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BANKING STABILITY AND SUSTAINABLE INVESTMENT

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INTEGRI PROCEDAMUS

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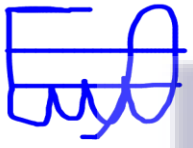
DECLARATION

I, Ebenezer Kwame Arthur, hereby declare that this thesis has not been documented for presentation in this or any other university. I hereby assert that this thesis is entirely my own work and that all references have been appropriately cited. I bear complete responsibility for any shortcomings that may be discovered in this thesis.



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CERTIFICATION

We hereby certified that this thesis was supervised in accordance with the laid down procedures and guidelines by University of Ghana, Legon.

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(**SUPERVISOR**)

DEDICATION

I dedicate this work to God Almighty for His grace, favour, and protection during the period of this thesis and to my family and loved ones.

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My first thanks go to the Almighty God for His countless favors, good health, and well-being, which made it possible for me to finish this work successfully. I am appreciative of His mercy.

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ABSTRACT

Sustainable investment has become a trending issue in the area of investment. Thus investors are seeking to invest in businesses that do not only focus on profit maximization but also take into consideration the environmental, social, and governance (ESG) impact of their economic activities. This is because climate change affects businesses adversely. According to the physical and transition risk theory, climate change brings about unexpected natural occurrences which environmentally and socially affect the well-being of the people as well as transmission of risk to financial sectors in the form of NPL which leads to financial instability. This has necessitated that all industries including the financial sector to incorporate ESG factors into their operations to allocate funds to promote sustainable development. The stability in the financial sector is an indication of economic growth in a country. Therefore, the roles performed by banks are of much concern to the government, policymakers, regulators, and citizens. This study assessed the impact of sustainable investment (ESG) on banking stability. Study data was obtained from the websites of the World Bank database and the Global financial development database for 155 countries for a period of 11 years from 2010 to 2020. Two econometric estimators were adopted; a two-step system GMM and a fixed effect model. The results from the system GMM model showed that at the global, bank-level performance indicators, financial structure variables, macroeconomic factors and sustainable investment (ESG) all have significant impacts on the stability of the banking sector. The results from the fixed effect model showed that bank-level performance, financial structure, macroeconomic and sustainable investment have impacts on banking stability in all continents except the Asian continent which have no impact from bank-level performance and macroeconomic factors, and for Europe and South America, no impacts were found for sustainable investment pillars. In all cases, the impacts depend on the proxy used for banking stability. The study therefore recommends that regulators, supervisors, and policymakers should consider the institutional structures and

governance quality of the country when making their decision and require banks to be socially inclusivity and ensure good environmentally sustainable practices in their operational activities. The study further recommends that similar studies be replicated among the various bloc such as Middle East and North African(MENA) countries, Middle-Income Countries, Sub-Sahara Africa, etc.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter of the study gives an introduction to the study. This is made up of the background to the study, the statement of the problem, research objectives, research hypothesis, purpose, significance, scope and limitations, and organization of the study.

1.1 Background of Study

For several years, businesses and investors have been talking about sustainable development and social responsibility, and as a result, investors are seeking more responsible methods to invest. Sustainable investing has emerged as a viable option for addressing social and environmental issues (Richardson, 2013). Investors now demand investments that address social and environmental concerns. This paves the way for long-term or value-based investment (Landier and Nair, 2009). Sustainable investment, according to the Global Sustainable Investment Alliance (2014), is the inclusion into investment decision-making issues of environmental, social, and governance. Even though research reveals that sustainable investment extends back to the 18th century, it has only received attention recently. The success of the United Nations Principles for Responsible Investment (UNPRI) launched in April 2006, which calls for environmental, social, and governance (ESG) factors to be considered in ownership decisions and investment has become the leading indicator for the rising level of sustainable investment (UNPRI, 2018).

Environmental, social, and governance (ESG) investing has become a popular trend among many investors and financial managers recently.

Since 2013, the market impact of firms producing sustainability reports has increased (Aureli et al., 2018). All of this points to an increase in investor interest in sustainability reporting in the market, as well as a growing interest in sustainable investing. In 2019, European investors invested twice as much in sustainable funds as they did in 2018, with 120 billion EUR in sustainable investment products (Schumacher, Chenet, and Volz, 2020).

ESG investing is a subcategory of socially responsible investing that focuses on ensuring that societal changes, elements, and goals are addressed. While social factors are included in investment decisions, financial performance and targets are also important to the investors of these assets (Revelli and Viviani, 2015).

In the aftermath of the recent financial crisis and volatile financial markets, socially responsible investing has continued to grow, aiming to provide investors with the image of a secure investment that can survive extreme volatility better than traditional investments. According to a Morgan Stanley poll conducted in 2019, with a sample of 800 US individual investors, the results of the poll suggest that 85 percent of individual investors are interested in sustainable investing, up from 75 percent in 2017, reaffirming that sustainable investing is here to stay. The survey also indicated that the number of options available to those investors has increased.

Sustainable investment is an investing plan that considers the issue of environmental, social and governance. The environmental (E) aspect of sustainable investment deals with the organization's strategy in reducing the environmental impact of its operations. According to Sharma (2000), environmental strategy refers to "outcomes in the form of activities firms take in compliance with regulations as well as voluntary actions they take to lessen their operations' environmental consequences". This strategy can also be defined as "an organization's comprehensive approach to

environmental challenges. It establishes how an organization views the environment; whether it is an issue of legal and regulatory requirements, risk management, an opportunity, or whether the company desires to be ecologically sustainable. Non-governmental organizations (NGOs), governmental agencies, and financial institutions since the early 1990s have considered how essential sustainable development is in addressing the rising environmental issues.

A small group of commercial banks such as HSBC Holdings, Royal Bank of Canada, and Deutsche Bank in May 1992 collaborated with the UN Programme to release a statement by banks on the Sustainable Development and Environment and establish the Banking Initiatives (UNEP, 1992). With the help of this initiative, it will be possible to meet current demands and needs without jeopardizing our ability to meet those of future generations. Since then, the financial sector has worked diligently to support the long-term development of the countries in which it conducts business. In 2003, the Equator Principles were instituted to ensure that banks –financed projects that are both socially and environmentally responsible. The Equator Principle (EP) serves as a guideline for banks to take into account the social and environmental risks in approving a new project which has a capital cost of US$10 million and above. The Equator Principle creates a framework for banks to follow with regards to responsive banking and removing responsibility in terms of responsive banking, removing responsibility from the World Bank a multilateral development bank. As of September 2022, 118 financial institutions in 37 countries had accepted the Equator Principle which represents more than 70% of the Project Finance debt in emerging economies globally (www.banktrack.org). The Equator Principle can affect a significant range of projects due to its vast number of participants, but it has been criticized for failing to deliver on its promises (O'Sullivan and O'Dwyer, 2009; Macye and Chen 2010).

The social (S) strategy of sustainable investment is concerned with the socially responsible behaviour of the banks. Human nature is rooted in social responsibility, which directs corporate operations and financial decisions. In recent times, the need for fostering social responsibility in economic markets has gradually increased as a result of globalization and sociopolitical changes. In the aftermath of the 2008–2009 Global Financial Crisis, the move for social responsibility in the financial markets has culminated. This has necessitated the rethinking of social responsibility in a newly defined financial sector. Given their position as important financial mediators and their links across the globe, banks have enormous social influence. The results of their actions affect not only the well-being of their shareholders, employees, and customers but also the entire society due to their participation in the processes of wealth creation and distribution as well as how the banking sector's solvency position impacts stability on the entire economy.

Both the individual institutions' responsibility for the security of funds entrusted to them and the sector's collective responsibility for the stability of the financial system and the economy are included in the social responsibility of banks.

Furthermore, a lot of the products and services provided by banks are of long span, resulting in a complex structure of relationships with their external stakeholders that span relatively long periods (Lentner, Szegedi, & Tatay, 2015). In addition to maximizing profits for their owners, banks' business goals should also consider the needs of other stakeholders and society as a whole.

In light of the aforementioned, banks should be compelled to incorporate social responsibility into their business decisions and to inform the public about the scope and results of their operations (Branco & Rodrigues, 2008). Participating in socially responsible activities allows banks to be distinctive and improve their public perception of service quality.

The governance (G) strategy of sustainable investment deals with the strategy of making the management or board of directors responsible and accountable to shareholders and other stakeholders of the business. It is an important strategy because it can affect the shareholders or stakeholders' value maximization. For instance, in a study by Kusi, Gyeke-Dako, Agbloyor, and Darku, (2018) which investigated whether corporate governance structures promote shareholders or stakeholders' value maximization, they found that corporate governance structures enhanced and detract from shareholders' and stakeholders value maximization.

According to Bassen and Kovacs (2020), firms need to understand the environmental, social, and governance analysis of firms as it affects the entire landscape of the economy and creates risk and opportunities for investors.

The banking sector plays an important financial intermediaries role in the financial market of the economy such as assisting in the money creation process, capital accumulation, payment services, financing investment, and economic growth (Alam, Rabbani, Tausif and Abey, 2021). Therefore, the stability of the banking sector is paramount for the growth of the economy because it reflects the confidence of customers as well as institution in the banking sector (Hussein, 2016). Although there is no widely recognized definition for banking stability, however, some policymakers consider banking stability to be the absence of bank failures (Segoviano and Goodhart, 2009). Due to the lack of consensus on this matter, each national bank supervisor must define banking stability and decide whether it encompasses non-financial institutions, conventional banks, and shadow banks that operate outside of the legal financial system. Regardless of the definition of banking stability, the literature fails to sufficiently address the factors that affect the stability of the banking sector in emerging economies while taking into account the importance of institutional quality and financial structure.

Several analysts contend that structural problems make it difficult for developing markets to achieve financial stability (Caprio and Honohan, 1999; Barth et al., 2004; Brunnermeier, Crockett, Goodhart, Persaud & Shin, 2009). Demirgüç-Kunt and Detragiache (2002) claim that regulators concentrate on both macro and micro-prudential regulations when determining banking sector stability without considering the structural and institutional determinants of the sector that affect bank stability, whereas Brunnermeier et al. (2002) show that crises are more likely to occur in nations with weak institutions. Given these considerations, as well as the inadequate institutional framework of some continents, determining what factors influence banking stability is critical.

Bank profitability and financial institution stability are said to be an increasing issue for regulators and bank supervisors. Following the 2007–2008 financial crisis, this topic has gotten a lot of attention from academics. The global financial crisis has been blamed on huge banks, which has had a substantial impact on many economies (Adusei, 2015). According to Vinals et al. (2013), there has been a greater emphasis on organizational complexity, appropriate bank size, and financial institution operations since the global economies have recovered from the crisis. Policymakers in the United States are more concerned about bank performance, according to the Vickers Report (2011), and are seeking greater liquidity and capital. This vigorous effort by authorities is in response to Basel-III requirements, which limit banks' ability to participate in high-risk projects. De Haan and Poghosyan (2012), on the other hand, point out that bank scale reduces return volatility in the United States. This relationship was described by them as non-linear (i.e. size effect positively on return volatility, when bank size crosses some threshold level).

Hossain and Reaz (2007) found that assets and firm size in place were significantly favourable indicators of corporate social responsibility (CSR) disclosure in a study of 38 publicly traded Indian banks. Khan (2010) using data from a sample of private commercial banks in Bangladesh,

investigates the impact of corporate governance characteristics on corporate social responsibility (CSR) reporting (such as non-executive directors and female board members). He found that non-executive directors significantly impact CSR reporting while no significant relationship was found between CSR reporting and female representation on the board. Similarly, Bhasin, Makarov, and Orazalin (2012) look into voluntary disclosure in Kazakhstan's banking sector and found that voluntary disclosure is more significantly impacted by the number of outside directors, while Birindelli, Dell'Atti, Iannuzzi, and Savioli (2018) recently extended their study of the qualities of the board of directors and their impact on ESG performance with a size of 108 publicly traded banks in United State and Europe. They found that ESG performance impact positively on the board size and emphasized the key role corporate governance principles play in bank supervision.

Buallay (2019) investigated the relationship between ESG and banks' operational, financial, and market performance and he found that ESG overall has a significant positive relationship with bank performance using return on assets, return on equity, and Tobin's Q for banks' operational, financial and market performance respectively.

Shakil, Mahmood, Tasnia, and Munim (2019) examined how the financial performance of banks in developing economies is affected by environmental, social, and governance performance. They found social and environmental performance to be positive and significantly influence bank financial performance while no impact was found for corporate governance on bank performance.

From 2007 through 2009, the global financial crisis affected banks and other institutions. This lead to customers and institutions losing confidence in the banking sector (Hussein, 2016). According to the United Nations Environmental Programme Financial Initiative (UNEP-FI Report, 2020), more than a decade after the financial crisis, the banking industry is still experiencing difficulties regaining the confidence of its clients, consumers, employees, and other stakeholders. To restore confidence

and effectively communicate with its stakeholders, it has been suggested that the banking industry try to define and confirm its responsibility and role in creating and funding a sustainable future (UNEP-FI Report, 2020). For instance, if the banking sector wants to maintain its prominence in the twenty-first century, it must show how it is meeting changing demands and preferences (UNEP-FI Report, 2020; UN Global compact report, 2020; Adu, Flynn, & Grey 2021). Sustainable investment in banking or responsible banking efforts is an example of the means through which the banking sector achieves this (UN Global Compact, 2020; Adu et al., 2021). The social, environmental and governance issues are creating dangers to businesses, which in turn puts their lenders at risk. Immature legal systems, susceptible ecosystems, poor governance, social inequality, and political and social and political instability can all cause severe challenges for firms operating in some continents, putting their investors at risk of financial loss. It is based on this background that this study becomes necessary to be conducted to assess the impact of sustainable investment (environmental, social, and governmental issues) on the stability of the banking sector globally.

1.2 Problem Statement

In recent years, public recognition of the role of social well-being and environmental concern as well as the role performed by businesses in this area, has increased. As a result, there are higher expectations for businesses to operate in an environmentally and socially responsible manner. Since then, practices like the triple bottom line have gained traction as a means of ensuring that environmental, social, and governance and the company's operational objectives are aligned, and the current trend is to attribute equal importance to corporate social performance and corporate financial performance. With the introduction of resolution mechanisms by the Bank Resolution and Recovery Directive (BRRD), special legislation on capital adequacy (e.g., Basel III), and other

legislative frameworks which apply to financial firms, particularly banks are under scrutiny for meeting these requirements (e.g., MiFID II for EU).

Banks must incorporate the pillars of sustainable investment (social, environmental, and governance) into operational activities as public interest in businesses' social, environmental, and ethical statuses grows. This is because the banking sector is one of the key aspects of the financial market of every country. Banks are well-known for playing an important role as financial intermediaries in the allocation and transmission of financial resources. In reality, a healthy bank may focus on increasing lending and lowering transaction costs, whereas a bank with high transaction costs, such as banking overheads, fees, and customer service, will limit the firm's economic performance and profitability (Nguyen, 2020). Therefore, banking stability is at the heart of every country as it is an indicator of economic growth. Several studies on financial stability in the literature have shown how essential stability in the financial sector is (Barth et al., 2013; Kasman and Carvallo, 2014), the role of financial institutions (Shehzad and De Haan, 2015; Tabak et al., 2013), regulations (Agoraki et al., 2011; Bermpei et al., 2018, Barth et al., 2013; Allen and Gu 2018), and theory of systematic risk and design of prudential bank regulations (Acharya, 2009).

Other empirical studies have examined the factors that influence banking stability (Sanya and Wolfe 2011; Lepetit et al., 2008; Uhde and Heimeshoff, 2009; Ali and Puah, 2018; Pham, Dao, and Nguyen, 2021), however, these studies did not consider the sustainable investment as part of the determinant. Some studies also looked at the determinants of bank financial performance (Samail, Zaidi, Mohamed, and Kamaruzaman, 2018; Ongore and Kusa 2013; Nawaz, and Haniffa 2017).

Researchers over the years neglected the impact of climate and societal concerns on financial stability. However, with the emergence of sustainable finance, which incorporates sustainability initiatives into the financial sector, there have been a number of financial benefits for banking institutions as

well as the overall economy, including reduced risk (Weber, 2017), improved performance (Dam and Scholtens 2015), and economic development, to identify a few.

Due to the fact that several nations have regulations requiring financial institutions to act sustainably (Zadek and Robins, 2018), has resulted in favorable economic, environmental, and social outcomes (Weber, 2017). Six nations in Latin America including Peru, Ecuador, Panama, Brazil, Mexico, and Colombia implemented sustainable financial legislation between 2008 and 2018. Banks have adopted sustainable business practices and organizational cultures thanks to these policies (Weber, 2015; Oyegunle and Weber, 2015). Based on the benefits accrued to the firms in the financial sector as well as its negative effect, researchers have recently focused on examining social, environmental, and governance challenges in the financial industry. However, most of these empirical studies looked at sustainability or socially responsible banking and banks' financial performance (Crespi and Migliavacca, 2020; Bolibok, 2021; Hörnlein, 2015; Alexander 2014; Chiaramonte, Dreassi, Girardone and Piserà, 2021). Most of the countries' markets' financial systems are predominantly driven by banks, with lending being limited, assets concentrated in a few institutions, and overall asset volume being low. Simultaneously, more and more questions have been raised about how banks contribute to society, and banks are increasingly facing difficulties in regaining trust lost by customers (IFC World bank Guide, 2014). According to Ozili (2018), although banks have risk models, it is critical to understand the specific determinants of stability and the parameters to be included in this model.

Environmental, social, and governance (ESG) challenges are creating dangers to banks which in turn puts their lenders at risk. Immature legal systems, susceptible ecosystems, poor governance, social inequality, and political and social and political instability can all cause severe challenges for firms operating in some continents, putting their investors at risk of financial loss. Stakeholder expectations of financial institutions' roles in addressing sustainability challenges are rising. Banks all across the world have had to cope with reputational difficulties and reestablish public faith in

them as ethical corporate citizens (IFC World bank Guide, 2014). The recent financial crises highlighted the need for effective corporate governance, with obvious links between well-governed companies and improved performance, and it is commonly acknowledged that social and environmental responsibilities may add value to enterprises. Also, according to physical and transitional risk theory, climate changes brings about unexpected natural occurrences, which affect banks operations in the form of increased non-performing loans leading to financial instability in the banking sector. This is because the funds provided by the banks to firms and investors are sometimes invested in activities which could cause environmental and social risk to the society such as investment in illegal mining, fishing, production of illicit drugs etc. These illegal activities engaged in by some various investors result in climate changes. Therefore, banks in performing their roles as financial intermediaries ensures investment of funds in ESG related activities since scholars, central banks, and regulators, however, have been analyzing the effects of climate change issues from the perspective of financial stability and risk (Carney 2015; Battiston et al. 2017; Volz 2017; Kim et al. 2015).

Although, sustainable investment (ESG) is a global issue that needs to be addressed, however, it has not been extensively explored in all regions, especially in the banking sector. Many studies focus on the consequences of environmental, social, and governance in non-financial firms (Godfrey et al. 92020; Santis, Albuquerque, and Lizarelli 2016). Nonetheless, several works (Levine, 2005; Beck, Demirgüç-Kunt, and Levine 2010) have stressed that banks' role in distributing capital and encouraging economic growth should inspire greater research. Even though there is considerable evidence that sustainable practices significantly boost banking profitability (Gangi et al. 2019; Cornett, Erhemjamts, and Tehranian 2016; Wu and Shen 2013; Nizam et al., 2019 and others), the

question of how and whether ESG activities influence bank risk and stability are still fundamental and unresolved. The key motivation behind the study is this gap in the existing literature.

According to the empirical literature, most of the studies employed either Z-Score (such as Uhde and Heimeshoff, 2009; Bourkhis and Nabi, 2013; Srairi, 2013) or Non-performing loan (Guy and Lowe, 2011; Umar and Sun, 2018) as a proxy for stability in the banking sector of a country or banks except studies by Ozili (2018), Kasman and Kasman (2015) and Rahim and Zakaria (2013) which adopted both. According to Kasman and Kasman (2015), the use of both Z-score and non-performing loan as a proxy for banking stability in a study serves as a robustness check for the study. Therefore, this study adopts the two variables to determine the impact of sustainable investment on the banking stability of a country or a continent.

To the best of my knowledge, there have not been studies on banking stability and sustainable investment at the global level, hence this study.

1.3 Purpose of the study

The purpose of the study is to assess how sustainable investment affects banking stability.

1.4 Objectives of the Study

The specific objectives are to:

1. investigate the impact of sustainable investment on banking stability
2. assess the differences in the impact of sustainable investment on banking stability among continents.

1.5 Research Hypotheses

The following are the hypothesis for the study:

1. **H_1**: There is a positive significant relationship between sustainable investment and banking stability
2. **H_1**: There are significant differences in the relationship between sustainable investment and banking stability among continents.

1.6 Significance of the Study

The study in all makes three major contributions;

The literature on sustainable investment in banking is scant and mostly focused on specific countries at the neglect of other countries although, it is a global concern. Also, this study includes variables relating to bank level performance, macroeconomics, and financial structure in additional to the sustainable investment variables. Two variables were used as independent variables which makes the analysis comprehensive. Therefore, this study contributes to the existing literature in the area of sustainable investment and the banking sector, which serves as reference for future studies. The study will assists investors in their investment decision-making on how to focus on the non-financial aspect of investment in addition to financial returns. Most investors focus on the financial returns associated with the funds invested at the expense of non-financial factors, which could cause loss of funds deposited at the bank. With consideration to some of these factors, which could result in bankruptcy of banks, it provides investors with information on banks activities and boost customers' confidence in the banking sector. The study moreover, provides information to policymakers, governments, and regulators of various countries or continents in making regulations regarding the roles of the banking industry. Thus, it helps the regulators to streamline the activities of the banks to

maintain confidence and credibility in the financial sector, as it examines banking stability in comprehensive manner both globally and continently.

1.7 Scope and Limitation of the Study

This study focused on countries globally whose data were available at the World Bank. Thus, countries with no data available on the website of the Global Financial development database and World Bank were streamlined and removed from the sampled countries for the study as well as those with incomplete data. The study considered only the country-level analysis. This includes countries from each of the six continents, however, the number of countries drawn from each continent were unequal due to the unavailability of data for some countries.

1.8 Organization of the Study

The study is structured into the following five chapters;

The study's background, problem statement, objectives, research question(s), purpose, significance, scope, and limitations were all covered in the first chapter.

The study's relevant literature is reviewed in the second chapter, both theoretically and empirically, and draws conclusions. The study's methodology was the primary focus of the third chapter. Population samples, data sources, and the data analysis model are all examined. The results and data analysis are covered in the fourth chapter, and the study's summary, conclusion, and recommendations for further study and policy are covered in the last chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

A review of relevant studies on banking stability and sustainable investment is presented in this chapter. It includes a brief history of sustainable investment, growth of sustainable investment, sustainable investment strategies, theoretical review, empirical analysis, conceptual framework, and conclusion drawing.

2.1 Brief History of Sustainable Investment

Sustainable investment began in the early 18th century through religious groups such as Muslims, Quakers, and Methodists who were the pioneers and established ethical investment guidelines for their portfolios. Muslims adopted this strategy to create investments that adhere to Islamic law, often known as Shariah, which prohibits the use of weapons among other things. The Methodists and Quakers were responsible for the founding of the first ethical unit trust in the United States and the United Kingdom; they created investment vehicles based on negative screening, avoiding companies that engaged in alcohol, tobacco, or gambling (www. morningstar.com, Hong & Kacperczyk, 2009). In the 1980s, the anti-apartheid movement which was pushing for divestment from South Africa is getting popular. This movement agitated for shareholder activism which puts pressure on corporations to participate and eventually became a public policy after it reaches the US government. In 1992, the UN hosted a global conference on environment and development which was to ensure economic development and environmental conservation. Sustainable Investment grows continuously and in the year 2000, the Global compact Initiatives was launched which was built on

the Sullivan Principle to encourage the integration of environmental, social, and corporate governance into the capital market. The initiative coined the term ESG investing with the intention that going forward sustainable investing would shift. The issue of climate change, labour practices, and environmental degradation has become known and consumers and investors now make a decision taking into consideration these issues. All of this adds up to high expectations for public firms to be excellent environmental stewards, to care for the well-being of all their stakeholders, and to run their businesses ethically and transparently. ESG investing is becoming increasingly popular. Many approaches are termed "sustainable" as an emerging practice, and efforts to further regulate and build standards continue. In 2018, the European Commission unveils its action plan for sustainable finance, which includes measures for regulating sustainable investment and risk reporting.

2.1.2 The Growth of Sustainable Investment

Sustainable investment emerge as a new investment concept and has recently become popular among individual and institutional investors. Over the past decade, this investment opportunity has grown tremendously. For instance, there was a fourfold increase between 2012 and 2014, in the sustainable investment assets, with a value of US$4.30 trillion invested in sustainable investment portfolio. This accounts for about 17% of all financial assets in the US that are professionally managed, a 76% rise over the preceding two years. The European Union's ESG criteria-integrated assets saw a 65% growth in value, reaching EUR 5.23 trillion in 2014, comparable to the US market. The Global sustainable investment assets hit US$35.3 trillion in 2020, up 15% from 2018, according to the Global Sustainable Investment Review in 2020. This fifth version of the biennial study includes data from a number of organizations, including the US Sustainable Investment Forum, Japan Sustainable

Investment Forum, RIA Canada, and the Responsible Investment Association Australasia, as well as insights from the UK, China, Asia, Latin America, and Africa. Europe and the United States collectively make up more than 94% of the global socially responsible investments, according to the Global Sustainable Investment Alliance with Asia only makes up 0.2% of the global socially responsible investment assets. As at 2022, US sustainable investment assets has reached US$8.4 trillion as shown in the figure 2.1 below.

Figure 2.1: Sustainable Investment Trend

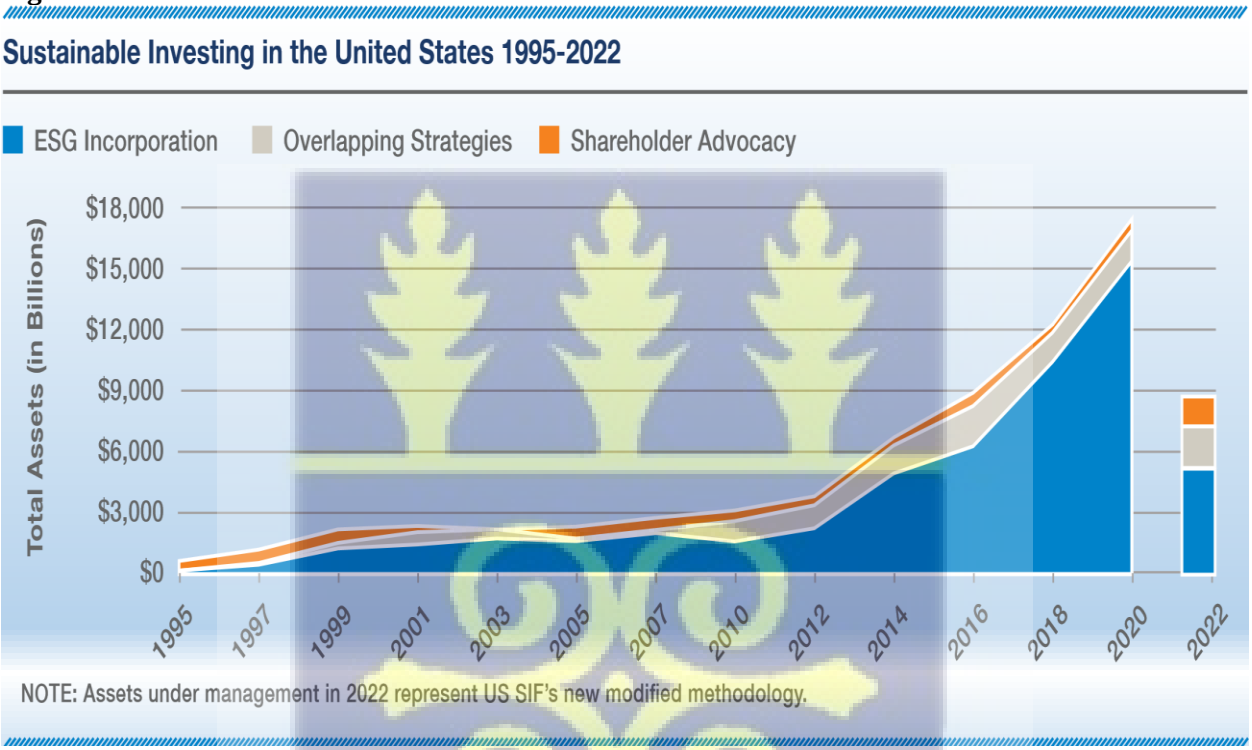

Figure. 2.1: *Source USIF 2022*

Although, sustainable investment has increased since its inception, it is popular among some continents such as Europe, and North America as compared to South America, Asia, Australia and Africa. As a result, only 35% of the study on sustainable investments is global, with Europe, the US, and Canada receiving the majority of attention (Talan and Sharma, 2019). The discrepancy, which is illustrated by the concentration of research, is further confirmed by the volume of sustainable

investment in these areas. Sustainable investment has the ability to benefit underdeveloped nations in terms of employment, health, and literacy according to Social Impact Investment Taskforce (2014). It has therefore becomes important that scholars in the discipline must concentrate on regions outside of North America and Europe and determine the causes of the lack of acceptability of sustainable investment in those regions.

2.1.2 Sustainable Investment Strategies

A sustainable investment strategy seeks to produce gains for the economy, the environment, and society. As investors recognize the importance of taking into account how their investments influence the world, sustainable investment approaches are becoming more and more popular (Pedersen et al., 2021). This method of investing is based on the idea that when making choices, investors should consider the long-term as well as the environmental and social impacts of their choices (Ditlev-Simonsen, 2021). The increase in the use of this investing strategy can be attributed to investors' growing awareness of the potential for strong portfolio gains. The idea of sustainable investing is based on the core idea that investors should consider the financial, social, and environmental effects of their investments (Martini, 2021). The various strategies or approaches used by businesses and investors to evaluate sustainable investment opportunities are in consistent to those identified by EUROSIF such as negative screening, corporate, positive screening, norms-based screening, sustainability-themed reporting, and community investing in addition to ESG incorporation. According to Talan and Sharma (2019), most of the literature demonstrates that the ESG approach is essential to sustainable investing decisions.

Screening strategy

There are three categories of screening which include negative/exclusion, positive/best and norm-based screening.

Negative screening involves a fund avoiding investments in companies with unethical actions, such as cigarette promotion or resource use. This is primarily used in Europe for environmental concerns, such as nuclear energy and genetically modified organisms. In South Africa, most funds are Shariah-compliant, evaluating enterprises based on Shariah principles.

Positive screening is a strategy used by investors to identify and reward businesses with strong corporate citizenship, aligning with their social and environmental interests (Lamore, Link, and Blackmond, 2006: 430). In Europe, it encourages investors to fund businesses that create environmentally friendly solutions. In South Africa, investments focus on infrastructure development and black economic empowerment initiatives within corporations Viviers *et al*. (2008: 5, 2009:10). The best of sector screening strategy involves combining ESG grading with financial information to invest in the best firms. This approach is used to underweight or overweight companies' stock portfolios.

Norm based screening is the strategy in which investments are screened in accordance with their compliance with international standards and norms using this method. It involves selecting investments based on a set of international standards or standards covering a range of ESG factors.

ESG Integration

ESG investing is a systematic strategy that takes potential investments' environmental, social, and governance aspects into account (Edmans & Kacperczyk, 2022). With the help of this method, the conventional investment process will take governance, social, and environmental considerations into account (Amicis et al., 2022). Institutional investors like this technique because it enables them to pursue financial goals while including ESG factors into their portfolios (Henderson, 2012). The ESG framework is widely acknowledged as an important framework for sustainable investing within

current discourse. ESG integration aims to create portfolios that are more in line with investors' values and goals while still generating returns.

Impact Investing

Another concept in sustainable investing is impact investing, which focuses on financial returns while having positive social and environmental effects on the world (Mensah & Casadevall, 2019). The goal of impact investing, according to Cojoianu et al. (2022), is to make money while simultaneously having a long-term good impact on society. This strategy is becoming more and more popular among investors since it enables them to make a profit while investing in businesses and initiatives that have a positive impact on the globe (Cojoianu et al., 2022).

Sustainability Themed

Investment in subjects or things related to sustainability development. Thematic funds concentrate on one or more ESG-related topics. Investments with a sustainability focus naturally help to address social and/or environmental problems like climate change, eco-efficiency, and health. To be included in this strategy, funds must have an ESG analysis or investment screening.

2.2 Theoretical Review

Physical and transition risk theory, as well as stakeholder theory, are covered in the study's theoretical review. The physical and transitional risk theory explain the environmental dimension of the sustainable investment, which result from the climate change. The climate related risk such as environmental risk exposes banks to risk since they provide funds to institutions and investors, which may be difficult to be recovered, causing financial instability to the banks. The stakeholder theory on the other hand explain the social and governance dimensions of the sustainable investment. This theory suggests that firms perform social responsibilities to the society, which increased the

profitability of the firm. It also ensures that governance structure of the firm is well composed to enhance accountability and fulfilment of shareholder wealth.

2.2.1 The Physical and Transition Theory

There is no conclusive scientific data regarding how changes in climate will influence the banking industry, according to the Intergovernmental Panel on Climate Change report (2001). Scholars, central banks, and regulators, however, have been analyzing the effects of climate change issues from the perspective of financial stability and risk (Carney 2015; Battiston et al. 2017; Volz 2017; Kim et al. 2015). Because there is a lack of a regulatory and supervisory framework, more central banks and regulators are now becoming conscious of their position and possible role in mitigating environmental problems and climate change brought by banks in the banking sector. They are also taking action (Volz 2017).

The prudential regulation authority (PRA) of the Bank of England (PRA, 2018; Feridun, and Güngör, 2020) has recognized the two main financial risk concerns linked to climate-related changes. Physical risk occurs when a natural disaster, such as a flood, drought, or storm, or an increase in sea level, occurs. It also occurs when systems that affect people and the environment are vulnerable to these events (PRA 2015; PRA 2018; Batten et al. 2016). This lead to investors and depositors withdrawing their funds from the banking sector or increasing the demand for loans to undertake cover or protection against the disaster leading to insolvency risk or increasing the non-performing loan provision. Thus, this can lower asset prices, increasing credit risk and financial losses.

Transition risk occurs when moving towards less pollution, a greener economy, an eco-friendly environment, or a low-carbon economy, which is usually conducted informally (Platinga and Scholtens, 2016; Carney 2015). Such a transition could shift the banking sector's asset values or

increase the costs of doing business. For example, when banks grant loans to illegal mining companies, the introduction of policies to curtail the activities of these illegal miners can increase the probability of default on the loan payment. This increases the non-performing loan provision due to impaired loan portfolio which affects the stability of the banks. Also, a shift from the use of non-renewable energy consumption to renewable implies an increase in the overhead costs of banks in the banking sector using non-renewable energy source which reduces the banks' profitability and affect their stability.

2.2.2 The Stakeholder Theory

The prosperity of every business is dependent on its stakeholders. The shareholders are key stakeholders of a company and their interests should be considered in addition to other stakeholders. Stakeholders are groups of persons who have an interest in the affairs of the firm. Stakeholder theory is a theory that promotes practical, effective, efficient, and ethical means of managing an organization in a highly complex and dynamic environment (Freeman, 1984; Freeman, Harrison and Wicks, 2007). According to the stakeholder theory, the management of firms should not only focus on shareholders' wealth maximization but should also consider the needs of other stakeholders such as customers, potential investors, employees, community, and government which increase the profitability of the firm in the long-term as a result of an increase in buying of firm's product (customers), hard work and loyalty to the firm (employees) and better financial terms (financier) (Harrison, Freeman and Abreu 2015). Thus, according to the stakeholder theory, "management of stakeholders" entails, at least, addressing these stakeholders' well-being and interest (Harrison, Philips and Bosse, 2010) with fairness, honesty, and generosity. The demand of these stakeholders has changed over the past few decades and now firms are required to satisfy their needs in an environmentally and socially responsible manner. Therefore, the stakeholder theory has become a

premise for debate on sustainable investment. Thus, it supports the inclusion of the issues of environmental, social, and governance (ESG) in the operations of the firm as a way of improving the long-term returns of investors or shareholders while at the same time satisfying the needs of other stakeholders. For instance, studies have shown that firms that do not adopt environmental policies can adversely affect shareholders' wealth (Marie-Louise and Juliane, 2017; Ming-Te, 2016). The firm's social activities have increased its social performance, which has improved the firm's financial performance, and the stakeholders are more concerned about these activities (Velte, 2017). The stakeholder theory required firms to be ethical, transparent, and accountable to stakeholders (Lerach, 2002; Aboud and Diab, 2018) in respect of their operational activities. Given this, firms recently disclose both financial and non-financial information to stakeholders about their environmental, social responsibility, and governance issues to enhance stakeholders' confidence in the firm's operation as well as show stewardship (Kaymak and Bektas, 2017). This has led to companies producing voluntary reports including integrated reporting and sustainability reports.

2.3 Empirical Review

This section deals with empirical literature on sustainable investment (ESG), financial performance and financial stability. Sustainable investment is the inclusion of environmental, social and governance in investors and shareholders' decision-making processes. While ESG investing promotes investment opportunities that benefit society and the environment, the primary focus is on portfolio performance. ESG measures help investors protect their investments from new sources of risk in the future which could emanate from climate related activities. This affect the financial performance and stability of the financial market, especially the financial institution. Bank managers and analysts evaluate profitability using return on equity and return on assets, identifying high-performing banks that consistently outperform the market. Literature suggest that a high profitable

bank is often stable, although there are few contradictory findings. Financial stability refers to the financial system's ability to withstand shocks and unravel financial imbalances, including financial intermediaries, markets, and infrastructures. The financial stability of a financial system is proxy by many scholars with Z-score. Financial stability in a country is an indicator of banking stability since banks perform financial intermediary's role in the economic development of a country.

2.3.1 Sustainable Investment

By converting funds from investors into investment opportunities with risks associated with desired returns, conventional investing creates value. To enhance long-term results, sustainable investing combines social, environmental, and governance considerations with conventional investing. Sustainable investing can be seen as a part of the evolution of investing in a number of ways. Businesses and investors are becoming more aware that some ESG factors have an impact on the economy, particularly over the long term, and that it is crucial to include relevant ESG factors in decision-making. Sustainable investment aims to consider the interest of diverse stakeholders which is in line with how businesses are evolving. As interest in sustainable investing grows, so does the demand for investment organizations to shift to a sustainable investing model. Sustainable investors, ranging from global institutions to individuals, mix traditional investment strategies with ESG data to achieve their investment objectives. Sustainable investing seeks out companies that are well-positioned to grow while also doing good and pioneering innovative business practices. This technique blends a desire to serve others with a return-oriented mindset.

The goal of undertaking sustainable investment (ESG) is to boost profitability by investing in well-managed, socially responsible businesses. Environmental challenges include things like climate risk, carbon management, pollution, exposure to adverse weather, and the exploitation of limited resources. Social challenges include things like diversity and inclusion, workplace safety, customer

data protection, product safety, and human rights; governance issues involve matters like regulatory compliance, corporate accountability, and overall effective board control.

ESG investors assess and evaluate firms based on data and the impact of ESG risks and opportunities on the company's performance. This strategy typically encourages long-term investments while maintaining the same level of financial rewards as a standard investment strategy. According to Barclays Research, between 2018 and 2020, over $100 billion was invested globally in specialized ESG funds (www.gobyinc.com).

While ESG investing promotes investment opportunities that benefit society and the environment, the primary focus is on portfolio performance. ESG measures help investors protect their investments from new sources of risk in the future.

The inclusion of ESG aspects is the rapidly growing and most prominent means of sustainable investment (Akhigbe, and McNulty, 2005; Galbreath, 2013). Despite the increasing global popularity of sustainable and ESG-related investments, there is still a disparity in practice and concept across geographical locations (Bengtsson, 2008). Even though sustainable investment has grown rapidly in areas such as America, Australia, and Europe, it has been more sluggish in developing countries (Nair and Ladha, 2014) like Africa. ESG techniques have also resulted in variations in sustainable investment decisions due to a range of causes. When constructing portfolios, investors and asset managers commonly assign varying degrees of emphasis to each ESG component. Additionally, governance is not seen as a crucial component that integrates into ESG strategies but rather as a pillar that stands alongside the environment and society (Hickman, Teets and Kohls, 1999; Cadman, 2011). Furthermore, Kempf and Osthoff (2008) reported that ESG-driven mutual funds investment process brings additional costs and charged higher fee ratios. Although

ESG provides a suitable framework for long-term investing, such challenges cast doubt on the approach's legitimacy.

A study by Talan and Sharma (2019) systemically reviews the literature on sustainable investing with a concentration on how effective ESG is as a sustainable investment strategy. In a study, 213 literature papers were reviewed and analyzed. They found that ESG integration was the world's second most popular sustainable investment approach, with the leading regions such as Asia, Oceania, and United States. They also found it one of the most popular long-term investment ideas. In addition to ESG, the study identified positive screening, corporate contact, and community investing as other important methods of achieving long-term success. However, ESG was a critical approach to sustainable investment and that evidence suggests variations in how different firms and investors implement ESG strategy.

Crespi and Migliavacca (2020) looked at the determinants of ESG rating in the financial industry using global sample data from 727 financial firms, both banks and non-bank institutions, operating in 22 countries from 2006 to 2017, looking for firms, countries, and temporal factors that affect corporate social performance. The study employed the Pearson correlation and ordinary least square regression model to analyze the data. The findings from the study indicate that higher firm size leads to higher ESG scores. Return on equity was found to positively and significantly affect the ESG scores of financial firms while a negative impact was found for leverage. Moreover, nations with a civil law system and developed economies seem to positively influence corporate social performance. The corporate social performance of financial firms was assessed using the MSCI-ESG scores, based on the three pillars: social, environmental, and governance. The environmental pillar consists of indicators such as footprint, carbon emissions, as well as corporate climate change sensitivity. It also assesses a firm's dedication to ongoing research into environmentally friendly

materials and techniques. Management's ability to implement cutting-edge corporate governance and behavior norms is measured by the corporate governance factor. It focuses on board diversity and unequal pay, as well as business ethics and transparency in general. The social pillar measures the company's effort to build loyalty and trust among its stakeholder such as enhancing job conditions, protecting human rights and safety, and strengthening its reputation in society.

The study further identified that the size of the firm was an important variable indicator of the improvement in corporate social performance. Thus, the result showed that big financial institutions are driving the overall improvement in CSP, while small businesses are struggling. This was because small financial institutions lack the necessary financial and organizational resources to implement certain external and internal sustainable practices.

Shakil, Mahmood, Tasnia and Munim (2019) examined how the financial performance of banks in developing economies is affected by environmental, social and governance performance. After collecting data on the ESG index and financial performance of 93 banks from the Asset4 database and Refinitiv Datastream database from 2015 to 2018 using the dynamic GMM model an as estimation technique. The social and environmental performance had a positive and significant impact on banks' performance according to the findings. However, in the case of an emerging market, the study found no impact of corporate governance on bank performance. Some studies such as those of (Dincer, Celik, Yilmaz, and Hacioglu, 2014; Miras-Rodrguez, Carrasco-Gallego and Escobar-Pérez, 2015; Esteban-Sanchez, Paredes-Gazquez and Cuesta-Gonzalez, 2017) all indicated a positive and significant relationship between financial performance and corporate governance.

A study by Buallay (2019) investigated the relationship between ESG and banks' operational, financial, and market performance. The study used return on assets, return on equity and Tobin's Q for banks' operational, financial, and market performance respectively for the firm with bank-

specific (total and financial leverage) and macroeconomic factor (GDP) as control variables. Sampled data from 235 listed banks on the European Union countries' stock exchange was obtained from the Bloomberg Database for a period of 10 years from 2007 to 2016. The study adopted path analysis, panel causality test, and random-effect model. The result of the study showed that ESG overall has a significant positive relationship with bank performance. However, considering the individual element of ESG, a positive correlation was found between environmental disclosure and Tobin's Q and ROA. Social responsibility negatively affects ROA, Tobin's Q, and ROE whereas corporate governance positively affects Tobin's Q but negatively affects ROA and ROE. It was found that Tobin's Q granger caused ESG from the Granger causality test. This shows inconsistent evidence in the literature with regards to governance aspects of ESG and financial performance.

According to Popli, Ladkani, and Gaur (2017) and Popli, Akbar, Kumar, and Gaur (2017), firms that plan their actions in accordance with the dynamic environment are best positioned to prevent profitability erosion. As a result, in order to profit, environmental awareness is required. Furthermore, social actions must be disseminated in both formal and informal ways so that investors and stakeholders understand the firm's social responsibilities (Hwang and Gaur, 2009).

Adu (2022) looks into how corporate governance disclosure affects sustainable banking initiatives from a broader perspective and then assesses how much corporate governance principles influence sustainability for performance sensitivity metric. For country-level data over 11 years, data was gathered from the websites of the sampled 220 banks from 16 Sub-Saharan African countries, the World Bank, and the IMF (2007 to 2018). The study adopted the OLS model and GMM estimator. The results of the study showed that sustainable banking initiatives help banks in Sub-Saharan Africa enhance their financial performance. Effective corporate governance has an impact on long-term

decisions. This suggests that the sustainability for-performance sensitivity metric is generally favorable and improves in banks with sufficient corporate governance systems.

The long-term viability of a bank's financial performance is dependent on its sound corporate governance systems.

A study by Alguindigue (2020) explored the relationship between sustainable financial practices and financial stability. The study used data from a sample of 149 banks from 17 Latin American countries for a period of 11 years (2008 to 2018), obtained from the databases of the International Monetary Fund (IMF) and banks' consolidated financial statements. The countries with sustainable finance regulation practices and those without were classified depending on the banks that were sampled. For the analyses, the study used the Z-score as a proxy for financial stability and employed various statistical tools such random effect regression model, Wald test, binary logit regression and dynamic panel 2-step GMM estimator. The study found statistically significant differences between banks in countries without and with sustainable banking regulations. The findings also indicated that sustainable finance regulations enhance sustainable banking practices and financial stability. Moreover, there is higher financial stability in banks found in nations with sustainable finance regulations.

Tommaso and Thornton (2020) conducted a 12-year study from the period of 2007 to 2018 to assess the effect of ESG on bank value and risk-taking in European banks. The findings of the linear panel regression model revealed that high ESG ratings are significantly associated with a decrease in bank value and risk-taking.

Research by Chiaramonte et al, (2021) examined the independent and joint effects of social, environmental, and governance ratings on the stability of banks. From 2005 to 2017, the study employed 21 banks from various European countries. The panel linear regression model was

employed, and the results indicate that the ESG score and its component pillars reduce bank fragility during recessions. Banking institutions with higher ESG ratings experience this stabilizing effect more strongly. Results indicate the benefits of stability increase with the length of ESG disclosures during financial crises. The study shows that depending on the characteristics and operational contexts of the banks, the relationships between ESG and bank stability vary significantly.

A study by Dell'Atti, Trotta, Iannuzzi, and Demaria (2017) examined the relationship between sustainable practices, company reputation, and financial success. Between 2008 and 2012, the study used a sample of 75 large international banks. They found that positive correlation between social performance and reputation but a negative relationship between environmental and governance performance and reputation.

A study by Velte (2017) examined the effect of social, environmental, and governance performance on the financial performance of individual pillars and collectively. Data was obtained from 2010 to 2014 from a sample of listed companies on the German prime standard (TecDAX, MDAX, and DAX30) and the Thomson Reuters' Assets4 database. The findings indicated that collectively social, environmental, and governance performance boost profitability. However, singularly,governance performance has the highest effect on financial performance, followed by environmental and social performance.

A study on the empirical effects of social responsibility performance on the value relevance of financial data in the Polish banking industry was conducted by Bolibok (2021). The sample data from 17 Warsaw Stock Exchange-listed banks from 2009 to 2020 was collected for the study. The study uses multivariate regression analysis that discovers the structural breaks based on the Chow test and the Ohlson model. The findings indicate that financial disclosures of banks included in CSR indexes are more value relevant. Also, banks with more commitment to social responsibility have

market prices that are more (less) responsive to the book value of equity (net earnings) than competitor banks that are less socially responsible.

Bernardelli, Korzeb, and Niedzióka (2022) evaluated the effect of financing fossil fuel on banks' ESG ratings and the application of this to their investment and actual credit risks. Consequently, to ascertain whether coal power finance affects ESG ratings. The largest fossil fuel firms in the world are financed by a sample of 60 of the most prestigious banks in the world. Following the adoption of two logistic regression models, which were later integrated into a single final model, one was used to identify banks with less ESG risk and the other to predict banks with greater ESG risk. The study discovered that, in comparison to the low- or medium-risk ESG groupings, the likelihood of being assigned to the high-risk ESG category lowers as the Sustainable Development Index (SDI) increases. Additionally, it was shown that while banks' exposure to the fossil fuel industry is growing, their environmental and social responsibility scores for the world's largest biggest banks have not yet reflected. The findings also demonstrated that the actual risk of firms in the coal sector had an impact on ESG ratings, both low and high. However, none of the financial position evaluation categories (asset quality, profitability, liquidity, and solvency) had a statistically significant influence on their ESG ratings.

In order to reorient a regional and local bank's business toward sustainability, Hörnlein (2015) looked at sustainable banking principles and socially responsible investment. This study, which assumes a positive relationship between CSR and financial performance, concludes that expanding banking operations into the sustainability niche does produce positive financial returns and even better performance than conventional banks. Credibility and reputation are related to this, particularly in times of economic distress.

A study by Tóth, Lippai-Makra, Szládek, and Kiss, (2021) investigated how different ESG scores affect capital adequacy ratio estimation (total and environmental only). ESG score as a proxy variable for capturing a bank's non-financial soft skills. Thus, it is used to represent a bank's ethical standards in the long run. The study employed quantile regression and unbalanced panel regression models to analyze the data obtained from 2002 to 2018 from 247 banks in the European Economic Area. The result showed that the ESG score is a significant contributor to financial stability. It makes it easy in identifying certain, more financially stable market segments. The findings from the quantile regression indicated that a greater ESG score was associated with a higher capital adequacy ratio. Thus, it explains the disparities between banks with low and high capital adequacy levels.

2.3.2 Banking Stability

Banking stability is attained when all banks in the banking system are stable, which is characterized by the absence of banking crises (Brunnermeier et al., 2009). Banking stability can also be described as the banks' direct or indirect interdependence, such as credit to popular sectors and private equity (Segoviano and Goodhart, 2009). The absence of unusual disruptions in bank lending, payment services, or financial products is referred to as banking stability (Ozili, 2018). An analysis of banks' stability is key as it contributes to the growth and stability of the entire economy. The determinants of banking stability and their impact on the financial system stability vary across countries, and this has necessitated that each national bank regulator learned more about them. Empirical research has documented some financial, regulatory, economic, and institutional factors that affect banking stability. Some of the various literature on banking stability and its determinants are as follows:

A study by Kočišová (2014) outlines some of the attempts being made to create an index of overall financial and banking stability that takes into consideration measures of capital adequacy and performance which are indicators of a bank's financial strength as well as liquidity and credit risks.

Using data from 2004 to 2014 from the IMF financial soundness indicators, the study focused on ten nations that joined the European Union in 2004. According to the study, four main indicators of financial stability and banking stability were identified based on the Banking stability indexes (BSI). The results showed that Luxembourg was the most stable country from 2009 to 2014 followed by Estonia and Romania in terms of capital adequacy. Portugal, Spain, and Malta's banking systems recorded the lowest capital adequacy.

The study established that the non-performing loans ratio rises exponentially during the crisis period which affected asset quality (decline) and positively affected the banking system stability of Finland, Luxembourg, Estonia, and Sweden with the banking systems of Greece, Italy, and Cyprus being the worst performers. In terms of earnings and profitability, it was found to be the major indicator that affected the EU banking sector as evidenced by an average of more than 40% of the overall BSI value. This positively influenced the banking sector stability of Cyprus, Malta, Slovakia, and the Czech Republic, and the banking systems of Hungary and Portugal which recorded the lowest level. For liquidity indicators of stability, it was found that the banking sectors of Germany Luxembourg, and Romania were significantly affected with Spain's banking system recording the lowest level. However, this was primarily attributed to an increase in the growing volume of liquid assets.

A study by (Heimesoff and Uhde, 2009; Srairi, 2013; Bourkhis, and Nabi 2013) evaluated the banks' stability with Z-score as a proxy and economic condition and banks specific variables. The results of the study by Heimesoff and Uhde, (2009) show that domestic banking industry concentration affects the soundness of European banks' finances.

They also conclude that state banks are more vulnerable to financial issues than non-state banks.

A study by Berger and DeYoung (1997) investigated the link between non-performing loans and bank efficiency using non-performing loan ratios as a measure of banking stability. The findings of

the study indicate that bank efficiency is good for managing credit risk which enables banks to reduce non-performing loans and increase their stability.

Guy and Lowe (2011) studied NPL and banking stability with a sample of six (6) banks from Barbados. The study employed the fixed effect estimation technique and the results indicate that commercial banks have a significant risk from a high non-performing loan (NPL) ratio. The study used a mix of bank-specific variables and macroeconomic factors to explain NPL behavior. NPL forecasting and bank stability stress tests were also performed. The findings suggest that both macro and micro variables play a role in NPL behaviour.

Khasawneh (2016) investigated the factors that affect bank stability and profitability in the Middle East and North Africa, categorizing the sampled banks into commercial and Islamic banks. Using data collected from IMF and Bearue Van Dijk data holding company, from 2006 to 2013 with 268 banks made of 207 commercial banks and 61 Islamic banks. The study adopted the descriptive approach and unbalanced panel data econometric technique to analyze banks' stability and profitability. The results showed that the determinants of banks' profitability and stability depend on the type of bank. It was found that commercial banks are more stable than Islamic banks, but Islamic banks are more profitable than commercial banks. In addition to financial crises, the study established that some bank characteristics variables and macroeconomic variables influence bank profitability and stability in MENA. The study also showed that smaller banks were less stable compared to larger banks.

Tan and Anchor (2016) looked into the link between stability and profitability in the Chinese banking system. Between 2003 and 2013, 12 joint-stock commercial banks, 5 state-owned commercial banks, and 83 city commercial banks were examined. The study used return on assets as a proxy for profitability and employed the GMM approach to analyze the data. They discovered

greater bank instability to be associated with higher profitability, which suggests that greater bank fragility in Chinese commercial banks results from higher profitability. Tan and Anchor concluded that bank efficiency is also a considerable determinant when it comes to banking stability.

For the investigation into the factors influencing Africa's banking stability, Ozili (2018) used data from the Global financial development database and World Bank's governance indicators. The study employed a fixed-effect model to analyze panel data, and the result showed that the presence of foreign banks, government effectiveness, investor protection, banking supervision, regulatory quality, political stability, unemployment rates, and corruption control were all significant factors influencing banking stability. He concluded, however, that the significance of each indicator varies depending on the period being examined and how banking stability is defined.

Ozili (2019) conducted a follow-up study to look into the elements that contributed to Nigeria's banking stability over a 14-year span, from 2003 to 2016. He used banking sector and macroeconomic data from the World Bank's databank, including the global economic prospect database and the global financial development database. The findings showed a strong correlation between banking stability and ROA and bank concentration. This suggests that increased profitability and greater bank concentration are linked to stronger banking stability in Nigeria, according to the study's analysis, which used the OLS estimation model. However, the regulatory capital ratio, inflation, and bank efficiency coefficients are all positively associated with Nigerian banking stability, while the relationships are not statistically significant. According to the results of the study, return on assets, the cost-to-income ratio, bank concentration, and the depth of the financial system were all significant factors that influence banking stability in Nigeria.

Rashid, Yousaf, and Khaleequzzaman (2017) examine the relative financial condition of Islamic banks and their contribution to financial stability. The study also looks at the link between banking

stability and bank competitive behaviour. For the period 7 years from 2006 to 2012 with data from 4 full-fledged Islamic banks, 10 conventional banks, and 6 independent Islamic branches of conventional banks in Pakistan, using the random-effects estimator. The results demonstrated that when using the Z-score as a measure of bank stability, there is a significant effect of macroeconomic indicators and bank-specific variables on banking stability. In addition, they evaluated the differential influence of each underlying variable on financial stability between Islamic and conventional banks such as loan-to-asset ratio, asset size, income diversity, profitability ratio, and market concentration ratio. Islamic banks have contributed more effectively to financial sector stability than conventional banks. The findings show that Islamic banks' contribution to financial stability has been reasonable and promising.

The effects of bank regulatory capital on banking stability in Sub-Sahara Africa from the period 2000 to 2017 were examined by Yakubu and Bunyaminu (2021). They discovered that in the presence of institutional quality, regulatory capital has a significant positive impact on bank stability, but a negative impact when institutional quality is absent using the system-generalized method of moments (GMM).

2.4 Conceptual Framework

The set of ideas, presumptions, expectations, convictions, and theories that serve as the research's guide and direction make up a conceptual framework (Boateng, 2020). Thus, a conceptual framework is developed from a review of literature, concepts, and theories to develop a suggestive theory. In this study, the objective is to assess the impact of sustainable investment on banking stability particularly, environmental, social, and governance (ESG) factors. The conceptual framework for banking stability and sustainable investment showing the relationship that exists between them is as follows.

Figure 2.2: Conceptual Framework of Banking Stability and Sustainable Investment

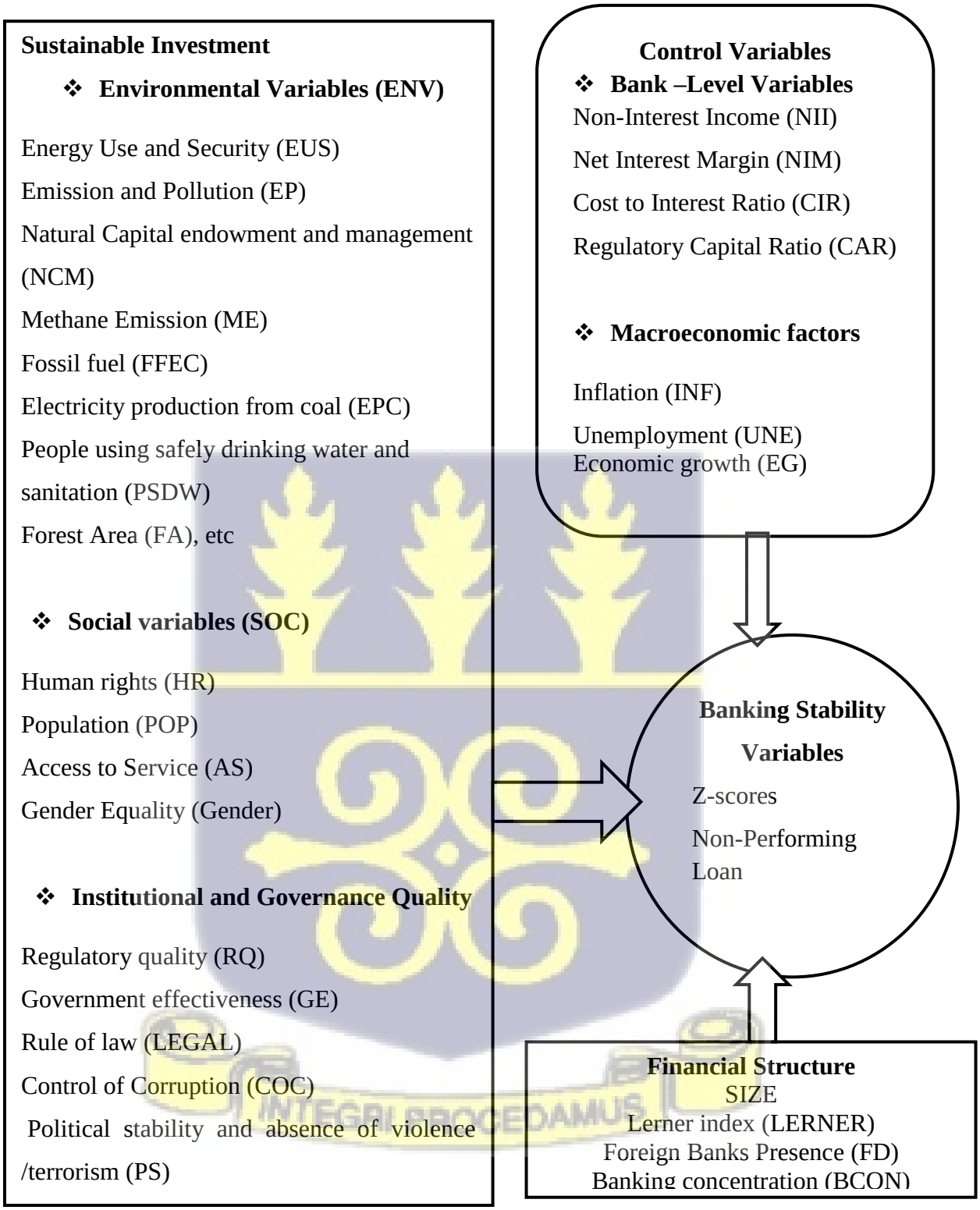

Figure 2.2. Source: Researcher's Model

2.5 Conclusion

From the relevant review literature, the conclusions drawn are as follows;

Based on the review of the related studies, most of the literature on sustainable investment (ESG) concentrated on specific countries in Europe and Asia with few of them focusing on some countries in other continents such as Africa, Australia, etc. This is because there is inadequate disclosure on social, environmental, and governance issues in some of the continents. However, these studies (Dincer, et al 2014; Miras-Rodrguez, 2015; Adu, 2022; Buallay, 2019; Crespi & Migliavacca, 2020) focus on corporate social responsibility, environmental issues or corporate governance as a proxy for ESG.

Again, most of the studies on the determinants of banking stability did not consider the impact of sustainable investment (Pham et al., 2021; Uhde and Heimeshoff, 2009, Ozili, 2018).

Few studies, however, looked at the stability in the banking sector and sustainable investment (Chiaramonte et al, 2021; Alguindigue, 2020; Tóth et al, 2021) in some countries and the bank level. Other studies looked at sustainability banking or socially responsible banking and financial performance (Velte, 2017; Bolibok, 2021; Hörnlein, 2015; Chiaramonte et al, 2021; Shakil et al., 2019).

Moreover, most of the studies on banking stability determinants used Z-score as a measure of stability while few of them used non-performing loans, and others employed both. The findings of some studies reviewed on determinants were inconsistent. While some studies found a significantly positive correlation between banking stability and factors such as bank concentration, institutional quality, profitability, competition, and macroeconomic variables (inflation, unemployment, GDP growth, etc.), others rather found negative but significant relationships, and some found no relationship. This may be, however, attributed to differences in economic conditions, political environment, culture, and institutional settings existing in the various countries or continents. These

inconclusive findings are not an exception in the case of sustainable investment (ESG). For instance, Buallay (2019) discovered a negative correlation between bank performance and corporate governance while Miras-Rodrguez et al., (2015), and Paredes-Gazquez et al., (2017) discovered a positive correlation between bank financial performance and corporate governance. Other studies revealed a positive link between banks' performance and socially responsible and environmentally friendly banks while others found otherwise.

Even though there has been evidence of literature on banking stability and sustainable investment (ESG) conducted in some countries, the literature is scant, especially at a global level. Therefore, this study will be my contribution to the literature by assessing the impact of sustainable investment on banking stability at the global level.

CHAPTER THREE

METHODOLOGY

3.0 Overview

The study's methodology is presented in this chapter, including the research design, sample size and population, data source, descriptions of the study's variables, estimation techniques, and data analysis methods.

3.1 Research Design

The approach used to gather and analyze data is referred to as a research design. Throughout the various stages of the study, the design chosen has an impact on the researcher's choices. A study design's important components include the methods utilized for data collection and analysis, as well as the strategies tailored to the study. To achieve its objectives, the study used a quantitative approach. The primary purpose of quantitative research, according to Bryman (2016), is to collect numerical data to characterize a specific occurrence. This method involves gathering data and then subjecting it to various statistical tests, and analyzing it from the researcher's point of view (Asor, Abraham, Yeboah, Torviawu, and Laryea, 2018). The quantitative technique must be employed when it's important to deduce statistical inferences and relationships among different variables. Therefore, a considerable segment of the population can be assumed when generalizing the conclusion from the analysis. The objective of this study is to use secondary data to assess how sustainable investment affects banking stability. Therefore, a quantitative method is acceptable given that the study aims to examine and understand statistical data on banking stability and sustainable investment.

3.2 Population and Sample Size

Population refers to the total amount of people, things, or objects being studied. The population for the study is all countries globally. Thus, the study focus on countries globally and a sample of 155 countries for which data is available were used to investigate banking sector stability and sustainable investment (environmental, social and governance) of the countries, and how these may affect the financial market and stability of the banks operating in the sector. The period for the study will be 11 years from 2010 to 2020. This period was considered appropriate due to availability of data as well as to consider financial stability of the banking sector in aftermath of financial crisis.

3.3 Econometric Model

A panel econometric model was then used to analyse the data. The study included the sustainable investment (ESG) variables in a model adopted from Ozili (2018), Fernández et al. (2016), and Uhde and Heimeshoff (2009) as stated below:

$$\text{Bank Stability} = f(\text{bank level performance variables}, \text{financial structure variables}, \text{macroeconomic factors}, \text{environmental factors}, \text{social factors and institutional and governance factors})$$

$$BS_{it} = \beta BPER_{it} + \gamma FINSTRUCT_{it} + \theta MACRO_{it} + \mu ENV_{it} + \vartheta SOC_{it} + \delta GOV_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots (1)$$

- where BS = banking stability
- $\beta, \gamma, \theta, \mu, \vartheta$ and δ = Vector of coefficients of independent variables
- ε = the error term.

The variables ENV, SOC, and GOV in the model have constructed proxy indexes for each component of sustainable investment (ESG) using principal component analysis (PCA).

Estimation Techniques

The estimation techniques for the study are the system generalized method moment (GMM), a dynamic panel regression, and a fixed effect model.

The study employed a dynamic panel system GMM estimation model for estimating the impacts of sustainable investment on banking stability at the global level. According to Roodman (2009), the system GMM is appropriate when the dependent variable (Banking stability) is persistent, thus the previous dependent variable affects its current, the period (11 years) is lesser than the number of cross-sections (155 countries), and there is the existence of specific effect, endogeneity problem, serial correlation and unobserved panel heterogeneity. Therefore, this model was deemed appropriate for the data due to its ability to control the aforementioned problems.

The GMM model Specification;

$$BS_{it} = \alpha BS_{it-1} + \beta_1 NIM_{it} + \beta_2 NII_{it} + \beta_3 CIR_{it} + \beta_4 CAR_{it} + \beta_5 BCON_{it} + \beta_6 LERNER_{it} + \beta_7 SIZE_{it} + \beta_8 FBP_{it} + \beta_9 UNE_{it} + \beta_{10} INF_{it} + \beta_{11} EG_{it} + \beta_{12} ENV_{it} + \beta_{13} SOC_{it} + \beta_{14} GOV_{it} + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

- where BS_{it}= Banking Stability in country i at time t represented by two variables (i.e. $BS_{it} = LnZscore_{it}$ and NPL_{it})
- BS_{it-1} = lagged of banking stability
  - α = coefficient of lagged variable
  - $\beta_1 - \beta_{14}$ - vector of coefficients of independent variables and
  - u_{it}= composite error term for country i and time t: $u_{it} = Z_t + \omega_i + v_{it}$
    - Z_t = unobserved time-dependent error term
    - ω_i= unobserved time invariant error term
    - v_{it} = random error term

- NIM (Net Interest Margin), NII (Non- interest income), CIR (Cost to income ratio) and CAR (Regulatory capital ratio) represent bank-level performance variables, BCON (Bank concentration), LERNER (Competition), SIZE and FBP (Foreign bank presence) represent the financial structure, UNE (Unemployment), INF (Inflation) and EG (Economic growth) for macroeconomic and ENV (Environment factors), SOC (Social factors) and GOV (Governance factors) representing the sustainable investment variables.

In order to achieve the second objective of the study, which seeks to assess whether there are differences in the impact of sustainable investment on banking stability among continents, we adopted the fixed effect model. The fixed effect model is employed as appropriate because it controls for individual continent fixed effects. It is also deemed suitable for the data because some continents' number of cross-section (countries) are lesser than the amount of time which makes the GMM model inappropriate for this objective. Therefore, the fixed effect model is specified as follows;

$$BS_{it} = \lambda_1 NIM_{it} + \lambda_2 NII_{it} + \lambda_3 CIR_{it} + \lambda_4 CAR_{it} + \lambda_5 BCON_{it} + \lambda_6 LERNER_{it} + \lambda_7 SIZE_{it} + \lambda_8 FBP_{it} + \lambda_9 UNE_{it} + \lambda_{10} INF_{it} + \lambda_{11} EG_{it} + \lambda_{12} ENV_{it} + \lambda_{13} SOC_{it} + \lambda_{14} GOV_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

- where BS_{it}= Banking Stability in country i at time t represented by two variables (i.e. $BS_{it} = LnZscore_{it}$ and NPL_{it})
- $\lambda_1 - \lambda_{14}$= Vector of coefficients of independent variables
- ε_{it}= composite error term for country i and time t: $\varepsilon_{it} = Z_t + \omega_i + \epsilon_{it}$
  - Z_t = unobserved time-dependent error term
  - ω_i= unobserved time invariant error term
  - ϵ_{it}= random error term

3.4 Sources of Data

The study made use of online-accessible secondary data. Thus, data at the country level from the World Bank database was used for the study. The World Bank's Global Financial Development database was used to access data on banking stability, bank-level performance, and financial structure. World Bank's Governance Indicator was used to obtain data on institutional quality and governance, while data on macroeconomic, social, and environmental factors were obtained from World Bank's indicators.

3.5 Description of Variables

3.5.1 Dependent Variables

The study adopted two variables as dependent variables Non-performing loans and Z-score in accessing banking sector stability. Most researchers have employed Z-score for measuring banking stability in that it has an inverse relationship with the possibility of bank insolvency. The insolvency risk of banks is measured by Z-score and is computed as regulatory capital plus return on asset divided by the standard deviation of the return on asset. According to Strobel and Lepetit (2013), a greater Z-score value suggests lesser insolvency risk and improved banking stability and a lower value implies high insolvency risk and higher instability. To normalize the extreme skewness of the Z-score, a number of recent studies, including (Houston et al., 2010; Laeven and Levine, 2009; Fernández et al., 2016; Beck et al., 2013; and Ozili, 2018), have adopted the natural logarithm of Z-score as a measure for a bank bankruptcy risk when assessing banking stability.

Credit risk is the major source of risk to banks in the banking industry. The greater level of nonperforming loans (NPL) in a bank's loan portfolio results from the increased credit risk profile of the banks (Martínez-Peria and Schmukler, 2001; Ozili, 2015; Nier and Baumann, 2006; Fernández et al., 2016; Ozili and Outa, 2017). If a higher NPL is uncontrolled, it may result in

banking failure. Therefore, NPL is recognized as an essential macro-prudential indicator, which should be observed by banking regulators in assessing banking stability. Loan quality has been measured in the literature using NPL and small non-performing loan-to-gross loan ratios indicate improved asset performance which subsequently leads to increased banking stability.

3.5.2 Explanatory Variables

The variables used as independent variables to explain the banking sector stability were categorized into banks' specific performance, financial structure, macroeconomic factors, and environmental, social, and governance factors.

3.5.2.1 Control Variables

Banks Specific Performance

The study used four variables to represent the banks-specific performance which are control variables: Non-interest income (NII), net income margin (NIM), regulatory capital ratio (CAR) and cost-to-income ratio (CIR). NIM measures the profitability in the banking sector (Athanasoglou et al., 2008; Ozili and Uadiale, 2017; Ozili, 2018). When Z-score is used, a positive correlation between NIM and the stability of the banking sector is predicted; however, when NPL is taken into account, a negative correlation is anticipated. This is because profitable banks have higher NIMs hence more stable than unprofitable banks (Dwumfour, 2017).

NII measures how much profit banks make from non-interest and fee-based sources of funding. According to Williams, (2016) and Smith et al., (2003) banks do compete for depositors' money, therefore, over-reliance on interest income may lead to bank failure. However, Stiroh, (2004) indicated otherwise that greater reliance on NII results in higher volatility in bank income and higher risk but not a return. This is because the more banks move towards NII activities, the lesser their

effort in realizing the full diversification benefit due to trade-offs in worsening risk and return. As a result, we cannot make a firm expectation about how banking stability and NII will relate.

Bank regulatory capital ratio (CAR) indicates how much they are required to keep as risk capital in order to cover the risks they take. Higher CARs enable banks to have enough capital to absorb possible unforeseen losses when they occur according to theory. As a result, a positive relationship is expected between banking stability using the Z-score and CAR and a negative relationship using NPL.

The cost-to-income ratio (CIR) variable measures the effectiveness of the banks. Thus, CIR indicates the operational efficiency of the banking sector. A lower CIR should be correlated with improved banking stability. When bank profitability is higher and stability is higher, a lower CIR improves bank profitability (Pasiouras and Kosmidou, 2007; Athanasoglou et al., 2008; Zoubi and Olson, 2011). Therefore, a positive relationship is expected with NPL and inverse in the case of Z-score.

Financial Structure

The study employed four variables to proxy the financial structure of the banking sector of a country namely: the competition in the banking sector (LERNER), size of the banking sector (SIZE), banking concentration (BCON), and the presence of foreign banks in the banking sector of the country (FBP). The SIZE of the banking sector is measured in this study as private deposit money to GDP as employed by Ozili (2018). How large or small a country's banking industry is has a direct impact on the size and scope of financial intermediation within its financial system. If there is a strong regulatory structure in place to address the systemic risk, more stability is expected in large banking sectors than small banking sectors. The size of the banking industry should be positively correlated with banking stability. A large banking industry may be associated with increased instability financially. If competition is high, it causes banks to take enormous risks which may lead

to losses in times of poor economic conditions. In this case, a negative relationship is likely to be assumed between size and banking stability.

The Lerner index is one of the most important measures for measuring the amount of competitiveness in the banking business. The Lerner index analyzes the difference between output prices and marginal costs; it quantifies the banks' market power over their consumers. Thus, the Lerner index measures the amount of market power a bank has to raise its prices above marginal costs. The Lerner index values range from zero to one with lower values suggesting less competition and higher values implying high competition (Tan, 2016). According to Caminal and Matutes (2002), less competition may result in fewer credit restrictions and larger loans, which may ultimately increase the chance of bank failure. A positive relationship is expected between banking stability and competition. The depth and breadth of a financial system's financial intermediation are increased by the presence of foreign banks in the banking industry. This is because foreign banks bring innovation to financial services offered to users through the introduction of new technologies and financial products and services. The foreign bank presence (FBP) variable for this study is measured as the ratio of the number of foreign banks among the total number of banks in the banking sector of a country. We anticipate a positive relationship between FBP and Z-score as a proxy for banking stability and a negative relationship in terms of NPL.

In this study, banking concentration is determined by comparing the assets of the three major commercial banks to all commercial banks in a given banking sector. The association between banking stability and banking concentration, or whether bank concentration is good or bad, is the topic of numerous theories, according to Safarzyska and Vanden Bergh (2017a). We, therefore, do not have a firm expectation of the relationship between bank concentration and banking stability.

Macroeconomic Factors

The study adopted three macroeconomic factors which may influence the stability in the banking sector such as unemployment (UNE), inflation (INF), and economic growth (EG).

When there is inflation, banks may be unable to charge their clients higher prices for banking (and other financial services). During periods of inflation, banks cannot increase their profitability due to the high cost of operations and the fall in the value of fixed loans granted, which contributes to greater banking instability. Therefore, we predict that inflation and banking sector stability will be negatively related when Z-score is used and positively correlated to NPL. Another macroeconomic factor that could affect the stability of the banking industry is unemployment, as borrowers are more likely to apply for loans when unemployment is high. In a period of high unemployment and job loss, borrowers mostly default on the interest on loans or loan repayment. Boating et al., (2015) indicated that high unemployment leads to high loan default which increases the credit risk of banks resulting in greater banking stability. Using the NPL to proxy banking stability, a positive relationship is expected with unemployment while a negative relationship is anticipated with Z-score as banking stability.

The last macroeconomic factor which the study considered to influence stability in the banking system is economic growth (EG). During a period of higher economic growth, loan defaults tend to reduce (Laeven and Majnoni, 2003) and banks enjoy improved performance making them more stable. Economic growth is measured in this study as the real GDP growth rate. We, therefore, anticipate a negative relationship between economic growth and NPL as banking stability and a positive relationship with regards to Z-score as a proxy for banking stability.

3.5.2.2 Sustainable Investment Variables
Environmental Factor

Climate change is a major world environmental concern. Literature suggests that human activities also contribute to this climatic change. Over time, climatic changes have shifted from environmental threat to economic risk (Zouabi, 2021). This economic risk influences the financial system at the macroeconomic level (Battiston et al., 2017). Multinational corporations are already devising strategies for utilizing renewable energy to "become a carbon-neutral company" (Unilever, 2019), "fight climate change" (Apple, 2018), "address the world's most serious environmental concerns" (P&G, 2019), or "assist in carbon [emissions] reduction" (Nestle, 2018). However, the move to renewable energy, reduction in carbon emissions, and combating climate change is a capital-intensive decision that will necessitate significant engagement from financial institutions. Banks are likely to be crucial in helping a country transition to renewable energy and strengthen its financial resilience to environmental threats according to Mazzucato and Semieniuk, (2018). In the quest of assisting to solve environmental challenges, the banks reduce their assets in the form of granting loans, which threaten their stability. In addition, loans granted by banks to customers that increase environmental risk lead to an increase in the non-performing loans of the banks most especially in this era where countries enact various anti-pollution laws. In this study, we used principal component analysis to construct an environmental index using some selected World Bank environmental indicators such as electricity production from coal sources energy, CO_2 emission, and methane emission indicating the amount of carbon dioxide and methane in the atmosphere, people using safely managed drinking water services, PM2.5 air pollution, mean annual exposure, access to clean fuels and technologies for cooking, forest area, fossil fuel energy consumption, nitrous oxide emissions, people using safely managed sanitation services renewable electricity output, renewable energy consumption, terrestrial and marine protected area, and natural resources depletion. These

indicators are environmental metrics used to assess how effective and efficient countries are in promoting a sustainable environment. A lower value for environmental factor indicates a poor concern for environmental issues hence an increase in environmental risk. However, a higher value for the environmental factor suggests a move towards a more eco-friendly environment. In this study, we anticipate that environmental factor relate negatively to non-performing loans and positively to Z-score.

Social Factor

The existence of a bank in a country supports the citizens' social needs. The banking sector performs social responsibilities that promote the well-being of the people. As the banks give to society, in exchange society reciprocates by patronizing their products and services which increases the profitability of the banking sector making them more stable. The banking sector as part of its social responsibilities advocates for gender equality, respect for human rights, implementation of community-based development projects, and many more which generate loyalty and trust with its workforce, customers, and society which is positively related to stability (Bauer, Derwall, and Otten 2007). In this study, the social variable used as an independent variable is an index constructed from the principal component analysis made up of factors such as the proportion of seats held by women in national parliaments (gender), the strength of legal right index (human rights), population density (population) and access to electricity (access to service). The population of a country affects the number of people who used the banking service. The human right index also suggests how the rights of the citizens are protected and respected in the country. A higher value for the social factor suggests the satisfaction of citizens with the services provided by the banking industry. Therefore, banking

stability is expected to be positively related to social factors using the Z-score while a negative relationship is expected using NPL.

Governance Factor

Institutional and country governance quality is important for banking stability. For example, to safeguard the interest of depositors and investors the regulators of the banking sector make macro-prudential policies that protect them. The stakeholders' view suggests that because there is less incentive to accept risks, the governance pillar should be directly related to banking stability (Kirkpatrick, 2009). Corporate governance that prioritizes stakeholders may be essential for boosting social goals and bank moral capital. Gaganis et al (2020) conducted an extensive study for a large cross-country sample. They concluded that there is an emergence of positive impacts of corporate governance as macro-prudential policies tighten. A recent study in Africa on corporate governance, regulation, and banking stability by Agbloyor, Kusi, Abor, and Ntim (2022) discovered a negative correlation between banking stability and the corporate governance structure at the country level. The study constructed an index for governance from the World Bank governance indicators using the principal component analysis. The selected indicators are government effectiveness, regulatory quality, rule of law, political stability and absence of terrorism, and control of corruption. These selected governance indicators were used in studies by Ozili (2018) and Kaufmann et al. (2011) as control variables. However, this application differs from our study, as it constitutes one of the pillars of sustainable investment (ESG) which is a variable of interest. A higher value for the governance factor suggests effective government and institutional quality in the country in which banks operate. Therefore, we predict that the governance factor would have a positive relationship with Z-score as a measure of stability but a negative relationship with Non-performing loans. Thus, the more

effective the governance and institutional quality of a country, the more stable the banks become in terms of operations.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

The analysis of the study's data is presented in this chapter. The descriptive statistics for the variables used are presented in the first section. The correlation between the variables is discussed in the second section. The third section presents the empirical findings related to sustainable investment and banking stability. The analysis was conducted in two folds; analysis of data at the global level and continental analysis of the data. An analysis of the robustness tests is provided in the final section.

4.2 Descriptive Statistics

The variables or indexes used in the analysis are described in table 4.1 by their descriptive characteristics. All the variables and the number of observations are represented in the first and second columns. The last four columns report the summary values of means, standard deviations, minimum and maximum respectively. From the table, it can be inferred that banking stability variables; natural logarithm of Z-score (LZSCORE) and non-performing loan (NPL) have a mean of 2.651, standard deviation of 0.633 and mean of 7.335, standard deviation of 7.145 respectively. The Net interest margin (NIM) is averagely 4.394% and ranges from the lowest of 0.025% to the highest of 56.108% which represents the proportion of profit of the banking sector from interest. Non-interest income (NII) has a mean of 37.069 standard deviation of 13.82 which indicates that averagely 37.07% of the banking sector's income earned is made up of income from bank charges, commissions, fees, and others rather than interest. The cost to interest ratio (CIR) is 4.011% and ranges from 2.038% to 5.308%. This indicates that the banking sector is averagely 4.011% efficient

in terms of operations. The regulatory capital ratio (CAR) of the banking sector has a mean of 17.477, a standard deviation of 3.601 and has minimum and maximum of 1.755 1nd 42.203 respectively. This indicates that the banks in the banking sector averagely have 17.477% of their assets reserved to cover unexpected losses or risks. The bank concentration (BCON) has a mean of 69.700 with a standard deviation of 19.022. This suggests that the banking sector of countries on average is 69.7% concentrated. Thus percentage share of assets of a country's three largest commercial banks to the total commercial banks' assets. The Lerner index variable has the least mean of 0.630 and a standard deviation of 2.062. This implies that a country with less competition in its banking sector has a minimum value of -0.049 and the highest competitive banking sector has a maximum value of 43.000. The size of the banking sector is averagely 56.458, standard deviation of 41.151 and ranges from 0.429 to 215.611. This indicates the proportion of banks' deposits to GDP ratio of the countries. Foreign bank presence (FBP) is averagely 43.461% of the total banks operating in the banking industry of a country, a standard deviation of (15.644). This also shows that the banking sector of countries is made up of averagely 43.46% foreign banks and a maximum of 100%. Unemployment (UNE) is averagely 7.972% of the total labour force and a standard deviation of 6.031. Inflation (INF) has a mean of 1.127 and a standard deviation of 1.065 which reflect the percentage of consumer price index. The economic growth (EG) is averagely 2.715%, which represents the rate of growth in the real GDP of the countries. The environmental (ENV) variables have a mean of 5.729 and standard deviation of 0.619, indicating how effective and efficient countries are in dealing with environmental issues. The social (SOC) variable which is one of the pillars of sustainable investment has a mean and standard deviation of 3.996 and 0.689 respectively. The institutional and governance variable (GOV) has the least mean of 0.015; standard deviation (0.981) which suggests that governance issues are challenges in the countries' banking sector,

averagely 0.015% institutional and governance effectiveness. A minimum of -2.416 shows country with weak institutional and governance quality and a country with effective institutional and governance quality has a maximum of 2.304.

Table 4.1: Summary of Descriptive Statistics

VARIABLES	Obs	Mean	Std. Dev.	Min	Max
LZSCORE	1701	2.651	0.633	-4.110	4.203
NPL	1705	7.335	7.145	0.146	64.113
NIM	1705	4.394	2.754	0.025	56.108
NII	1705	37.069	13.820	5.691	96.92
CIR	1705	4.011	0.257	2.038	5.308
CAR	1705	17.477	3.601	1.755	42.203
BCON	1705	69.700	19.022	22.505	100.000
LERNER	1705	0.630	2.062	-0.049	43.000
SIZE	1705	56.458	41.151	0.429	215.611
FBP	1705	43.461	15.644	0.000	100.000
UNE	1705	7.972	6.031	0.100	32.020
INF	1705	1.127	1.065	-4.791	6.323
EG	1705	2.715	5.965	-62.076	78.140
ENV	1702	5.729	0.619	3.080	7.819
SOC	1703	3.996	0.689	1.886	7.655
GOV	1705	0.015	0.981	-2.416	2.304

Notes: *This table reports a summary of statistics (mean, standard deviation, minimum and maximum) of the variables for the study. The dependents variables are the natural logarithm of Z-score (LZSCORE) measuring the insolvency risk of the banking sector [(ROA + CAR)/SDROA] and non-performing loan (NPL) measured as a proportion of non-performing loans to total loans. Net*

interest margin (NIM) measures the profitability of banks, non-interest income (NII) measured as a percentage of income to the bank's total income, the cost to income ratio (CIR) measured by the proportion of income that goes into the cost (thus representing banking sector efficiency), regulatory capital ratio (CAR) represented by the percentage of banks' regulatory capital to risk-weighted asset, consumer price index represent inflation (INF), the proportion of labour force for unemployment (UNE) and real GDP growth rate for economic growth (EG) are the control variables. Banking concentration (BCON) measured as a percentage share of assets of the three largest commercial banks to the total commercial banks' assets, the Lerner index (LERNER) measures the market power (competition) in the banking sector, banking size (SIZE) measured by the proportion of banks deposit to GDP ratio and foreign bank presence (FBP) percentage of the total number of foreign-owned banks represent the financial structure and variables of interest sustainable investment (environmental (ENV), social (SOC) and governance (GOV) indexes constructed using various measurement metrics (see appendix table 5).

4.3 Correlation

Table 4.2 reported the correlation matrix for all variables used in the study. The results from the correlation table indicate that there is no multicollinearity in the model because all coefficients are less than 0.5 except the correlation between bank size and governance factor which is 0.696, however, we keep both variables since this coefficient is moderate and they form part of different categories of our independent variables; financial structure and sustainable investment. This can be confirmed by the variance inflation factor results (see appendix table 1). Also, in identifying the threshold for concern of multicollinearity, literature has indicated that a correlation level of 0.600 is the average of thresholds posited by two contending strands. In essence, Kennedy (2008) has argued for a 0.700 threshold while previously, Wichers (1975) and Obrien (2007) had argued for a 0.500 threshold.

Table 4.2 Correlations Matrix for All Variables

VARIABLES	LZSCORE	NPL	NIM	NII	CIR	CAR	BCON	LERNER	SIZE	FBP	UNE	INF	EG	ENV	SOC	GOV
LZSCORE	1.000															
NPL	-0.111	1.000														
NIM	-0.098	0.062	1.000													
NII	-0.123	0.141	-0.127	1.000												
CIR	-0.120	0.082	-0.000	0.299	1.000											
CAR	0.002	0.160	0.127	0.055	0.012	1.000										
BCON	0.044	-0.049	-0.064	0.077	-0.011	0.132	1.000									
LERNER	0.050	-0.042	0.015	0.008	-0.016	-0.028	0.052	1.000								
SIZE	0.152	-0.220	-0.477	-0.139	-0.106	-0.157	-0.040	-0.015	1.000							
FBP	-0.073	0.099	0.123	-0.003	0.031	0.094	-0.008	-0.003	-0.163	1.000						
UNE	0.001	0.175	-0.014	0.065	0.079	-0.067	0.139	0.088	-0.028	0.086	1.000					
INF	-0.092	0.011	0.109	0.084	0.021	0.005	0.004	0.002	-0.154	-0.004	0.001	1.000				
EG	0.011	-0.066	0.114	0.015	-0.026	-0.014	-0.066	0.016	-0.127	-0.032	-0.153	-0.053	1.000			
ENV	0.030	-0.102	-0.146	-0.005	-0.143	0.057	0.116	-0.039	0.190	-0.143	-0.086	-0.010	-0.052	1.000		
SOC	0.093	-0.094	-0.129	-0.024	-0.084	-0.042	0.058	-0.012	0.199	0.000	-0.116	-0.042	0.008	0.055	1.000	
GOV	0.110	-0.265	-0.447	-0.106	-0.056	-0.063	0.087	-0.002	0.696	-0.045	-0.058	-0.233	-0.066	0.264	0.252	1.000

Notes: *This table reports the correlation coefficients of all variables employed in the study. The dependent variables are the natural logarithm of the Z-score (LZSCORE) and non-performing loan (NPL). Net interest margin (NIM), non-interest income (NII), the cost to income ratio (CIR), regulatory capital ratio (CAR), inflation(INF), unemployment (UNE), and economic growth (EG) are the control variables. Banking concentration (BCON), Lerner index (LERNER), banking size (SIZE), and foreign bank presence represent the financial structure and variables of interest sustainable investment (environmental (ENV), social (SOC), and governance (GOV).*

4.4 Empirical Results

4.4.1 Empirical Results of First Objective

To accomplish the study's first objective, which is to investigate the impact of sustainable investment on banking stability, we run sustainable investment and banking stability using our system-GMM model and the result is presented in table 4.3. We analyze banking stability and sustainable investment variables considering the control variables (bank-level performance and macroeconomic factors) and financial structure variables as shown in columns 3 and 6.

The coefficient of the environmental factor (ENV) which is one of the pillars of sustainable investment is positively significant when using LZSCORE and negatively significant to NPL as reported in columns 3 and 6. According to physical and transition theory, the effect of environmental risk affects the operations of the banking sector by reducing or increasing its insolvency and credit risks. A positive relationship with LZSCORE implies that when environmental risk is low banks' insolvency risk reduces making the banking sector more stable and a high environmental risk increased the insolvency risk of banks making the banking sector more unstable or less stable. Also, a negative relationship with NPL shows that at a higher level of environmental risk clients (borrowers) of banks default on loan repayment which increases the non-performing loan ratio of the overall loan portfolio of the bank. This increased the credit risk of the banking sector hence less stable or unstable. However, when environmental risk is low NPL ratio reduces making banks more stable. This outcome is consistent with earlier research, including that of (Feldman, Soyka, and Ameer in 1997; Cheng, Ioannou, and Serafeim in 2014; Chiaramonte et al. in 2021; Bouslah, Kryzanowski, and M'Zali in 2013; Gangi et al. in 2019). Feldman et al., (1997) for instance show that the banks in the banking sector should take on environmental responsibilities to generate community benefits while also addressing the pressures of increased regulatory requirements. According to studies, participating in environmental practices reduces investors' perceived riskiness.

Banks, according to Gangi et al. (2019), should use this responsibility to further their own strategic goals. Also in a study by Ozili (2019), on social activism and financial stability, he found that environmental sustainability is positively related to bank-lead financial stability with a Z-score as a proxy for financial stability, which confirms our result. This study affirms the results of a study by Choudhury, et al (2021) who found that an increase in financial support by banks in promoting the supply of renewable energy reduces its default risk significantly.

The coefficient of social factor (SOC) which is the second variable of interest is positively significant with LZSCORE as shown in column 3. This suggests that as banks undertake social responsibility, it improves their operational activities of the banks. A positive relationship shows that an increase in the social satisfaction of customers and society enhances the banking stability of a country. According to the stakeholder theory, financial performance will be enhanced as a result of better effectiveness and efficiency in addressing the demands of various stakeholder groups. Building strong bonds with significant stakeholders can contribute to the development of valuable goodwill that will protect banks from unforeseen social issues and present them with new opportunities that may boost their financial performance (Scholtens, 2009; Platonova et al., 2018). The result confirms a study by Chiaramonte et al., (2021), who found a positive association between a social factor and banking stability using the Z-Score.

The result also affirms the findings of a study by Ozili, (2019) who found gender equality to be positive and significantly related to bank-lead financial stability.

Using the NPL as a measure of banking stability, the social factor is negatively significant as shown in column 6. This indicates that the social satisfaction of customers, employees and the entire society affects the credit risk of banks. Thus, when customers and employees of the banking sector are satisfied socially, it translates into banks in the banking sector having lower credit risk, increasing

their stability. The possible explanation for this is that when bank employees' rights are respected, well remunerated, and better welfare packages available to them, they can monitor and follow up on loans granted to customers, which reduces banks' non-performing loan ratio.

Finally, the last variable of our sustainable investment pillars is the governance factor. The coefficient of institutional and governance factor (GOV) is positively related to LZCORE and significant as shown in columns 3. Using the NPL as a measure of banking stability, the institutional and governance factor is negatively correlated to banking stability and is significant. This suggests that institutional quality and government effectiveness increases stability in the banking sector of a country. Thus, whenever banks are properly regulated and the regulators resolve institutional weaknesses, it ensures that loans granted by banks to individuals and institutions are controlled. This result confirms a previous study by Chiaramonte et al., (2021) who found a positive and significant correlation between governance and banking stability. The study results also confirm the findings of Ozili (2018) who used similar variables which were used to construct our governance factor but in their individual form as control variables. He found that government effectiveness and control of corruption were positively associated with LZSCORE and significant but government effectiveness was negatively related to NPL. He also found political stability and absences of violence/terrorism negatively correlated with LZCORE. Moreover, this result corroborates the findings of (Bermpei, et al 2018; Alharthi 2016; Uddin et al. 2020). Uddin et al. (2020), for instance, found an increase in institutional quality indices like rule of law, government effectiveness, and corruption control to improve banking stability as a result of a significant reduction in bank risk. However, the result is contrary to the study by Hoque, et al (2015) who found no relationship for control of corruption

The results showed that banks operating in highly politically unstable and government-ineffective

countries tend to experience higher insolvency risk and NPL ratio hence more unstable. However, in strong government effectiveness and a highly controlled corruption environment, banks in the banking sector experienced stability.

For the Net interest margin (NIM) which is our first bank-level performance variable, no relationship was found for both proxies for stability (LZSCORE and NPL) as shown in columns 3 and 6. This finding does not support the studies such as Athanasoglou et al., (2008), Dwumfour, (2017), Ozili and Uadiale, (2017) and Ozili, (2017b), all of whom found net interest margin to be positively associated with banking stability.

Non-interest income (NII) was positively significant to LZSCORE as a measure of banking stability and negatively significant to NPL. The results suggest that banks are more stable when NII is high. Thus, as banks' income from other sources such as service fee, commissions, and many more increases other than those from interest, it increases the solvency of the banks and relieves the banks from depending solely on the interest income from loans granted for survival. This limit the excessive loans granted by banks, which reduces its NPL ratio to the total loan portfolio. This finding support studies by (Williams, 2016; Smith et al., 2003; Ozili, 2017a) who suggested that over-reliance on banks for interest income makes them more unstable due to competition. This result is contrary to Ozili (2018) who found no relationship between NII and the LZSCORE.

The coefficient of Cost to income ratio (CIR) is negative and significant to banking stability using LZCORE as shown in column 3. Therefore, lesser CIR correlated to higher banking stability because it lowers the likelihood of banks going bankrupt. With NPL as a measure of banking stability, fewer non-performing loans are also related to a lower CIR. This suggests that increased efficiency in the banking industry enhances stability by reducing non-performing loans. The results of Ozili (2018) and Berger and DeYoung (1997), which contend that effective banks are more stable than inefficient

banks, which are reflected in reduced NPLs, are in line with this finding. Our results also confirm the study by Heffernan and Fu (2008) who found the cost-to-income ratio (CIR) to be negative and significant to banking stability. However, Ozili (2018) found no significant relationship between CIR and LZSCORE. These findings are contrary to our results.

The regulatory capital ratio (CAR) is positively significant to LZSCORE as shown in column 3. When banks have a greater capital ratio, it increases their protection against possible losses due to greater risk activities undertaken which subsequently improves bank stability. This suggests that banks with a higher regulatory capital ratio are associated with lower insolvency risk since it serves as protection for the banks making them more stable. This result is consistent with Besanko and Kanatas, (1996), Yakubu and Bunyaminu (2021), and Aiyar et al., (2015). The coefficient of the CAR is positive and significant to NPL when use as a proxy for banking stability. This result is surprising as a higher regulatory capital ratio leads to a greater non-performing loan ratio, affecting the stability of banks.

For our financial structure variables, bank concentration (BCON) has a negative coefficient and is significant with LZSCORE. This result implies that a lower bank concentration is associated with greater bank stability. The result confirms the studies by Kasman and Kasman (2015) and Uhde Heimeshoff (2009) who found bank concentration to be negatively significant to banking stability. Calice, et al., (2021), Shim (2019), and Shijaku (2017) all found bank concentration to be negatively influencing banking stability. This outcome contradicts the conclusions of IJtsma et al., (2017), who found no association between banking concentration and stability at the bank or county level. Unlike Ozili (2018), who discovered a negative, significant correlation between them, our study found no link between NPL and banking concentration. However, Kasman and Kasman (2015) found a positive relationship between bank concentration and NPL.

The competition in the banking sector is a proxy as the Lerner index. From the empirical result, as shown in column 6, the LERNER index is negatively significant to NPL. The result of our study indicates that higher competition is associated with lower non-performing loans which increase the stability in the banking sector. Less competition according to Caminal and Matutes (2002) may result in larger loans and a reduction in credit rationing, which may increase the risk of loan default or bank failure in the long run and, as a result, increase banking instability.

The finding is consistent with Beck, De Jonghe and Schepens, (2013), De-Ramon, Francis and Straughan (2018), Kasman and Kasman (2015), Rahman et al, (2021) who found the competition to be negatively correlated to the NPL ratio. The result also supports the "competition-stability view," which maintains that greater bank competition is linked to greater bank stability (Fiordelisi and Mare, 2014; Berger and Bouwman, 2013; Schaeck and Cihak 2014). Thus, there is the likelihood that banks will reduce their overall risk exposure as the banking sector becomes more competitive. However, the result is inconsistent with Kasman and Carvallo (2014) and Dias (2020) who discovered that competition had a positive effect on bank stability using the NPL.

The coefficient of SIZE is positively significant to both LZSCORE and NPL as measures for banking stability as shown in columns 3 and 6. A positive relationship between SIZE and LZSCORE implies that larger banks are more stable. This supports the view that there is relatively more stability in larger banking sectors compared to smaller ones. However, a positive association found between SIZE and NPL suggests otherwise that not all large banks tend to experience lower non-performing loans. The results of this study corroborate the findings of Ozili (2017b) who suggested that during difficult economic times, large banks undertake unwarranted risk if they are encouraged by excessive competition in the banking sector making them less stable compared to small ones. The

results also reject "the too big to fail" hypothesis and support Rahim and Zakaria (2013), Berger et al., (1997) and Ozili, (2018) who found a positive correlation between SIZE and NPL.

Foreign bank presence (FBP) our last financial structure is positively related to LZSCORE and is significant. This implies that a higher foreign bank presence is associated with greater banking stability. A positive coefficient suggests that the more the presence of foreign banks in the banking sector of a country the more efficient the banks become. The possible explanation for this is that as the number of foreign banks increases, they influence the market by introducing innovative technology in their operations which compels the local banks to be more efficient in order to compete with them making the banks more stable. The result is consistent with the findings of Ozili (2018) who discovered a positively significant between FBP and LZSCORE. It also confirms the study by Sulemana, et al (2018) who found foreign bank presence to significantly lower the likelihood of a bank's crisis. However, unlike Ozili, (2018) and Boateng et al., (2015) who found a negatively significant association between FBP and NPL, this study found no relationship.

The coefficient of unemployment (UNE) is positively significant to NPL as banking stability as shown in column 6. This finding demonstrates how a higher rate of unemployment is associated with more non-performing loans. Using LZSCORE as a measure of banking stability, no relationship was found with unemployment as shown in column 3. This outcome is in line with what Heffernan and Fu (2008) and Boateng et al. (2015) who discovered unemployment affects bank stability due to the rising rate of loan defaults. However, the result is contrary to the findings of Ozili (2018) who found unemployment to be negatively significant to NPL.

The inflation (INF) coefficient is negatively significant to LZSCORE as shown in column 3. This result suggests that in a highly inflationary economy, banks in the banking sector incurred higher costs of operation which affect their profitability making them more unstable. Inflation is positively

significant to NPL as shown in column 6. The result indicates that higher inflation is associated with greater default. Thus, during the inflationary period, the number of defaulters of loans increases. This affects the stability of the banks as it increases the non-performing loan ratio. The result supports the studies by Rupeika-Apoga et al., (2018) and Chand et al., (2021) discovered that banking stability is influenced by inflation. However, the result is contrary to the findings of Rahim and Zakaria (2013) who found a reverse relationship for both NPL and Z-score. Jokipii and Monnin (2013) found no relationship between inflation and banking stability.

For economic growth (EG), the coefficient is positive and significantly related to LZSCORE as a banking stability proxy as shown in column 3. A positive relationship suggests that high economic growth leads to more stability in the banking sector. Thus, during high economic growth, banks incurred low operational costs which improve profitability. Using the NPL for banking stability, the economic growth coefficient was negative and significant to NPL as shown in column 6. This indicates that non-performing loans tend to be less at an increased economic growth. This result is in agreement with previous research by Bikker and Metzemakers (2005), Laeven, and Majnoni (2003), who argue that loan default rates tend to be lower during times of higher economic growth, which improves banking stability. The results also support studies by Chand, et al (2021), Jokipii and Monnin (2013), Rahim and Zakaria (2013), and Shayegani and Arani (2012) all of whom found a positive association between economic growth and banking stability.

Table 4.3: Two-step system GMM Results of ESG and Banking Stability

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**LZSCORE**	**LZSCORE**	**LZSCORE**	**NPL**	**NPL**	**NPL**
L.LZSCORE	0.2371***	0.5108***	0.1900***			
	(0.0046)	(0.0085)	(0.0064)			
L.NPL				0.6239***	0.5077***	0.8332***
				(0.0013)	(0.0066)	(0.0089)
NIM		0.0016**	0.0015		0.0501***	0.0042
		(0.0008)	(0.0011)		(0.0048)	(0.0100)
NII		0.0011***	0.0005**		-0.0194***	-0.0208***
		(0.0002)	(0.0003)		(0.0018)	(0.0034)
CIR		-0.0051***	-0.0056***		0.0050***	-0.0017
		(0.0002)	(0.0002)		(0.0011)	(0.0027)
CAR		0.0063***	0.0099***		0.1732***	0.0612***
		(0.0008)	(0.0010)		(0.0074)	(0.0119)
BCON			-0.0009***			0.0015
			(0.0003)			(0.0028)
LERNER			0.0183			-0.0286***
			(0.0143)			(0.0021)
SIZE			0.0022***			0.0099***
			(0.0004)			(0.0019)
FBP			0.0008***			0.0017

			(0.0002)			(0.0023)
UNE		-0.0098***	-0.0030		0.3960***	0.1701***
		(0.0009)	(0.0023)		(0.0132)	(0.0130)
INF		-0.0013***	-0.0006***		0.0024***	0.0079***
		(0.0001)	(0.0001)		(0.0005)	(0.0017)
EG		0.0015***	0.0007***		-0.0468***	-0.0433***
		(0.0003)	(0.0002)		(0.0042)	(0.0089)
ENV	0.0000**	0.0000*	0.0000***	-0.0008***	-0.0006***	-0.0007***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
SOC	0.0003***	0.0002***	0.0003***	-0.0007***	0.0018***	-0.0015***
	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0002)	(0.0002)
GOV	0.0446***	-0.0250**	0.0870***	-0.0972***	-0.1430**	-0.3435***
	(0.0077)	(0.0106)	(0.0129)	(0.0143)	(0.0712)	(0.1028)
CONSTANT	2.0670***	1.3628***	2.1723***	3.2523***	-2.0685***	-0.5299
	(0.0133)	(0.0314)	(0.0505)	(0.0449)	(0.1991)	(0.3534)
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.001	0.000	0.001	0.000	0.000	0.000
AR(2)	0.187	0.611	0.172	0.728	0.963	0.689
Sargan OIR	0.119	0.106	0.121	0.114	0.109	0.112
Hansen OIR	0.255	0.122	0.118	0.117	0.198	0.182
DHT for instruments						

(a) Instruments in levels						
H excluding group	0.213	0.044	0.024	0.223	0.076	0.053
Diff(null,	0.555	0.404	0.952	0.093	0.0.962	0.564
H=exogenous)						
(b) IV(years, eq(diff))						
H excluding group	0.124	0.049	0.092	0.122	0.048	0.038
Diff(null,	0.893	0.833	0.444	0.347	0.987	0.620
H=exogenous)						
Fisher	177252.90***	77197.53***	4852.33***	23919.17***	7998.96***	3355.59***
Instruments	144	129	128	146	144	114
Countries	155	155	155	155	155	155
Observations	1,538	1,538	1,538	1,546	1,546	1,546

Note: *This table reports the dynamic panel data estimation result of the two-step system –GMM. The dependent variables are the natural logarithm of the Z-score (LZSCORE) and non-performing loan (NPL). Net interest margin (NIM), non-interest income (NII), the cost to income ratio (CIR), regulatory capital ratio (CAR), unemployment (UNE), inflation(INF), and economic growth (EG) are the control variables. Banking concentration (BCON), Lerner index (LERNER), banking size (SIZE), and foreign bank presence represent the financial structure and variables of interest sustainable investment (environmental (ENV), social (SOC), and governance (GOV). *** p<0.01, ** p<0.05, * p<0.1 for significance level of 1% , 5% and 10% respectively. Standard errors are in parentheses.*

DHT: Difference in Hansan Test for Exogeneity of Instrument Subsets. Diff: Difference; OIR: Over identifying Restrictions Test, No autocorrelation exists as shown by AR(1) & AR(2) tests Sargan and Hansen OIR tests showed that instruments are valid as the null hypotheses are rejected

4.4.2 Empirical Results of the Second Objective

In order to accomplish the study's second objective, which seeks to assess whether there are differences in the impact of sustainable investment on banking stability among continents, we sort the data into six continents namely; Asia, North America, Africa, South America, Australia, and Europe. We were unable to run the system-GMM model because our number of instruments was more than the number of groups, which renders system-GMM inappropriate to be used therefore, we run the fixed effect model. We analyzed sustainable investment and banking stability in the presence of all other explanatory variables under financial structure, bank-level performance, and macroeconomic factors.

4.4.2.1 Asia Continent

Table 4.4 columns 1 and 2 report the results of sustainable investment and banking stability of the Asian continent. For our sustainable investment pillars, we found that the institutional and governance (GOV) variable was positive and significant to both LZSCORE and NPL. The environmental factor was positively significant to LZSCORE and negative to NPL. A positive relationship with LZSCORE implies that when environmental risk is low, it increases the solvency of the banks. A negative relationship with NPL suggests that an improved environmental risk reduces the probability of credit default hence strengthening the stability of the banks. Our social factor (SOC) was found to be negatively correlated with LZSCORE, which is contrary to studies such as Ozili (2019) and Chiaramonte, et al (2021) who found social factor to be positively associated with Z-score as a measure of banking stability. It also refutes the argument that customers and society's comfort improves banks' profitability. The results from the study showed that with bank-level performance, net interest margin (NIM)) was positive and significantly related to

LZSCORE. A positive relationship between NIM and LZSCORE suggests that a higher net interest margin is related to greater banking stability. This research confirms previous findings by Athanasoglou et al. (2008), Dwumfour (2017), Ozili (2017b) and Ozili and Uadiale (2017) that profitable banks are more likely to be stable. Also, non-interest income (NII) showed a positive relationship with LZSCORE. This suggests that banks operating in the banking industry of Asian countries are more stable as they can reduce their cost of operation. The coefficient of NII is negatively correlated with NPL, which suggests that lower non-performing loans are associated with higher non-interest income. The coefficient of CAR was however positively significant to NPL showing that a higher regulatory capital ratio leads to increased NPL. No relationship was found for both financial structure and macroeconomic variables.

4.4.2.2 Africa Continent

Table 4.4 columns 3 and 4 report the results of sustainable investment and banking stability of the African continent. For our sustainable investment pillars, only the environmental variable was negative and significantly correlated with LZSCORE. This result showed that higher environmental risk is associated with lower solvency of the banking sector and hence more unstable. In terms of bank-level performance variables, NII and CIR were negatively significant to LZSCORE as a measure of stability in the banking sector and CIR and CAR were positively significant to NPL as a measure of banking stability. The CIR result showed that banking sector efficiency influences the banking stability in the continent. The SIZE variable was the only financial structure variable that was positive and significant to NPL, which showed that large banks are associated with higher non-performing loan ratio. For our macroeconomic factors, EG was negatively significant to NPL suggesting higher economic growth in Africa is associated with lower non-performing loans. Both

unemployment (UNE) and inflation (INF) were positively significant to NPL and LZSCORE respectively. These results indicate that higher unemployment contributes directly to the increased level of non-performing loan ratio in the banking industry. The positive relationship between INF and LZSCORE suggests that in Africa, in times of higher inflation service fees charged by banks are high making them more stable.

4.4.2.3 Australia Continent

Table 4.4 columns 5 and 6 report the results of sustainable investment and banking stability of the Australian continent. For our sustainable investment pillars, two of them are significant namely the governance factor and the environmental factor. The governance factor is positively correlated with LZSCORE. This indicates that improved institutional and governance quality leads to greater stability in the banking sector. The environmental factor is negatively related to LZSCORE, suggesting that higher environmental risk is associated with lower solvency of the banking sector hence more unstable. In terms of the bank-level performance variables, NIM and CIR were both negatively significant to LZSCORE as a measure of banking stability. For NPL as a measure of banking stability, both NII and CIR were negative and significant while NIM was positive and significant. The result shows that higher NII is associated with lower non-performing loans. Higher banking sector efficiency increases the solvency of the banking sector making them more stable but could also increase the non-performing loan ratio. Thus, if banks based on operational efficiency to increase the level of loans granted to borrowers, it increases their NPL ratio which eventually affects their stability. Banking concentration (BCON) and Lerner index (LERNER) are the two financial structure variables that are negatively significant to LZSCORE and NPL respectively. The results show that higher banking concentration improves banking stability. A negative relationship between

LERNER and NPL as banking stability implies that higher competition lowers the non-performing loan ratio which enhances the stability of the banking sector. The coefficient of economic growth (EG) was negatively significant to LZSCORE, suggesting that higher economic growth is associated with lower banking stability. This result is contrary to the previous studies such as Chand, et al (2021), Jokipii and Monnin (2013), Rahim and Zakaria (2013), and Shayegani and Arani (2012) all of whom found a positive relationship between economic growth and banking stability.

Table 4.4: Fixed-Effect Results of Continents for ESG and Banking Stability

VARIABLES	ASIA		AFRICA		AUSTRALIA	
	LZSCORE	NPL	LZSCORE	NPL	LZSCORE	NPL
NIM	0.0173***	-0.0369	-0.0057	0.0182	-0.0583*	2.248***
	(0.0063)	(0.0515)	(0.0074)	(0.154)	(0.0274)	(0.488)
NII	0.0056***	-0.0321**	-0.0059***	0.0315	0.0101	-0.395***
	(0.0018)	(0.0144)	(0.0013)	(0.0272)	(0.0052)	(0.0933)
CIR	-0.0017	0.0071	-0.0024**	0.0549**	-0.0084**	-0.297***
	(0.0014)	(0.0111)	(0.0011)	(0.0234)	(0.0034)	(0.0604)
CAR	-0.0021	0.176***	0.0000	0.491***	-0.0140	0.233
	(0.0080)	(0.0658)	(0.0035)	(0.0729)	(0.0150)	(0.267)
BCON	-0.0015	0.0156	-0.0012	-0.0201	-0.0462***	-0.0316
	(0.0014)	(0.0114)	(0.0009)	(0.0196)	(0.0053)	(0.0936)
LERNER	-0.220	0.446	0.0009	0.0109	0.195	-5.355**
	(0.158)	(1.294)	(0.0032)	(0.0658)	(0.119)	(2.120)
SIZE	-0.0010	0.0015	-0.0005	0.0598***	-0.0007	0.0008
	(0.0012)	(0.0099)	(0.0008)	(0.0167)	(0.0006)	(0.0111)
FBP	0.0014	-0.0181	-0.0006	-0.00586	0.0024	-0.0131
	(0.0014)	(0.0111)	(0.0009)	(0.0177)	(0.0018)	(0.0324)
UNE	0.0143	0.0534	0.00327	0.549**	0.0118	-0.208
	(0.0157)	(0.129)	(0.0105)	(0.218)	(0.0427)	(0.761)
INF	0.0008	-0.0117	0.0014***	-0.0069	-0.0002	0.1800

	(0.0034)	(0.0281)	(0.0005)	(0.0105)	(0.0186)	(0.331)
EG	0.0068	-0.0250	0.0003	-0.0482*	-0.0201**	-0.144
	(0.0043)	(0.0354)	(0.0012)	(0.0256)	(0.0064)	(0.114)
ENV	0.0002**	-0.0021***	-0.0002**	-0.0017	-0.0009**	-0.0039
	(0.0000)	(0.0006)	(0.0000)	(0.0015)	(0.0003)	(0.0046)
SOC	-0.0026*	0.0084	0.0016	0.131**	-0.005	0.0787
	(0.0012)	(0.0100)	(0.0028)	(0.0589)	(0.0193)	(0.343)
GOV	0.232**	1.562**	-0.0597	-1.934	0.265*	0.872
	(0.0913)	(0.749)	(0.0750)	(1.560)	(0.119)	(2.114)
Constant	2.023***	7.545***	3.302***	-10.80**	6.396***	21.65
	(0.312)	(2.545)	(0.202)	(4.208)	(0.907)	(16.15)
Country Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	85.53	61.25	80.95	76.25	99.59	92.61
F-Statistic	41.91	11.96	31.69	24.18	300.91	16.42
P-Value	0.000	0.000	0.000	0.000	0.000	0.001
Observations	437	438	492	492	33	33

Notes: *This table reports the fixed effect results of three continents Asia, Africa, and Australia. *** p<0.01, ** p<0.05, * p<0.1 for significance level of 1%, 5% and 10% respectively. Standard errors are in parentheses. Both country and year effects were included in the model specification.*

4.4.2.4 Europe Continent

Table 4.5 columns 1 and 2 report the results of sustainable investment and banking stability of the European continent. The result shows that none of the sustainable investment pillars (ESG) influence banking stability in the European continent.

The coefficients of NIM and NII are all positive and significant to LZSCORE as a proxy for banking stability. A positive relationship implies that banks with higher net interest margins as well as higher income from sources other than interest make them more stable. However, the NIM was also found to be positively correlated to NPL. This may be attributable to the fact that banks in their quest to increase credit to achieve higher NIM lead to an increase in loan default which lowers the stability of the banks. The coefficient of CAR was positive to LZSCORE as banking stability and negatively significant to NPL as a measure of banking stability. The result suggests that banks with higher CAR are more stable as it gives evidence of an increased bank asset to cover risks. Foreign bank presence (FBP) and bank concentration (BCON) are all negatively significant to NPL. These results imply that higher BCON and increased FBP are associated with a lower NPL ratio. The SIZE coefficient is negatively significant to LZSCORE which confirms the rejection of "the too big to fail" hypothesis and show that large banking sector are associated with greater insolvency risk. The coefficient of unemployment (UNE) is positively correlated to NPL and significant implying that higher UNE is associated with greater non-performing loans.

4.4.2.5 North America Continent

Table 4.4 columns 3 and 4 report the results of sustainable investment and banking stability of the North American continent. For the sustainable investment pillars, only the governance factor is positively significant to LZSCORE as a measure of banking stability. This indicates that improved institutional and governance quality leads to greater stability in the banking sector.

For our bank-level performance variables, the coefficient of NIM is positive and significant to LZSCORE as a measure of banking stability. A positive relationship implies that banks with higher NIM are associated with greater solvency. NII is negatively significant to banking stability using LZSCORE. This result suggests otherwise that higher NII is associated with higher insolvency risk which is consistent with a study by Stiroh, (2004) who found NII to be positive and significantly correlated with Z-score. The CIR result suggests that banking sector efficiency influences the banking stability in the continent as shown by a negative relationship between CIR and LZSCORE. The coefficient of CAR was positively significant to NPL as a proxy for banking stability. The result suggests otherwise that banks with higher CAR are more unstable. Banking concentration (BCON) coefficient was negatively significant to LZSCORE. The results show that lower banking concentration improves banking stability. A positive relationship between LERNER and LZSCORE as banking stability implies that higher competition enhances the stability of the banking sector.

The coefficient of unemployment (UNE) is positively correlated to NPL and significant implying that higher UNE is related to greater non-performing loans.

4.4.2.6 South America Continent

Table 4.5 columns 5 and 6 report the results of sustainable investment and banking stability of the South American continent. The result shows that none of the sustainable investment pillars (ESG) influence banking stability in the South American continent. The NIM and NII coefficients are all significant and positive for LZSCORE as a measure of banking stability. A positive relationship suggests that banks with increased NIM and NII are more likely to be stable. The CIR result indicates that banking efficiency improves the stability of the banking sector as shown by a negative relationship between CIR and LZSCORE. The coefficient of CAR was positively significant to NPL as a measure of banking stability. The result suggests otherwise that banks with higher CAR are more unstable. The SIZE coefficient is positively significant to NPL indicating that large banks experience higher loan default when competition in the industry is keen. Foreign bank presence is positively significant to LZSCORE as a proxy for banking stability. This result implies that higher FBPs are associated with greater solvency since local banks in the industry are encouraged to improve to match competition from foreign banks. The coefficient of inflation (INF) is negatively correlated to LZSCORE and significant implying that during highly inflationary times, banks in the banking sector tend to be less stable.

Table 4.5: Fixed-Effect Results of Continent for ESG and Banking Stability

VARIABLES	EUROPE		NORTH AMERICA		SOUTH AMERICA	
	LZSCORE	NPL	LZSCORE	NPL	LZSCORE	NPL
NIM	0.0942***	1.049***	0.0213**	-0.0067	0.0217*	-0.0011
	(0.0232)	(0.276)	(0.0096)	(0.0749)	(0.0121)	(0.0621)
NII	0.0063***	0.0135	-0.0041**	-0.0083	0.0076**	-0.0041
	(0.0022)	(0.0255)	(0.0020)	(0.0155)	(0.0030)	(0.0153)
CIR	-0.0013	0.0028	-0.0040**	-0.0041	-0.0085**	0.0025
	(0.0022)	(0.0234)	(0.0017)	(0.0135)	(0.0041)	(0.0208)
CAR	0.0352***	-0.271***	0.0100	0.682***	0.0206	0.423***
	(0.0089)	(0.105)	(0.0180)	(0.141)	(0.0176)	(0.0904)
BCON	-0.0015	-0.0480**	-0.0043***	-0.0124	-0.0026	0.0126
	(0.0018)	(0.0217)	(0.0012)	(0.0092)	(0.0016)	(0.0081)
LERNER	0.299	0.976	0.297***	-0.624	-0.332	0.751
	(0.211)	(2.462)	(0.0684)	(0.536)	(0.270)	(1.390)
SIZE	-0.0043***	-0.0119	0.0016	0.0230	-0.0046	0.0511***
	(0.0015)	(0.0172)	(0.0018)	(0.0141)	(0.0034)	(0.0172)
FBP	-0.0003	-0.0333*	0.0002	0.0026	0.0052**	0.0065
	(0.0015)	(0.0181)	(0.0008)	(0.0062)	(0.0023)	(0.0120)
UNE	-0.0075	1.242***	-0.0018	0.232***	-0.0270	-0.163
	(0.0103)	(0.120)	(0.0074)	(0.0581)	(0.0216)	(0.111)
INF	0.0016	0.0797	0.0049	-0.0333	-0.0036***	0.0044

	(0.0051)	(0.0601)	(0.0065)	(0.0511)	(0.0010)	(0.0052)
EG	0.0110	0.134	-0.0029	0.0490	0.0026	-0.0273
	(0.0084)	(0.0982)	(0.0045)	(0.0352)	(0.0042)	(0.0213)
ENV	-0.0000	0.0005	0.0000	0.0006	-0.0002	-0.0000
	(0.0001)	(0.0014)	(0.0000)	(0.0006)	(0.0001)	(0.0006)
SOC	-0.0038	-0.0539	0.0004	-0.0814	-0.0277	0.0058
	(0.0043)	(0.0511)	(0.0078)	(0.0608)	(0.0170)	(0.0874)
GOV	0.277	-0.601	0.257***	0.0589	0.0370	-0.150
	(0.177)	(2.100)	(0.0792)	(0.621)	(0.184)	(0.948)
Constant	2.475***	2.889	2.677***	-4.503	3.161***	-5.067
	(0.404)	(4.790)	(0.425)	(3.332)	(0.748)	(3.848)
Country Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	70.05	72.39	89.16	90.75	82.50	77.77
F-Statistic	17.19	19.27	35.01	41.58	19.59	14.80
P-Value	0.000	0.000	0.000	0.000	0.000	0.000
Observations	437	440	154	154	143	143

Notes: *This table reports the fixed effect results of three continents Europe, North America, and South America. *** p<0.01, ** p<0.05, * p<0.1 for significance level of 1%, 5% and 10% respectively. Standard errors are in parentheses. Both country and year effects were included in the model specification.*

4.5 Robustness Checks

The diagnostics of the research model is important in studies that most especially employed secondary data. To ensure that results are robust, we run various diagnostics checks.

The study check for the possible multicollinearity problem which may affect the study's finding such as making t-statistics insignificant even when F-statistics is significant or making the standard errors of the estimators too large. From the correlation matrix, no multicollinearity issues is existing. The variance inflation factor (VIF) is run to confirm this, and the results show that all the variables have a variance inflation factor of less than 10 (see appendix table 1).

Also in constructing the indexes for our sustainable investment pillars; ENV, SOC, and GOV, using the principal component analysis, we checked for possible collinearity among the variables.

To ensure that our results are consistent we employed the two major indicators used by existing literature as proxies for banking stability. This means that it is unlikely that our model will widely differ from the studies that adopted either of them.

The study employed the two-step system GMM model for estimating the impacts of sustainable investment on banking stability at the global level. The system GMM is a dynamic panel data estimation model which is mostly preferred due to its ability to control for the fixed effect, endogeneity problem, serial correlation, and unobserved panel heterogeneity. However, until the validity of the instruments is established, it is impossible to trust the results of GMM (Stock et al. 2002). Likewise, autocorrelation can cause estimates to be inaccurate. We included several diagnostic tests, including the Arellano-Bond Test for second-order serial correlation [the AR (1) and AR (2)] and the Hansen test of over-identifying restriction, as recommended by Arellano and Bond (1991), to examine the instruments' reliability and the absence of autocorrelation. We, therefore, included AR1 and AR2 in our two-step system GMM results to ensure that there is no

bias resulting from first- and second-order autocorrelation. Using Roodman's criteria, we reject the null hypothesis of no serial correlation for all of our P-values for AR1, as shown in table 4.3, but not for AR2 (2009). In order to test the null hypothesis that the instruments are over-identified, we provided the P-values for the Hansen and Sargan tests of over-identifying restriction. The P-values do not rule out the possibility that the instruments were over-identified as the null hypothesis. Roodman (2009) claims that another indication of the reliability of instruments is when the number of groups in the model is greater than the number of instruments. The lagged dependent variables of our model are at a 1% significance level. From the results of our diagnostic test shown in table 4.3 our model also satisfactorily passes.

To determine the continental impact of sustainable investment on banking stability, the study also employed a fixed effect model. After rejecting the Hausman test's null hypothesis, which states that a random-effect model is preferable to a fixed effect model (see appendix table 2). The diagnostic test from our results in tables 4.4 and 4.5 after controlling for time and country effects in the model specification, showed that our F-statistics is significant at a 1% level indicating that there is a joint relationship existing between banking stability and its determinants. Thus, the independent variables account for the variations in the banking stability of each continent's banking sector. The adjusted R-square of each of the models showed that our independent variables (bank-level performance, financial structure, macroeconomic and sustainable investment) explain greater variations in the banking stability for each continent.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the conclusion for the study. It gives a summary of the study's findings. After drawing a conclusion from the summary, recommendations are made for policy direction and future studies.

5.2 Summary

Because the banking sector serves as a crucial financial intermediator in the financial market of the economy, facilitating the process of money creation, capital accumulation, payment services, and financing investment, banking stability are essential for economic growth. Stability in the banking sector reflects the confidence of customers as well as the institution. This is because customers and institutions that deposit their funds with the banks will feel secure. However, determining the factors that affect the stability of the banking sector is a question that needs to be answered. Over decades ago, investments in a firm by investors have been based purely on financial returns without considering the non-financial factors of the investment. Recently non-financial factors such as environment, governance, and social impact have become significant factors in investment decision-making. According to Bassen and Kovacs (2020), it is important for firms to understand the environmental, social, and governance analysis of firms as it affects the economy and creates risks and opportunities for investors. Therefore, using data from the World Bank Development Indicators (WDI) and Global Financial Development Indicators (GFDI), this study estimates the impact of sustainable investment on banking stability at the global level. It also analyses the other factors that

are determinants of banking stability such as bank-level performance, financial structure, and macroeconomic factors.

The study specifically aims to accomplish the following objectives: first, assess the impact of sustainable investment on banking stability globally, and second assess whether there are differences in the impact of sustainable investment on banking stability among the continents. To achieve these objectives, the study employed the two-step system GMM and the fixed-effect models.

For the first objective of the study (impact of sustainable investment on banking at the global level), the results from the analysis of the two-step system GMM show the following major findings:

The results indicated that NIM reduces insolvency risk in the banking sector but also increases non-performing loans. However, this happens in the absence of a proper financial structure. The finding of NII showed that higher banks' non-interest income improves the stability in the banking sectors and this support existing literature. The results also suggested that CAR reduces the insolvency risk hence improving the stability of the banking sector but could also positively affect the non-performing loans ratio which may cause the banks to become more unstable. The CIR result suggested that banking stability is enhanced when banks are more efficient in managing operational cost as well as reducing the level of default loans. The findings were consistent with previous studies.

For the macroeconomic factors variables, inflation was found to be one of the key contributing factors to banking instability. Thus, during inflationary periods, banks incurred higher operational costs and this reduces the solvency of banks making them more unstable. Inflation also increases the non-performing loans ratio of the banking sector. Also, unemployment significantly increased the non-performing loans ratio of the banking sector which affect the stability of banks. It also increases the insolvency risk of the banks in the absence of a better financial structure. In addition, the results showed that economic growth improves the stability of the banking sector. This is due to increased

productivity in the country which enhances the standard of living of the people hence a higher loan recovery rate. This finding is consistent with existing studies.

In terms of financial structure variables, the results suggested that BCON influenced banking stability significantly when LZSCORE is a proxy for banking stability but has no influence when NPL is used. Banking competition improves the stability in the banking sector as it reduces the non-performing loan ratio. The results were consistent with previous studies. The results from the size of the banking sector suggested that large banks are relatively stable compared to smaller banks. However, it could also affect the NPL ratio if large banks based on their size grant more loans, which makes them prone to failure. The results of the FBP indicated that an increased number of foreign banks in the banking sector of a country enhance the stability of the banks due to the increased competition that local banks are exposed to by the presence of these foreign banks.

The results of the sustainable investment pillars suggest an impact on banking stability. The environmental (ENV) pillar was found to positively correlate with LZSCORE and negatively significant to NPL. This result indicates that environmental effects contribute significantly to instability in the banking sector as the NPL ratio increases when new environmental protection laws are implemented or existing laws are made strict. The finding was in line with previous studies and the theory of physical and transition risk. The result of the social factor indicates that the social responsibility performed by banks is a form of self-enhancement as it contributes positively to their stability in the future. This is shown by a positive and a negative relationship with LZSCORE and NPL respectively. A positively significant was discovered between institutional and governance factor (GOV) and LZSCORE which suggests that banks in the banking sector are more stable when the institutional structures and governance system in the country are of good quality. This is

confirmed by a negative significant relationship found for GOV and NPL as a proxy for banking stability. This result is consistent with existing studies.

The following findings were drawn from the analysis of the data from the fixed effect model for the second objective:

The results suggested that NIM was positively significant to LZSCORE in four continents except for Australia which showed negative and in Africa no significant relationship was found. However, we found a positive relationship between NIM and NPL in Europe and Australia. The results indicated that NII has a positive relationship with LZSCORE in Asia, Europe, and South America and a negatively significant with NPL in Asia and Australia but a negative correlation was found between NII and LZSCORE in Africa and North America. CIR was negatively significant to LZSCORE as banking stability in Africa, Australia, North America, and South America and positively significant to NPL in Africa. However, a negative relationship was found with NPL in Australia.

For the financial structure indicators, the SIZE of the banking sector was positively significant to NPL in Africa and South America and negatively related to LZSCORE as banking stability in Europe. In addition, the results showed that BCON was negatively associated with LZSCORE in Australia and North America and negatively related to NPL in Europe. The LERNER index which represents competition in the banking sector exerts a positive impact on banking stability using LZSCORE as a proxy in North America and a negative impact on banking stability using NPL in Europe. The results suggest that foreign banks' presence in the banking sector positively affects banking stability in South America using LZSCORE as a proxy and negatively influences banking stability using NPL as a proxy in Europe.

In terms of macroeconomic variables, unemployment (UNE) was found to be the main factor contributing to increased NPL ratio in Africa, Europe and North America. This is shown by a positive relationship between NPL and unemployment. Inflation was positively significant with LZSCORE in Africa but negative in South America. For economic growth, a negative relationship was found for LZSCORE in Australia and a negative association was found for NPL in Africa.

For sustainable investment (pillars) which is the variable of interest for this study, a positive relationship was found for environmental and LZSCORE as a proxy for banking stability in Asia while a negative association was found in Africa and Australia. A positive correlation was found between the governance pillar and LZSCORE as banking stability in Asia and North America, but a negative relationship was found for social only in Asia. The results also indicated a negative relationship between banking stability using NPL and environmental pillar in Asia and a positive association for social and governance in Africa and Asia respectively.

5.3 Conclusion

From the study's findings at both the global and continental levels, the following conclusions can be drawn:

Bank-level performance indicators on average have impacts on banking stability at both global and continental levels which make them determinants of banking stability. The non-interest income and cost-to-income ratios are major indicators on which attention should be focused because these showed how efficient and effective banks were operationally in terms of managing costs and lessening the overdependence on a single source of income. However, the impact of bank-level performance indicators is dependent on the proxy used for banking stability.

The financial structure factors explain how a country's banking sector is structured. The results showed that foreign banks' presence in a country improves domestic banks' efficiency due to

enhanced technology and innovation. This makes the banks more stable as it creates competition among banks in the sector. The banking sector size of a country is not a conclusive determinant of banking stability because although some studies argue that large banks tend to be more stable compared to smaller banks, other existing studies including this study reject the "too big to fail" hypothesis. Banking concentration also influences banking stability. No relationship was found between financial variables and banking stability in the Asian continent. The impact of these indicators depends largely on the proxy for the banking stability and continents.

All three macroeconomic factors were found to impact banking stability at the global level which supports previous studies but none of them were found to influence banking stability in Asia while in other continents relationships exist for either one or two. This relationship exists relative to the proxy employed for banking stability.

The sustainable investment pillars which are variables of interest were found to be determinants of banking stability, especially at the global level. This showed that the impact of sustainable investment (ESG) is a global concern. However, at the continental level, the impact is not significant for all continents such as Europe and South America while others experience higher impacts depending on the proxy for banking stability.

Although there have been several studies on determinants of banking stability, most of these studies focus on banks' performance level indicators and macroeconomic factors without considering financial structure variables, others include financial structure and not the sustainable investment pillars. Studies that considered sustainable investment also study the pillars in isolation at the country level and without other variables used in this study. Therefore, this study is different from other existing studies, in that, the study includes sustainable investment pillars as determinants of banking stability at the global level as well as continental level.

5.4 Recommendations

The recommendations of this study are structured in two sections; first, for policy direction and second, for further future studies.

5.4.1 Recommendation towards Policy

The following recommendations are made based on the findings of the study:

In other to promote stability in the banking sectors national bank supervisors, regulators and policymakers should pay particular attention to banks' performance, macroeconomic indicators of the country as well as the financial structure of the banking industry.

The banking industry is a significant segment of the financial market and is crucial to a country's economic growth., therefore, government and regulators of countries as well as governing boards of financial institutions should ensure that governance ineffectiveness, as well as regulatory, institutional weakness, are resolved to enhance banking sector stability.

According to a review by the World Bank's Basel Committee and Bank for International Settlement (BIS) on Banking Supervisory Mechanisms, although Basel III offers regulators and bank risk management a flexible framework, most bank regulators have not used their supervisory framework to assess and evaluate the environmental risks on the banking stability. It is, therefore, recommended that the Basel Committee should formally recognize environmental risks as a current source of banks and banking stability systematic risk. Banks are encouraged to adopt the best practices in dealing with environmental issues, and regulators need to work with them to gather the necessary data that will enable them to carry out proper environmental risk analysis as well as keep track of it.

Social inclusion of banking firms in all facets of society such as ensuring gender equality, social protection, respect for human rights, etc, should be mandated by regulators, policymakers, and supervisors. This is important because it does guarantee the banking sector's long-term financial

stability. To ensure that banking institutions change their risk models to consider these aspects with prudence.

It would seem illogical if corporate leaders adopted comprehensively financially unstable, socially inclusive practices that could have a negative impact on the stockholders' value, therefore to ensure the stability of banks and improved return to stockholders it is recommended that bank management should determine the appropriate level of social inclusivity

Investors when making investment decisions should consider the environmental soundness, and social responsibility of the banks as well as the institutional quality and governance effectiveness history of the country most especially countries in Africa, Asian, North America and Australia as banks underperformed in an unconducive environment and become unstable.

5.4.2 Recommendations for Further Research

This study focus on the global level and continental analyses of banking stability and sustainable investment. Future studies could extend the analysis by looking at each of the pillars of sustainable investment in isolation at the country level to include more indicators without constructing a single index for them. This will give a fair understanding of how each index impact banking stability. In addition, similar studies can be replicated among the various bloc such as the Middle East and North Africa Countries, Middle-Income Countries, Sub-Sahara Africa, etc.

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APPENDIX

1. **Variance Inflation Factor**

	VIF	1/VIF
gov	2.3	.435
size	2.296	.436
nim	1.444	.693
nii	1.192	.839
env	1.148	.871
cir	1.141	.876
une	1.103	.907
bcon	1.101	.908
soc	1.094	.914
fbp	1.081	.925
car	1.078	.928
inf	1.073	.932
eg	1.066	.938
lerner	1.014	.986
Mean VIF	1.295	.

2. **Hausman (1978) specification test**

	Coef.
Chi-square test value	79.417

P-value	0.000

3. Names of Continent and Countries Used for the Study

Asia	Africa	Europe	Australia	North America	South America
Afghanistan	Algeria	Albania	Australia	Bahamas, The	Argentina
Armenia	Angola	Andorra	Fiji	Barbados	Bolivia
Azerbaijan	Benin	Austria	New Zealand	Canada	Brazil
Bahrain	Botswana	Belarus		Costa Rica	Chile
Bangladesh	Burkina Faso	Belgium		Dominican Republic	Colombia
Bhutan	Burundi	Bosnia and Herzegovina		El Salvador	Ecuador
Cambodia	Cabo Verde	Bulgaria		Guatemala	Guyana
China	Cameroon	Croatia		Haiti	Paraguay
Georgia	Central African Republic	Cyprus		Honduras	Peru
India	Chad	Czech Republic		Jamaica	Suriname
Indonesia	Congo, Dem. Rep.	Denmark		Mexico	Trinidad and Tobago
Iraq	Congo, Rep.	Estonia		Nicaragua	Uruguay
Israel	Côte d'Ivoire	Finland		Panama	Venezuela, RB
Japan	Djibouti	France		United States	
Jordan	Egypt	Germany			
Kazakhstan	Equatorial Guinea	Greece			
Korea, Rep.	Eswatini	Hungary			
Kuwait	Ethiopia	Iceland			
Kyrgyz Republic	Gabon	Ireland			
Lao PDR	Ghana	Italy			
Lebanon	Guinea	Latvia			
Malaysia	Lesotho	Luxembourg			
Mongolia	Libya	Malta			
Myanmar	Madagascar	Moldova			
Nepal	Malawi	Montenegro			
Oman	Mali	Netherlands			

Pakistan	Mauritania	North Macedonia			
Philippines	Mauritius	Norway			
Qatar	Morocco	Poland			
Saudi Arabia	Mozambique	Portugal			
Singapore	Namibia	Romania			
Sri Lanka	Niger	Russian Federation			
Syrian Arab Republic	Nigeria	Serbia			
Tajikistan	Rwanda	Slovak Republic			
Thailand	Senegal	Slovenia			
Turkey	Seychelles	Spain			
United Arab Emirates	Sierra Leone	Sweden			
Uzbekistan	South Africa	Switzerland			
Vietnam	South Sudan	Ukraine			
Yemen, Rep.	Tanzania	United Kingdom			
	Togo				
	Tunisia				
	Uganda				
	Zambia				
	Zimbabwe				

4. Definition of Variables Used for the study and Expected Sign

Dependent Variables	**Description/Measurement**		
Z-score	The insolvency risk of the bank is measured by the Z-score. It is computed as; Z-score = $\frac{ROA+CAR}{SDROA}$		
Non-Performing loan (NPL)	It measures the credit risk of the banks(the ratio of the non-performing loans to the total loan)		
Independent Variables	**Description/Measurement**	**Expected Sign**	
Bank Performance variables (Control)		Z-score	NPL
Net interest Margin (NIM)	It measures the profitability of the bank	+	-

Non –interest income (NII)	This measures the bank's non-interest income to total income (%)	+/-	+/-
Cost-income ratio (CIR)	This measures the cost-to-income ratio of the bank which shows the efficiency of the bank.	-	+
Regulatory capital ratio (CAR)	It measures the level of capital ratio held by the bank. It is estimated as bank regulatory capital to risk-weighted assets (%).	+	-
Macroeconomic variables (Control)			
Inflation (INF)	Consumer prices (annual %)	-	+
Unemployment (UNE)	It measures the level of unemployment in the country. It is estimated as total unemployment (% of the total labour force)	-	+
Economic Growth	This will be a proxy for the real GDP growth rate (%)	+	-
Financial structure variables			
Lerner index (Lerner)	The Lerner index is a commonly used measure of competition (market power) in the banking sector (Ozili 2018; Beck et al., 2013)	+	_
Bank Concentration (BCON)	It measures the assets of the three largest commercial banks to the total commercial bank assets in a country.	+/-	+/-
Size	It is measured as private credit by deposit money banks and other financial institutions to GDP	+/-	+/-
Foreign Bank Presence (FBP)	It represents the percentage of the number of foreign-owned banks to the total number of banks in the banking sector of a country.	+	-
Sustainable investment (ESG Pillars)			
Environmental		+	-
Social		+	-
Governance		+	-

5. **Indicators Used To Construct the ESG Indexes**

Variables	**Definition/ measurement**	**Sustainable investment Pillars**
Control of Corruption (COC)	Reflects opinions about how much public power is used for personal gain.	Governance
Government effectiveness (GE)	Reflects opinions on how effectively the government functions, how well the civil service is performing, and how politically independent it is.	Governance

Regulatory Quality(RQ)	It is measured by the regulatory index	Governance
Rule of Law Index (LEGAL)	It is measured by the rule of law index	Governance
Political Stability and Absence of Violence (PS)	Political Stability and Absence of Violence/Terrorism: Estimate	Governance
Human rights (HR)	Strength of legal rights index (0 = weak to 12 = strong)	Social
Population (POP)	Measures the population density of a particular location	Social
Access to Service (AS)	Access to electricity (% of the population)	Social
Gender Equality (GENDER)	The proportion of seats held by women in national parliaments (%)	Social
Emission and pollution (EP)	Measures the amount of CO_2 emissions into the atmosphere (metric tons per capita)	Environmental
Access to Clean fuel and technologies (ACFT)	Access to clean fuels and technologies for cooking (% of the population)	Environmental
Fossil fuel (FFEC)	Fossil fuel energy consumption (% of total)	Environmental
Electricity production from coal (EPC)	Electricity production from coal sources (% of total)	Environmental
Energy use(EU)	Energy use (kg of oil equivalent per capita)	Environmental
Methane Emission (ME)	Methane emissions (metric tons of CO2 equivalent per capita)	Environmental
Nitrous oxide emissions(NOE)	Nitrous oxide emissions (metric tons of CO2 equivalent per capita)	Environmental
People using safe sanitation services (PSSS)	People using safely managed sanitation services (% of the population)	Environmental
People using safe drinking water (PSDW)	People using safely managed drinking water services (% of the population)	Environmental
Renewable electricity (REO)	Measured as renewable electricity output (% of total electricity output)	Environmental
Natural capital management (NCM)	Adjusted savings: natural resources depletion (% of GNI)	Environmental
Terrestrial and Marine Protected areas (TMPA)	Terrestrial and marine protected areas (% of the total territorial area)	Environmental

Air pollution, mean annual exposure (PMPMA)	PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	Environmental
Forest Area (FA)	This measures the land area covered by forest (% of land area)	Environmental
Energy Use and Security (EUS)	This measures the proportion of energy consumption that is renewable	Environmental