (2021) states that this is reinforced by TQ performance being less sensitive to earnings management and reflecting market perception of the increased ESG activities.

4.11. Hypothesis Discussion

The hypothesis was formulated in chapter 1, which is as follows:

H₀: Sustainability reporting, which is determined by the ESG disclosure score, results in better financial performance and value for investors and all stakeholders.

The hypothesis theoretical grounding is based on the stakeholder theory which states, “a company's ethical obligation is to maximize shareholder value”. These stakeholders include shareholders, clients, service providers, employees, the public and more. The consideration of stakeholders needs, and interest is a main driver for value maximisation. A recent definition of the stakeholder theory as discussed in Bualley (2019) emphasizes that value maximisation is not only limited to profit maximisation for shareholders but considers the broader long-term impacts on all stakeholders and societal implications of its activities. This incorporates the rising interest in sustainability practices as it allows for businesses to find ways to create value that contributes

positively to society. This hypothesis was further reinforced in the literature review in which various literature discussed sustainability reporting as a critical practice for organizations across various industries, including the banking sector, due to growing awareness of environmental, social, and governance (ESG). The relationship between sustainability reporting and a bank's financial performance has garnered considerable attention.

Different perspectives on the relationship appears in the literature view. Certain authors have found the relationship to be positive and value accretive from an accounting and market-based measure of financial performance, whereas other authors have found this relationship to be negative. This has led to conflicting results from the existing research. Given the presence of opposing theories, this research investigated the relationship of ESG on several indicators of bank financial performance (operational, financial and market). The hypothesis was utilized as a guiding measure to answer the research questions and adhere to the research objectives. For a comprehensive view of financial performance, three regression models were utilized.

1. ROA which is a measure of operational efficiency
2. ROE-measures a company's growth potential and efficiency in income generation
3. Tobins Q-measures the market perspective.

Using accounting and market measures allowed this research to fully explore the relationship as we could understand the financial implication from both perspectives. The models included bank specific and country specific variables to provide contextually relevant understanding of the phenomenon under investigation. Thorough diagnostic tests were conducted on the models to ensure the data used met the conditions of the fixed effect model. Based on the findings of this research it can be interpreted that the increase of ESG violates stakeholder theory in the context of South African banks. As such we fail to accept the null hypothesis.

Chapter 5. Conclusion and Recommendations

5.1. Introduction

This chapter presents an overview of the study, focusing on the aims and research questions that were asked. It then draws some conclusions and makes some suggestions for the direction of future study.

This study's purpose was to conduct an empirical investigation into the question of whether sustainability reporting, which was evaluated based on the disclosure of ESG, leads to improved financial performance and value for investors and all stakeholders within the South African banking industry. This study draws its motivation from earlier work carried out by several academics around the world. This research determined that there was a knowledge gap in South Africa and set out to reduce it by addressing the following issues:

- What is the relationship between Environmental, Social, Governance (ESG) and a Bank's Financial Performance (FP)?
- Does sustainability reporting increase shareholder value?

5.2. Summary of findings

Fixed Effects			
<i>Variables</i>	<i>ROA</i>	<i>ROE</i>	<i>TQ</i>
ESG	-	_*	_***
Size	_***	+***	+
Lev	_*	+***	_***
Liq	+**	-	+**
RRGDP	+***	+*	+
CPI	-	+	+
GFC_Dummy	-	_*	+
COVID_Dummy	_***	-	+
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ -Negative Relationship; +Positive Relationship			

Table 11: Summary of regression models

The fixed effects model was shown to be the most reliable by the diagnostic tests employed in this study, particularly the Hausman test. All three indicators of bank financial performance show a negative correlation with the financial performance of South African banks, which answers the first study question. When ESG involvement is considered, the ROE and TQ model exhibits a negative and substantial association with bank performance. Even if the ROA shows a negative association, it is not statistically significant.

This means the increase of sustainability reporting as measured by ESG disclosure score leads to a lower financial performance in both the account measures and market measurements of performance. This ultimately decreases shareholder value and addresses the second research question.

The bank size variable yielded various results in the three models. It was negative and insignificant for ROA and as explained in literature banks are failing to take advantage of the cost reduction that comes along with the economies of scale from an operational perspective. However, with the ROE, which is a measure of profitability it was positive and significant due to the easier access to capital and investment opportunities. With TQ The relationship with bank size was positive however not significant.

Leverage was statistically significant for all three models however it was negative for ROA and TQ, which was surprising as highly leveraged firms are generally more profitable however empirical results suggests this maybe be due to higher interest payments diminishing profitability of banks. Liquidity was positive and significant regarding ROA and TQ these results where expected as liquidity can indicate stability in a firm's management of their short-term liabilities.

Overall RGDP had a positive relationship with all three models however it was only significant with the accounting performance methods this may be due to, bank profits being procyclical because RGDP impacts the net interest income banks receive from lending. Inflation had no statistical significance in all three of the models.

The two dummy variables utilized to represent the structural gaps within the time period of this research. In the ROE model, only the GFC dummy variable was statically significant. In the ROA model and the Covid-19 dummy was negatively statistically significant as the outbreak has significantly reduced the banking sector's operational profitability because of businesses and households being unable to service their debt, which negatively affects banks' profitability by causing lost revenue and a rise in non-performing loans. The TQ model suggested that there was a positive relationship, however the relationship between the two dummy variables was insignificant.

5.3. Conclusion

The findings of the negative relationship between sustainability reporting and the banks financial performance could be due to the following factors:

ESG implementation requires a transition period with upfront investment in technology, infrastructure and ensuring employees are adequately trained in the processes. These investment costs can impact short-term profitability before the benefits of sustainability initiatives are realized. It takes time for ESG investment to yield tangible benefits, especially in terms of reputation and stakeholder trust. South Africa is an emerging market, with no regulatory board governing ESG investment. The country is still less mature in ESG implementation in comparison to its first world counterparts.

South Africa faces economic volatilities that impact the financial performance of its banks. These volatilities have recently been heightened in the past few years due to the impact of the Covid-19 pandemic. Although South Africa was largely insulated from the GFC, the negative contagion effects of the crisis had a severe impact on bank's balance sheet and the national economy. These challenges can overshadow the positive effects of ESG. Those challenges may also affect the market perception. Investors' awareness and perception of ESG's impact on financial performance might vary.

ESG requires effective integration into the bank's overall strategy and operations, improved risk management, reputation enhancement, and long-term sustainability. The impact of ESG can be

complex and multifaceted, and outcomes can differ based on a bank's strategy, market environment, and operational approach.

5.4. Policy Implications

There are significant policy implications for both regulatory authorities and the banking industry as a whole. Findings from this research can assist in the following implications:

Regulatory Frameworks and Standards:

South Africa has been a pioneer in promoting sustainability reporting the Johannesburg Stock Exchange (JSE) and the King Code of Corporate Governance. According to JSE (2022) they are developing a “Sustainability Disclosure Guidance”, along with a “Climate Change Disclosure Guidance” specifically tailored to the South African context. Regulatory authorities are vital in influencing sustainability reporting through guidelines and standards. Policymakers can enforce ESG metric disclosure for banks, improving comparability. Uniform reporting standards boost transparency, aiding stakeholders in informed decision-making.

Incentives for Reporting:

Sustainability reporting goes beyond the financial performance of a bank. Policies can be implemented that offer benefits such as tax advantages, this would allow banks to prioritize ESG disclosures in their reporting. These incentives drive banks to adopt sustainable practices, aligning their financial goals with wider societal and environmental aims.

In summary, well-designed policies can establish a framework where sustainability reporting and financial performance objectives harmonize, fostering transparency, accountability, and ethical business conduct in the banking sector.

5.5. Contributions to literature

This study aims to provide a contribution to the practice of sustainability reporting in the banking industry of South Africa, which is the study's overarching goal. As stated in the literature review, empirical studies provide conflicting evidence on this topic. In South Africa there is still limited ESG activities related research, with majority of research focusing on corporate governance. To ensure a thorough understanding of sustainability reporting and financial performance, it is important to engage with all the three components of ESG.

Hence this study was conducted to add to the existing literature on the topic and offer insight from an emerging market. This study concludes that an increase in sustainability as measured by ESG ultimately leads to a decline in financial performance, measured utilizing the following proxies: ROA; ROE; TQ, of South African banks and decreases shareholder value. These results will be of interest to banks management, policy makers, investors, and various stakeholders within the financial industry. This study will assist them in understanding the effects on financial, market and operational performance when ESG investment is increased.

5.6. Recommendations to future research

Given the increase in sustainability reporting requirements and the global ESG drive across the globe, future research may investigate the following:

1. The period of this study incorporates the 2008 GFC and the Covid-19 Pandemic. Although dummy variables were utilized to account for the structural impacts in this study. A recommendation for future research is a study that examines before, during and after these periods.
2. The sample size for this study was smaller than studies done in other markets since it only comprised of six banks, which were selected based on the following criteria: listed banks, locally controlled, asset size and market share in South Africa. A recommendation for future research is a study that includes after African countries to increase the sample size.
3. The components of ESG to be researched separately and assess the specific type of ESG activity that needs more to increase financial performance along with their ratings score. This may incentivise more participation within emerging markets and if there was a better

understanding of how the bank can ultimately maintain its financial value and still be sustainable.

4. The fixed effects estimation model utilized was presumed as the most suitable method of interpreting the data set given the research question and objectives along with the data size. Thorough robustness tests were performed to ensure no assumptions were violated and this protects the credibility and reliability of the results. However as discussed in Hill & Terrence et al., (2020) the model makes the assumption that all unobserved variables influencing the dependent variable for each group remain constant across time. This implies that any time-invariant unobserved characteristics are incorporated into the fixed effect. The model also provides insight into relationships within the sample of entities in the analysis. There may be limitations to generalizing the results beyond the entities observed. As such the exploration of a different model such as Generalised Method of Moments (GMM) can be explored if there is an adequate sample.
5. Lastly, we suggest incorporating more African countries in the research to provide a holistic understanding of the impact from an African perspective, which can be used as a comparative data to European studies.

Chapter 6. References

- Al Karim, R., & Alam, T. (2013). An evaluation of financial performance of private commercial banks in Bangladesh: Ratio analysis. *Journal of Business Studies Quarterly*, 5(2), 65. www.researchgate.net
- Azmi, W., Hassan, M. K., Houston, R., & Karim, M. S. (2021). ESG activities and banking performance: International evidence from emerging economies. *Journal of International Financial Markets, Institutions and Money*, 70. <https://doi.org/10.1016/j.intfin.2020.101277>
- Basias, N., & Pollalis, Y. (2018). Quantitative and qualitative research in business & technology: Justifying a suitable research methodology. *Review of Integrative Business and Economics Research*(7), 91-105.
- Bătae, O. M., Dragomir, V. D., & Feleagă, L. (2021). The relationship between environmental, social, and financial performance in the banking sector: A European study. *Journal of Cleaner Production*, 290. <https://doi.org/10.1016/j.jclepro.2021.125791>
- Branco, M. C., & Rodrigues, L. L. (2008). Social responsibility disclosure: A study of proxies for the public visibility of Portuguese banks. *The British Accounting Review*, 40(2), 161-181. <https://doi.org/10.1016/j.bar.2008.02.004>
- Buallay, A. (2019). Between cost and value: Investigating the effects of sustainability reporting on a firm's performance. *Journal of Applied Accounting Research*. Vol. 20 No. 4, pp. 481-496. <https://doi.org/10.1108/JAAR-12-2017-0137>
- Buallay, A. (2019). Sustainability reporting and firm's performance. *International Journal of Productivity and Performance Management*, 69(3), 431-445. <https://doi.org/10.1108/ijppm-10-2018-0371>
- Buallay, A., Al Marri, M., Nasrallah, N., Hamdan, A., Barone, E., & Zureigat, Q. (2021). Sustainability reporting in banking and financial services sector: a regional analysis. *Journal of Sustainable Finance & Investment*. <https://doi.org/10.1080/20430795.2021.1978919>
- Buallay, A., Fadel, S. M., Al-Ajmi, J. Y., & Saudagaran, S. (2020). Sustainability reporting and performance of MENA banks: is there a trade-off? *Measuring Business Excellence*, 24(2), 197-221. <https://doi.org/10.1108/mbe-09-2018-0078>
- Busco, C., & Sofra, E. (2021). The Evolution of Sustainability Reporting: Integrated Reporting and Sustainable Development Challenges. In *Corporate Sustainability in Practice* (pp. 191-206). https://doi.org/10.1007/978-3-030-56344-8_11
- Certo, T., & Semadeni, M. (2006). Strategy Research and Panel Data: Evidence and Implications. *Journal of Management*. https://www.researchgate.net/profile/Matthew-Semadeni/publication/230561792_Strategy_Research_and_Panel_Data_Evidence_and_Implications/links/0912f5017e2e61048c000000/Strategy-Research-and-Panel-Data-Evidence-and-Implications.pdf
- Commonfund. (2013). *From SRI to ESG- The Changing World of Responsible Investing.pdf*>. <https://files.eric.ed.gov/fulltext/ED559300.pdf>

- Cremona, B. M., & Passador, M. L. (2019). What about the future of European Banks? Board characteristics and ESG impact. *Securities Regulation Law Journal*, 47(4), 319-364. <https://ssrn.com/abstract=3441784>
- Crespi, F., & Migliavacca, M. (2020). The Determinants of ESG Rating in the Financial Industry: The Same Old Story or a Different Tale? *Sustainability*, 12(16). <https://doi.org/10.3390/su12166398>
- De Hoyos, R. E., & Sarafidis, V. (2006). Testing for cross-sectional dependence in panel-data models. . 6, *The stata journal*(4), 482-496.
- Di Tommaso, C., & Thornton, J. (2020). Do ESG scores effect bank risk taking and value? Evidence from European banks. *Corporate Social Responsibility and Environmental Management*, 27(5), 2286-2298. <https://doi.org/10.1002/csr.1964>
- Duque-Grisales, E., & Aguilera-Caracuel, J. (2019). Environmental, Social and Governance (ESG) Scores and Financial Performance of Multilatinas: Moderating Effects of Geographic International Diversification and Financial Slack. *Journal of Business Ethics*, 168(2), 315-334. <https://doi.org/10.1007/s10551-019-04177-w>
- El Khoury, R., Nasrallah, N., & Alareeni, B. (2021). ESG and financial performance of banks in the MENAT region: concavity–convexity patterns, . *Journal of Sustainable Finance & Investment*. <https://doi.org/10.1080/20430795.2021.1929807>
- Frees, E.W., 1995. Assessing cross-sectional correlation in panel data. *Journal of econometrics*, 69(2), pp.393-414. <https://doi.org/10.1128/jb.177.8.2008-2013.1995>
- Garcia, A. S., Mendes-Da-Silva, W., & Orsato, R. J. (2017). Sensitive industries produce better ESG performance: Evidence from emerging markets. *Journal of Cleaner Production*, 150, 135-147. <https://doi.org/10.1016/j.jclepro.2017.02.180>
- Hill, T.D., Davis, A.P., Roos, J.M. and French, M.T., 2020. Limitations of fixed-effects models for panel data. *Sociological Perspectives*, 63(3), pp.357-369. <https://doi.org/10.1177/0731121419863785>
- Hoechle, D. (2007). Robust Standard Errors for Panel Regressions with Cross-Sectional Dependence. *The Stata Journal*, 7(3), 281-312.
- Ifeacho, C., & Ngalawa, H. (2014). Performance Of The South African Banking Sector Since 1994. *Journal of applied business research* 30(4), 1183-1196.
- Jahan, N., & Islam, M. (2020). Evaluation of Accounting and Market Performance: A Study on Listed Islamic Banks of Bangladesh. *arXiv pre-print server*. <https://doi.org/None> arxiv:2005.08734
- Jahan, N., & M. (2020). Evaluation of Accounting and Market Performance: A Study on Listed Islamic Banks of Bangladesh. *arXiv pre-print server*. <https://doi.org/None> arxiv:2005.08734
- JSE. (2022). JSE's Sustainability and Climate Disclosure Guidance, 2023 <https://www.jse.co.za/our-business/sustainability/jses-sustainability-and-climate-disclosure-guidance>
- Johnson, R., Mans-Kemp, N., & Erasmus, P. D. (2019). Assessing the business case for environmental, social and corporate governance practices in South Africa. *South African Journal of Economic and management Sciences*, 22(1). <https://doi.org/10.4102/sajems.v22i1.2727>
- Khoza, M. (2020). An empirical analysis of bank performance and regulatory requirements in South Africa.

- Kosmidou, K., & Zopounidis, C. (2008). Measurement of bank performance in Greece. *South-Eastern Europe Journal of Economics*, 1(1), 79-95.
<http://www.asecu.gr/Seeje/issue10/kosmidou.pdf>
- Kuhlman, T., & Farrington, J. (2010). What is sustainability? *Sustainability*, 2(11), 3436-3448.
- Kumbirai, M., & Webb, R. (2010). A financial Ratio Analysis of Commercial Bank Performance in South Africa. *African Review of Economics and Finance*, 2(1), 30-53.
- Lisene, M. (2015). Sustainability practices and reporting by the South African banking sector.pdf.
<file:///Users/thokozaanimsimanga/Documents/2021/MMFI/Research/June%20Sustainability%20practices%20and%20reporting%20by%20the%20South%20African%20banking%20sector.pdf>
- Marozva, G. (2017). An empirical study of liquidity risk embedded in banks' asset liability mismatches. *Unpublished doctoral thesis. Pretoria: University of South Africa*.
- Matemane, R., & Wentzel, R. (2019). Integrated reporting and financial performance of South African listed banks. *Banks and Bank Systems*, 14(2), 128-139.
[https://doi.org/10.21511/bbs.14\(2\).2019.11](https://doi.org/10.21511/bbs.14(2).2019.11)
- Mefford, R. N., & Johnston, P. (2016). The Evolution of Sustainability in a Global Firm and Its Supply Chain. *Journal of Management and Sustainability*, 6(2).
<https://doi.org/10.5539/jms.v6n2p77>
- Mohammad, W. M. W., & Wasiuzzaman, S. (2021). Environmental, Social and Governance (ESG) disclosure, competitive advantage and performance of firms in Malaysia. *Cleaner Environmental Systems*, 2. <https://doi.org/10.1016/j.cesys.2021.100015>
- Munangi, E., & Sibindi, A. (2020). An Empirical Analysis of the Impact of Credit Risk on the Financial Performance of South African Banks. *Academy of Accounting and Financial Studies Journal* 24(3). https://www.researchgate.net/profile/Ephias-Munangi/publication/342833260_AN_EMPIRICAL_ANALYSIS_OF_THE_IMPACT_OF_CREDIT_RISK_ON_THE_FINANCIAL_PERFORMANCE_OF_SOUTH_AFRICAN_BANKS/links/5f0850eb299bf188161037d0/AN-EMPIRICAL-ANALYSIS-OF-THE-IMPACT-OF-CREDIT-RISK-ON-THE-FINANCIAL-PERFORMANCE-OF-SOUTH-AFRICAN-BANKS.pdf
- Nedbank. (2021). *Nedbank Group Integrated Report, 2020*.
- Park, H. M. (2011). Practical Guides To Panel Data Modeling: A Step-by-step Analysis Using Stata. <http://www.iuj.ac.jp/faculty/kucc625>
- Pesaran, M.H., 2004. General diagnostic tests for cross section dependence in panels. *Available at SSRN 572504*. <http://hdl.handle.net/10419/18868>
- Purba, J. H. V., & Bimantara, D. (2020). The Influence of Asset Management on Financial Performance, with Panel Data Analysis. *Advances in Economics, Business and Management Research*, 143. <https://doi.org/10.2991/aebmr.k.200522.031>
- SARB. (2020). *South African Registered Banks and Representative Offices*.
<https://www.resbank.co.za/en/home/what-we-do/Prudentialregulation/sa-registered-banks-and-representative-offices>
- SSE. (2015). *Model Guidance on reporting ESG information to Investors*.
<https://sseinitiative.org/wp-content/uploads/2019/12/SSE-Model-Guidance-on-Reporting-ESG.pdf>

- Thaslim, K. A. M., & Antony, A. R. (2016). Sustainability reporting - its then, now and the emerging next!
file:///Users/thokozanimsimanga/Documents/2021/MMFI/Research/June%20WSN42201624-40.pdf
- Tomuleasa, I. I., & Cocriș, V. (2014). Measuring the financial performance of the European systemically important banks *Financial studies*, 18(4).
[vhttps://ipe.ro/RePEc/vls/vls_pdf/vol18i4p31-51.pdf](https://ipe.ro/RePEc/vls/vls_pdf/vol18i4p31-51.pdf)
- Uddin Ahmed, S., Parvez Ahmed, S., & Hasan, I. (2018). Why banks should consider ESG risk factors in bank lending? *Banks and Bank Systems*, 13(3), 71-80.
[https://doi.org/10.21511/bbs.13\(3\).2018.07](https://doi.org/10.21511/bbs.13(3).2018.07)
- Weber, O., Hoque, A., & Ayub Islam, M. (2015). Incorporating environmental criteria into credit risk management in Bangladeshi banks. *Journal of Sustainable Finance & Investment*, 5(1-2), 1-15. <https://doi.org/10.1080/20430795.2015.1008736>
- Wiseman, K. (2014). *African Bank bailout used G20 principles* <https://www.iol.co.za/business-report/economy/african-bank-bailout-used-g20-principles-1735058>
- WWF. (2014). *ENVIRONMENTAL, SOCIAL AND GOVERNANCE INTEGRATION FOR BANKS- A GUIDE TO STARTING IMPLEMENTATION*.
https://d2ouvy59p0dg6k.cloudfront.net/downloads/wwf_environmental_social_governance_banks_guide_report.pdf
- Xiazi, X., & Shabir, M. (2022). Coronavirus pandemic impact on bank performance. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2022.1014009>
- Zach. (2019). *A guide to multicollinearity & VIF in Regression*. Statology
<https://www.statology.org/multicollinearity-regression/>

Chapter 7. Annexures

This annexure displays the model outputs of all three models run, however the analysis in this research is based on the fixed effects model as this was determined to be more suitable given the diagnostic tests and the non-random sampling of the data.

7.1. ROA -Model Outputs

Variables	Pooled Effects	Fixed Effects	Random Effects
	ROA	ROA	ROA
ESG	-0.0142*	-0.00178	-0.0142*
	(0.00689)	(0.00554)	(0.00689)
Size	-1.009***	-2.299***	-1.009***
	(0.253)	(0.260)	(0.253)
Lev	-0.348***	-0.118*	-0.348***
	(0.0442)	(0.0455)	(0.0442)
Liq	0.503	1.982**	0.503
	(0.858)	(0.717)	(0.858)
RGDP	0.0960***	0.0876***	0.0960***
	(0.0287)	(0.0219)	(0.0287)
CPI	0.0545	-0.0103	0.0545
	(0.0513)	(0.0398)	(0.0513)
GFC_Dummy	0.0231	-0.160	0.0231
	(0.248)	(0.190)	(0.248)
COVID_Dummy	-0.290	-0.746***	-0.290
	(0.264)	(0.208)	(0.264)
cons	10.40***	12.38***	10.40***
	(1.022)	(0.932)	(1.022)
<i>N</i>	102	102	102
<i>Groups</i>	6	6	6
<i>R</i> ²	0.861	0.697	0.7220
F-Stats/ Wild Chi2	63.67***	22.28***	157.47***
Hausman Test		262.49***	262.49***
Standard errors in parentheses			
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$			

7.2. ROE Model Outputs

	Pooled effects	Fixed effects	Random Effects
	ROE	ROE	ROE
ESG	-0.355***	-0.218**	-0.355***
	(0.0679)	(0.0656)	(0.0679)
Size	6.146**	8.423***	6.146**
	(2.008)	(2.078)	(2.008)
Lev	0.315	2.647***	0.315
	(0.354)	(0.539)	(0.354)
Liq	-14.81	-6.756	-14.81
	(7.972)	(8.491)	(7.972)
RGDP	0.598*	0.548*	0.598*
	(0.292)	(0.259)	(0.292)
CPI	0.963	0.385	0.963
	(0.517)	(0.471)	(0.517)
GFC_Dummy	-3.363	-5.375*	-3.363
	(2.509)	(2.253)	(2.509)
COVID_Dummy	0.616	-2.907	0.616
	(2.642)	(2.469)	(2.642)
_cons	12.20	12.07	12.20
	(8.649)	(11.05)	(8.649)
N	102	102	102
Groups	6	6	6
R²	0.512	0.575	0.512
F-Stats/Wild chi2	88***	13.09***	88***
Hausman test	-	47.57***	47.57***

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7.3. Tobin's Q-Model Outputs

	Pooled Effects	Fixed Effects	Random Effects
Variables	TQ	TQ	TQ
ESG	-0.0147*** (0.00209)	-0.0154*** (0.00202)	-0.0147*** (0.00209)
Size	0.0236 (0.0392)	0.0889 (0.0949)	0.0236 (0.0392)
Lev	-0.0800*** (0.00741)	-0.0808*** (0.0066)	-0.0800*** (0.00741)
Liq	0.296 (0.199)	0.867** (0.262)	0.296 (0.199)
RGDP	0.00673 (0.00955)	0.00618 (0.00800)	0.00673 (0.00955)
CPI	0.00638 (0.0168)	0.000797 (0.0145)	0.00638 (0.0168)
GFC_Dummy	0.103 (0.0815)	0.0690 (0.0695)	0.103 (0.0815)
COVID_Dummy	0.0221 (0.0850)	-0.0441 (0.0762)	0.0221 (0.0850)
_cons	1.730*** (0.201)	0.319 (0.341)	1.730*** (0.201)
N	102	102	102
Groups	6	6	6
R ²	0.612	0.227	0.6123
F-Stats/ Wild Chi2	16.14***	2.84**	145.28***
Hausman Test	-	50.72***	50.72***
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$			