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CSR and Bank Risk During Covid-19

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ABSTRACT:

Corporate Social Responsibility (CSR) has gained growing interest in recent years in the business sector globally. This effect is also present in the banking sector, which plays a significant role in the broader economy. An increasing volume of research focuses on CSR and its impact on the banking sector. However, the relationship between CSR and risk mitigation in the banking sector is inconclusive. Some studies show CSR to be a significant factor in bank risk reduction, while others do not find CSR to be a relevant factor in reducing risk for banks.

This study contributes to previous research by using multiple risk measures to create a comprehensive overview of the effects of CSR on bank risk. Specifically, this study focuses on the impact of CSR during the COVID pandemic. The impact of CSR on bank risk during a crisis period remains insufficiently explored in existing research. This study aims to contribute to existing research by analyzing various risk measures and CSR components within the context of a crisis.

The results of this study provide strong evidence of CSR's risk mitigation effects during a crisis period. CSR consistently decreases banks' default, portfolio, and liquidity risks. CSR and all its subcomponents are associated with risk mitigation. However, the regressions in this study have limitations such as limited sample size and emphasis on larger banks in developed economies. The topic should be studied further to confirm the effects.

The findings suggest that CSR can serve as an effective tool for mitigating banks' riskiness. Banks can strategically utilize CSR to enhance financial stability and gain competitive advantage during market instability. These insights are also relevant to many of the banks' key stakeholders. Regulators can implement them into policy decisions, while employees and investors can utilize this information to protect their interests during economic turmoil.

KEYWORDS: Corporate Social Responsibility (CSR), Environmental, Social, Governance (ESG), Z-score, Financing Gap Ratio (FGR), Risk Density (RD)

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1 Introduction

Corporate Social Responsibility (CSR) broadly relates to companies' actions that have a positive influence on the surrounding society. These actions address environmental or social challenges. Such factors are increasingly relevant in modern markets where the awareness of responsible practices is heightened. Research on sustainability and corporate responsibility in business has grown in recent years. This research examines how CSR contributes to tangible business value. In addition to research, CSR is often already incorporated in companies' business models. Consequently, studying sustainability can offer practical implications that can be utilized in business. Knowledge of these issues can be a source of competitive advantage for businesses or individuals.

The actions and guidelines of multiple international organizations, such as the United Nations (UN) and the Sustainability Accounting Standards Board (SASB), increase awareness of responsible business operations. These organizations are important links in defining the responsibility standards in business. For example, SASB standards claim to recognize the key issues related to sustainability for 77 industries (SASB, 2024). These standards are particularly relevant in the financial sector, where sustainability is becoming a key factor in business operations.

As CSR efforts become increasingly integrated into global business practices, the financial sector plays a key role in funding sustainability development. Given their central role in the economy, financial institutions contribute to economic growth and stability, making them an important subject of research. For example, Beck et al. (2000) find a positive correlation between financial intermediary development and productivity growth. Banking is also connected to stable economic growth by allocating the savings in the economy into investments (Galletta et al., 2022). Therefore, studying sustainability in the banking sector has potentially relevant implications for the whole economy.

Sustainability is a particularly relevant aspect in the banking industry compared to non-financial companies. Neitzert & Petras (2022) argue that this is due to the risk mitigation

effect of responsible business practices and banks' business models. Banks are particularly exposed to financial risks in the market. First, banks face the same financial risks as other companies in various industries. Additionally, banks are also exposed to the risks of their customers. These risks include factors that affect their clients such as credit and market risks. Banks' focus on responsible lending practices might lead to a reduction in both client-based and their own risks. Therefore, by using CSR as a risk management tool, banks are potentially able to affect risk on more levels compared to a non-financial company.

Further, the banks' lending policies and ESG development seem to have a deeper connection. Banks' lending policies are typically cyclical. The amount of lending increases in economically good times and drops in turbulent times. The reduction of lending during an economic downturn is a common risk-mitigating tool. Banks tend to decrease the supply of credit to avoid potential losses from defaulting clients (Cubillas & Suarez, 2018). This causes harm to the economy because in an economic downturn, businesses are often in need of credit from banks to survive the economic distress. The results of contracting the supply could lead to more defaults, unemployment, and other harmful economic consequences. Therefore, banks' contraction of supply during economic distress could make the downturn even worse. However, high ESG-rated banks tend to have different lending cyclicality than expected. These banks tend to reduce their credit supply less than banks with lower ESG ratings. (Abdelsalam et al., 2023). Thus, CSR in the banking industry can be a key tool in absorbing economic shocks.

This thesis aims to connect CSR with bank risk specifically during a financial crisis. The 2007 financial crisis demonstrated the effects of bank failures on the economy. The crisis in the banking sector was largely caused by excessive risk-taking. For example, Brunnermeier (2009) reports that the build-up of excessive risk was a major factor in developing the financial sector's vulnerabilities. Further, Wang et al. (2023) report the effects of peers on bank risk. They find evidence of a positive connection between bank risk between peers. Banks monitor and learn from other banks and make similar decisions

which leads to similar risk-taking behavior between them. Therefore, excessive risk-taking during the financial crisis could have partly been a result of learning between banks, leading to more widely spread risk-taking. CSR is one of the factors that could be implemented with banks' business models to reduce excessive risk-taking. Learning between banks could amplify the effect and contribute to preventing excessive risk-taking widely in the banking sector.

To mitigate the adverse effects of excessive risk-taking, banks are regulated by various policies designed to control risk. These policies aim to diminish the harmful influence of banks' excessive risk-taking on the economy. For instance, the Dodd-Frank Wall Street Reform and the Financial Policy Committee in the UK were established to mitigate excessive risks in financial institutions. (Baily et al., 2017) Banks also implement internal risk management practices in their operations. For instance, Equator Principles are internal control mechanisms that banks apply to decrease excessive risk. Policies and regulations are expected to place increasing emphasis on CSR factors. (Contreras et al., 2019)

Bank risk in this thesis is examined in the context of the Covid-19 pandemic. The COVID period is defined as the years 2020 and 2021 when lockdowns and the restrictions caused by the pandemic heightened the economic turbulence. For example, the global economic growth rate shrank by 3.1 percent. Additionally, the global trade volume decreased by over 8 percent. These effects indicate a significant disruption to the global economy. The crisis also had a major impact on banks globally, making it particularly relevant for analyzing its effects on bank risk. (Boubaker et al., 2022)

1.1 Purpose of The Study

The purpose of this study is to evaluate the effects of CSR on bank risk. This study intends to contribute to existing literature by analyzing comprehensively the effects of CSR on risk during a crisis period. This thesis builds on existing literature and provides additional evidence of the effects. The focus will be on determining CSR's impact on banks' default, portfolio, and liquidity risks. Banks' commitment to CSR is measured by the ESG score

provided by Thomson Reuters. ESG scores are further divided into smaller sub-components to evaluate their relative importance during a financial crisis. This thesis uses global banking data to study the issue.

1.2 Hypothesis Development

This section presents the hypotheses for this thesis. The hypotheses are developed to answer the research question and support the construction of this thesis. Hypotheses are also aligned with the existing research on the topic of this thesis.

Previous research, such as studies from Di Tommaso & Thornton (2020), Gangi et al. (2018), and Neitzert & Petras (2022) support the link between CSR and bank risk reduction. This thesis further extends the work of Neitzert & Petras (2022), who suggest that testing their results under different conditions such as catastrophes would be relevant. Liu et al. (2023) provide preliminary evidence concerning this issue, indicating that CSR reduces bank risk during a crisis. This thesis uses the Covid-19 pandemic as a context to assess the effects during market turbulence. To confirm the effects, this study employs several risk measures for a comprehensive analysis. Based on the discussed evidence, it is expected that banks with higher CSR engagement experienced lower risk during the Covid-19 pandemic.

H1 = Overall CSR reduces bank risk during the Covid-19 pandemic.

The second hypothesis focuses on the individual components of CSR. This hypothesis extends first by focusing on the individual pillars of CSR. Previous literature suggests that the individual pillars (Environmental, Social, Governance) tend to have inconsistent effects on banks' performance. Esteban-Sanchez et al. (2017) identify the governance pillar as the most influential pillar in generating returns in the banking sector. Neitzert & Petras (2022) and Danisman & Tarazi (2024) conclude that the environmental pillar is the driving factor in bank risk reduction. Previous studies frequently find one or two pillars

to contribute more significantly while other(s) are less relevant. Based on the evidence, the effects of individual CSR pillars on bank risk during a crisis are expected to be inconsistent, with certain pillars contributing to risk reduction more than others.

H2 = The environmental, social and governance pillars of CSR individually had significantly different effects on bank risk during Covid-19.

1.3 Structure of the Study

This thesis is organized as follows. First, the theoretical framework of the study is presented. Chapters three and four include an overview of practical issues and previous studies related to corporate social responsibility and the banking sector. After these sections, chapter five presents the data and statistical properties. Chapter six is the empirical section, showing the regression outputs and interpretations. Finally, chapter seven presents the conclusions of the thesis. AI tools, such as Grammarly, were used to improve the language of the thesis.

2 Theoretical Framework

This chapter analyzes the effects of CSR on the banking industry from a theoretical perspective. The key theories presented in this section are stakeholder and shareholder theories, social capital, and agency theory. The chapter concludes with a discussion of bank risk measurement.

2.1 Corporate Social Responsibility

CSR refers to companies' efforts to incorporate sustainable practices into their business models. These include various sustainability-related factors such as environmental and social issues. Furthermore, CSR is often defined by the voluntary nature of implementing these factors into a company's business model. CSR is increasingly viewed as a key tool for enhancing the relationship between a company and its stakeholders, including customers and employees. The increasing interest is demonstrated by the companies' CSR reporting. Over the past decade, the proportion of S&P 500 companies publishing sustainability reports has risen significantly, from 20% to 92% in 2020. (Nejati & Shafaei, 2023)

2.1.1 Shareholder and Stakeholder Theory

A traditional shareholder theory of finance claims that CSR operations are not essential for businesses. These actions should be handled by other members of society. Corporations should focus on the maximization of shareholder wealth, which would lead to optimal company performance (Friedman, 1970). Carroll (1979), however, analyzes business functions from a different perspective. He claims that companies should also consider the surrounding society. As members of society, businesses are also responsible for participating in the wellbeing of the surrounding community. The focus should not be solely on achieving economic targets. This perspective aligns with the stakeholder theory, which is opposite to the previously mentioned shareholder theory. This view emphasizes

the importance of managing relationships with all the stakeholders such as employees and suppliers. (Freeman, 1984)

Shareholder and stakeholder theories provide insight into how ESG factors can affect the overall bank risk-taking. High-ESG rated banks could align their actions with the stakeholder theory. The stakeholder theory implies that the motives of investing and non-investing stakeholders should be aligned. For example, employees do not necessarily value excessive risk-taking, which can be in the interest of shareholders. This alignment could lead to less risky banking practices. Reduced risk-taking may be reflected in the banks' investments, which could lead to lower risk-weighted assets in banks' portfolios. Another channel could be better customer loyalty, which decreases bank risk. (Di Tommaso & Thornton, 2020)

2.1.2 Agency Theory

The agency theory states that a company's shareholders are the primary group needing protection from the adverse effects of the agent-principal problem. (Fama & Jensen, 1983) Broadly, this aligns with the shareholder theory which considers shareholders the most important party of the company. The agency theory suggests that investments in CSR could be harmful to companies. This overinvestment view implies that CSR spending is not allocated optimally, leading to suboptimal performance. Instead, CSR spending is related to managers' opportunistic behavior. This view considers CSR spending to be a result of managers' desire to enhance their reputation at the expense of the company. (Chiaramonte et al, 2021). Thus, CSR spending represents overinvestment without real economic impact on banks' financial positions. This would imply that this thesis would not find a correlation between CSR and a decrease in bank risk.

Agency theory can be further extended to consider a wider range of stakeholders. This model was proposed by Hill and Jones (1992). They extend the model and propose the stakeholder-agency theory. This model acknowledges that a company consists of multiple stakeholders as presented by the stakeholder theory. The stakeholders of the

company create a nexus of contracts within the company. This nexus of contracts creates disagreements between the stakeholders involved in the company's business. In the banking sector, key stakeholders are parties such as regulators, depositors, and shareholders. Disagreements might arise, for instance, between regulators and shareholders. Regulators might prioritize risk reduction and sustainability development, whereas shareholders may favor increased risk-taking. The information between stakeholders can also be asymmetrical and they can have leverage to influence others. These tensions can create agency-like problems in the company. Board-level governance can mitigate this issue by aligning the interests of agents and principals. Therefore, CSR and specifically the focus on governance could be a factor in aligning shareholder interests, leading to reduced risk. Aligning the interest of a wider range of stakeholders would imply that the CSR investments would be more than just managers' selfish actions and could contribute to genuine risk mitigation.

2.1.3 Social Capital

Another key theory related to CSR is social capital. Social capital has been developed in the field of sociology and political science by Coleman (1988) and Putnam (1993). Social capital refers to the norms and cooperative networking density inside a community. In addition to sociology and political science, social capital is a highly relevant aspect in business, and it has relevant implications for this thesis.

Social capital is reported to be higher in firms located in high social capital regions, typically located in developed economies. Therefore, the social capital of an individual bank should reflect the amount of social capital of its region. Managers of companies in high social capital regions tend to be more altruistic, which should lead to higher CSR commitment in these firms. Although the top managers are key figures in implementing CSR in firms' operations, it is not the only avenue for CSR implementation. Social capital can also be connected to the previous key theories of this thesis. Stakeholder theory suggests that all the stakeholders influence companies' business. The stakeholders of a specific company should also be reflecting the social capital of its region. Even if the top

managers were less altruistic, the stakeholders of a region containing high social capital could shift the company to a higher CSR commitment. (Jin et al., 2017)

Social capital is found to be linked broadly to key business areas. Hasan et al. (2017) reports that the financing conditions are higher in places with higher social capital. This result applies to both public and private financing markets. Additionally, Jha and Shen (2015) find that the audit fees in regions with higher social capital are lower compared to regions with lower social capital. Social capital is also related to lower corruption. These findings suggest that banks are also impacted by social capital, and it could affect the results of this thesis.

The direct connection between banks' risk and social capital has been previously studied by Jin et al. (2017). They specifically analyzed the relationship between bank failures and social capital. They also explored the mechanisms causing social capital to affect banks' stability. They concluded that high social capital leads to less prominent risk-taking behavior and bank failures. In their study, social capital is also defined by the region a bank is operating in. The data in their study is skewed to the high social capital regions due to the CSR data availability in low social capital regions, potentially distorting the results. Jin et al. (2017) find that reduced riskiness in high social capital banks was driven by factors such as better-quality reporting and borrower selection.

The previous literature finds a connection between social capital and companies' financial variables. The company's risk is one of the variables affected by social capital. Therefore, it is reasonable to assume that social capital could be an important factor in determining the relationship between CSR and risk measures in this thesis. The data in this thesis also has similar issues with the study from Jin et al. (2017). The data availability leads to a skewed bank selection. There are considerably more banks operating in high social capital regions compared to low social capital regions. Thus, social capital could be a factor in finding a negative relationship between CSR and bank risk.

2.1.4 Bank Risk Measurement

Existing literature uses various measures for analyzing bank riskiness. Risk measures are typically derived from banks' financial statements or take a market-based approach such as Merton's distance to default. (Chiaramonte et al., 2021) The choice of risk measures is crucial for the quality of the analysis. This chapter presents the background on measuring bank risk and the selection of bank risk measures.

Bank risk is often analyzed by evaluating banks' probability of defaulting. Some of the most common variables in analyzing bank default risk are CDS spreads, Z-scores, the amount of non-performing loans, and loan loss reserve ratios (Lee et al., 2020). Studies often include multiple risk measures to comprehensively analyze riskiness. Di Tommaso & Thornton (2020) use CDS spreads, Z-scores, and the ratio of non-performing loans to total assets, Li et al. (2023) implement non-performing loans to total assets and financing gap ratio approach, while Neitzert & Petras (2022) focus on Z-scores and the ratio of risk-weighted assets to total assets. Z-score in the context of bank riskiness typically refers to either Altman's Z-score or the sum of return on assets and capital adequacy ratio scaled by the volatility of return on assets. This thesis implements the latter approach which is present in a large body of research. This measure is derived from the original work of Roy (1952) and later developed further in subsequent studies.

The Z-score is a component of three figures from banks' balance sheets: net income, total assets, and shareholders' equity. The return on assets (ROA) is calculated by dividing net income by the bank's total assets. Capital asset ratio (CAR) is calculated by dividing equity by the bank's total assets. To calculate the Z-score, the standard deviation of ROA is derived from the base ROA represented by $\boldsymbol{\sigma}\,ROA$, in the calculation below. The output from the calculation gives a figure that represents a bank's default risk. The Z-score can be interpreted as a value, how many times the standard deviation of ROA needs to fall from its mean until there is no equity left. Previous studies such as Citterio & King (2023) further normalize the values of Z-score for the regression analysis. This

thesis normalizes the Z-scores using the following method: (Z Score(i) - Minimum Z Score) / (Maximum Z Score - Minimum Z Score).

$$(1) \quad Z\text{-}score = \frac{ROA + CAR}{\boldsymbol{\sigma}\, ROA}$$

The Z-score is widely used to analyze bank risk, but it has also faced criticism. The criticism is related to the fact that the Z-score is accounting-based. This means that all the necessary values are derived from banks' balance sheets. The main issue with accounting-based figures is that they reflect the past situation, instead of the current financial position. As a result, the Z-score itself could also be backward-looking and inaccurate (Hafeez et al., 2022). However, the Z-score has also gained backing, and research supports its use as a risk measure. For example, Chiaramonte et al. (2016), conclude that 76% of bank defaults can be predicted by using the Z-score. Therefore, the Z-score as a proxy for banks' default risk is justified in this thesis.

However, focusing solely on the Z-score and default risk would not necessarily depict banks' overall riskiness accurately as shown by previous studies using multiple proxies for risk. Regulators are a relevant party in managing bank risk, so incorporating a regulatory point of view can potentially enhance risk analysis. Previous studies such as Aldasoro et al. (2022), Oino (2021), and Neitzert & Petras (2022) implement regulatory variables in analyzing bank riskiness.

The regulatory risk measure in this thesis is risk density (RD). RD is a variable that is calculated from the data of banks' balance sheets. Specifically, risk-weighted assets and total assets. Total assets are used in the formula for RD to scale risk-weighted assets by bank size. The calculation of the risk-weighted assets follows a standardized method. Every asset that banks have is multiplied by the risk weight determined by the regulators.

$$(2) \quad RD = \frac{Risk\text{-}weighted\text{-}assets}{Total\text{-}assets}$$

Risk-weighted assets are used as a variable to assess bank risk and capital sufficiency (Leslé & Amramova, 2012). Considering this information, using RD to assess bank riskiness is appropriate. However, risk-weighted assets has also gained criticism as a tool for measuring bank risk. Leslé & Amramova (2012) highlight some of the possible concerns about the use of risk-weighted assets. Concerns include inaccurate risk measurement, particularly an underestimation of bank riskiness. They note that risk-weighted assets scaled by total assets has decreased in times of market turbulence, which might indicate inaccuracy as a risk measure. Therefore, the reliability of analysis using RD as a risk measure can be questioned. However, using risk-weighted assets in assessing bank risk is valuable information from a regulatory perspective. Its use is relevant in the empirical section of this thesis as a part of a more comprehensive analysis while remembering the limitations of this measure.

In addition to default probabilities and regulatory perspective, banks' liquidity is another factor significantly impacting bank risk. Jasiene et al. (2012) mention that while banks face many types of risks, liquidity risk is one of the most influential and can lead to insolvency. Furthermore, Jasiene et al. (2012) emphasize the influence of liquidity risks during financial distress, making its inclusion in the analysis of bank risk during the COVID particularly relevant.

Mohammad et al. (2020) use a financing gap ratio (FGR) to describe banks' liquidity risk. The financing gap refers to the amount of loans a bank must finance outside its deposits by other sources such as short-term borrowing. This implies that banks must expose themselves to liquidity risks of different funding sources that can potentially be unstable. This thesis implements the financing gap ratio described in the study of Mohammad et al. (2020). Li et al. (2023) use the same approach further confirming its validity in analyzing liquidity risk. All the values for FGR (total loans, total deposits, and total assets) can be derived from banks' financial statements, which makes the measure relatively

easy to calculate. The financing gap is calculated as a subtraction of deposits from loans. It is then further scaled by total assets similarly to the RD risk measure.

$$(3) \quad FGR = \frac{Total\ loans - Total\ deposits}{Total\ assets}$$

3 Practical Issues Related to Corporate Social Responsibility

3.1 CSR and Sustainable Banking Practices

The European Commission defined CSR as actions to implement sustainability issues in companies' business. Further, the definition emphasizes the voluntary nature of the implementation (The European Commission, 2011). The idea of CSR stems from the ideology that the effects of businesses are not only related to the immediate tangible factors such as products or services created. Instead, businesses have a larger impact on the social sphere surrounding companies.

However, companies do not invest in CSR solely for its positive impact on society. Investments in CSR can provide a competitive advantage, that brings benefits to companies. Investments in CSR can create tangible benefits including cost savings and better access to capital (The European Commission, 2011). Furthermore, Mushafiq et al. (2023) mention benefits such as the attraction of top talent and an increase in the company's goodwill.

Multiple studies in recent years have studied the positive effects of CSR in various business areas. However, the effect of CSR on businesses can also be uncertain or even negative. For instance, Barnea & Rubin (2010) discuss CSR as a conflict between shareholders. They conclude that CSR seems to reduce profitability and decrease shareholder value. Nguyen & Nguen (2021) report that investments in CSR can lead to increased risk. This study was conducted in the banking industry, which is particularly relevant to this thesis as the results directly conflict with the expectations of the first hypothesis.

Banks have increasingly integrated the principles of sustainable finance into their business models. The target is often an improvement in key areas such as employee satisfaction or customer loyalty, leading to enhanced performance. A commonly utilized tool is the ESG framework, which promotes responsibility by dividing CSR into subsections and focusing on the development in these areas. (Batae et al., 2021)

Lending is one of the key areas where banks can integrate ESG factors and potentially create benefits. Implementing ESG in lending could reduce lending into controversial industries such as gambling or weapons which influence banks' risk. Banks can also allocate more capital to institutions that promote responsible development such as funds incorporating socially responsible investment practices. An important factor is also the ability to communicate the developments in the banks' responsibility. The policies should be acknowledged by its customers and business partners. (Batae et al., 2021)

The implementation of sustainable practices in the banking sector is affected by various policies and regulations. While some of these policies and regulations are implemented by the banking industry itself, others are controlled and measured by other authorities. One example of a voluntary framework is the Principles of Responsible Banking guidelines, which are adopted by over 500 banks. This framework uses the United Nations Sustainable Development Goals and the Paris Climate Agreement as the guiding principles for sustainability development. The goal is to align future visions and strategic decisions toward sustainability. The Principles of Responsible Banking covers sustainability topics broadly on strategic, portfolio, and transactional levels. The Global Recording Initiative provides additional standards about environmental, social, and governance reporting. Banks are increasingly adopting these standards for their sustainability reporting. (Manos et al., 2024)

The effects of sustainability are also noted by regulatory authorities. For example, the European Central Bank incorporated sustainable banking practices in the stress testing of banks in 2022. The stress tests focused particularly on the environmental aspect of the ESG framework. The European Banking Authority published a further analysis of ESG in risk management. This analysis specifically targeted credit institutions and investment companies highlighting regulator's growing interest in CSR as a relevant bank risk-controlling tool (Chiaramonte et al., 2021). Overall, the policies and authorities' focus on

CSR creates an environment where sustainability has become one of the main themes in the banking industry.

3.2 CSR Dimensions and Materiality

Corporate social responsibility is commonly characterized by the ESG framework. The empirical part of this study will also use the ESG framework to analyze CSR across different dimensions. One of the first ideas about these dimensions was presented by Elkington (1998). He introduced the triple bottom line theory that included environmental, social, and economic dimensions. The framework has not noticeably changed from that.

Today, the ESG framework continues to be structured around three distinct pillars. Environmental aspects concern problems like climate change, biodiversity, and water scarcity. The social pillar refers to human-related problems such as human rights, gender equality, and labor standards. The governance pillar addresses issues like board composition, corruption, and lobbying. Together, these pillars cover a wide range of sustainability issues. (SASB, 2024)

The vast number of ESG issues raise concerns about the relevance of all ESG factors to individual companies. Eccles & Serafeim (2013) report that the relevancy of ESG information likely varies across companies and industries. The problem of ESG factor relevancy is also described as ESG materiality. To address this issue, SASB provides a materiality map that identifies relevant factors for specific industries. (Khan et al., 2015)

One of the industries analyzed by SASB is the financial industry which is further divided into subcategories such as commercial banks, insurance, and asset management & custody activities. The most relevant subcategory for this thesis is commercial banking. SASB finds five sustainability issues as the most relevant concerning commercial banking. These are data security, access & affordability, product design & lifecycle management, business ethics, and systemic risk management. SASB emphasizes social and governance issues over environmental aspects. SASB does not find any issues to be material under

the environment category. However, within product design & lifecycle management, environmental issues are present in banks' lending practices section. Banks should be aware of the environmental issues in lending due to their positive effect on revenue streams and transparently disclose how these issues are incorporated in lending. Together, these suggestions form a sustainability framework that banks should prioritize according to SASB. (SASB, 2024)

3.3 CSR Reporting

An important topic around CSR is how companies report their CSR engagement. CSR reporting can be based on different frameworks such as the United Nations' framework of ten principles (United Nation's Global Compact, 2024). The disclosure of CSR information also varies by company location. Some countries have mandatory CSR reporting guidelines, while others do not have similar responsibilities. Krueger et al. (2024) studied the effects of these mandatory CSR disclosure requirements. They mention that in 2022, 38 countries globally had some form of CSR disclosure requirements. Mandatory CSR reporting is expected to increase in the future.

One example of mandatory CSR reporting was implemented in 2023 by the European Union. In January 2023, the European Union implemented a Corporate Sustainability Reporting Directive (CSRD) requiring specific companies to disclose CSR information. Disclosure is required from large companies, listed SME companies, and companies outside the European Union making over 150 million euros yearly in the European Union market. The reporting is required to follow the European Union Sustainability Reporting Standards (ESRS). The table below shows the reporting requirements according to ESRS. ESRS focuses mainly on environmental and social aspects with five and four reporting requirements, respectively. The governance pillar includes a single reporting requirement which is business conduct. (The European Commission, 2023)

Figure 1. ESRS Reporting Requirements

ESRS E1	Climate change
ESRS E2	Pollution
ESRS E3	Water and marine resources
ESRS E4	Biodiversity and ecosystems
ESRS E5	Resource use and circular economy
ESRS S1	Own workforce
ESRS S2	Workers in the value chain
ESRS S3	Affected communities
ESRS S4	Consumers and end-users
ESRS G1	Business conduct

Despite many sustainability reporting requirements, it is not always mandatory. Companies disclose ESG reports voluntarily without mandatory requirements. Companies engage in voluntary reporting to seek benefits. These can be categorized into specific areas such as managerial and economic incentives (Ferrell et al, 2016). However, there are also other influential factors like societal norms, culture, and normative pressures. Xiao et al. (2024) call these informal institutional factors which can lead companies to report CSR engagement without economic incentives.

ESG engagement is traditionally disclosed in annual reports and newspapers. However, platforms such as social media enable companies to engage in digital CSR reporting which deviates from traditional measures. For instance, Alhumud et al (2024) conclude

that social media platforms can effectively create consumer trust through CSR reporting and lead to economic benefits. Furthermore, Macca et al (2024) studied the engagement of CSR disclosure on financial institutions' social media accounts. They found that reporting employee diversification and employee practice information is associated with positive engagement with the banks' social media accounts.

3.4 ESG Ratings

Assessing a company's sustainability requires a specific CSR measure that evaluates a company's commitment to the principles of CSR. The most widely used standard is ESG ratings, which are also a core part of the empirical section of this study. The ESG rating industry has grown along with the increased demand for ESG data. There are now over 600 active ESG rating agencies, reflecting the growing demand for sustainability data. Major ESG rating providers are companies such as Thomson Reuters and MSCI. (Hu et al., 2024)

The ESG ratings are still a relatively new concept in finance. The ESG rating industry has developed some positive aspects like the fact, that the rating providers are not paid by the assessed companies reducing the risk of companies shopping for favorable ratings. However, the infancy of the ESG ratings industry also creates problems. A key issue is a lack of universally agreed ways to rate the sustainability of a company. Sustainability rating techniques vary significantly between providers. This issue causes diverging ratings between providers. (Berg et al, 2019)

Berg et al. (2019) studied the problem of rating divergence using six major rating providers and concluded that the correlations between them were low, ranging from 0.38 to 0.71. Berg et al. (2021) found a pairwise correlation between providers to be 0.36 on average using seven major providers. Sometimes significant rating divergence causes confusion in the market. One example is MSCI's high environmental rating for Tesla in 2018, while FTSE came to an opposite conclusion about Tesla's environmental sustainability (Mackintosh, 2018). Berg et al. (2019) conclude that the measurement is the main

source of disagreement between the rating providers. This hints that the measurement of the ESG attributes is imperfect. Billio et al. (2021) finds that rating agencies use different metrics leading to inconsistencies in defining ESG characteristics, attributes, and standards which confirms the conclusions of Berg et al. (2021).

This measured ESG rating divergence is often referred to as ESG rating confusion. The ESG rating confusion can have a significant effect on business research. Avramov et al. (2022) studied the connection between ESG rating confusion and the stock market. They conclude that ESG rating confusion significantly affects factors such as risk-return tradeoff measurement and economic welfare metrics. Chatterji et al. (2016) suggest that all previous studies utilizing ESG ratings should be reassessed due to the disagreement between providers. Consequently, ESG ratings should be used with caution in academic research,

In addition to scientific research, the divergence in ESG ratings influences companies' decision-making. For example, the divergence between providers can influence investments in CSR. Berg et al. (2021) argue that inconsistent ratings from the providers can lead to underinvestment in CSR and influence CEO compensation. Inconsistent ratings give mixed signals about the actions needed to improve ratings, decreasing companies' willingness to invest in CSR. The divergence also creates problems with CEO compensation packages. The contracts are difficult to fulfill due to unclear definitions of CSR. The CEO might optimize some aspects of CSR but miss targets in other key areas.

Due to ESG data reliability issues, empirical research is hard to conduct. ESG rating confusion is likely present also in the banking data used in this study. This study uses Thomson Reuters' ESG data which can potentially provide different results than data from other providers. When analyzing the results of this thesis, the reliability of the data should be considered.

4 Previous studies

This section reviews prior research on CSR within the banking industry. It will introduce several studies taking various perspectives on this topic. While the focus of this thesis is on CSR and bank risk, this section provides a more comprehensive overview of the effects of CSR on the banking industry.

4.1 CSR and Bank Risk Management

The first papers are related to the connection between CSR and bank risk management. Numerous studies have examined CSR and its ability to decrease risk for non-financial companies. However, the connection between CSR and risk management in the banking industry is not as extensively researched. One of the earliest studies on this topic by Gangi et al. (2018) uses the Z-score as a risk measure. They find a connection between CSR and an increase in Z-score, indicating that CSR contributes to bank risk mitigation. They argue that the connection to risk reduction could be related to various factors. One possibility could be more efficient use of resources compared to the low CSR firms. Other factors include enhanced reputation and customer loyalty, leading to decreased risks.

Di Tommaso & Thornton (2020) add to the previous paper by including additional risk measures and by focusing solely on the European banking sector. The risk measures used are CDS spread, Z-score, and ratio of non-performing loans to total loans. The results are consistent with Gangi et al. (2018). CSR is related to decreases in all the risk measures. However, the decreases in the risk measures are not large. Liu et al. (2023) confirms the findings of Di Tommaso and Thornton (2020), concluding that CSR is related to a reduction in non-performing loans. They used a sample from the United States which is evidence that the effects of CSR on risk are not country-specific.

Previous studies from Di Tommaso & Thornton (2020) and Gangi et al. (2018) found a strong connection between ESG scores and increases in banks' Z-scores. Galletta & Mazzu (2023), also use Z-scores as a proxy for bank risk. However, instead of using ESG

scores, they use the number of ESG controversies for measuring banks' commitment to the principles of CSR. They conclude that a lower number of ESG controversies were associated with higher Z-scores. These findings provide further evidence about CSR's risk mitigation ability.

Another relevant study concerning CSR and bank risk was conducted by Neitzert & Petras (2022). They used the Z-score as a proxy for bank risk like many previous studies, but they also contributed by adding risk density as a factor to assess bank portfolio riskiness. The results are mostly consistent with previous studies. CSR is found to have a connection with increased Z-score, indicating lower default risk. Also, risk density showed a negative relationship with CSR, suggesting that CSR was associated with decreased portfolio risk. Neitzert & Petras (2022) added to the previous literature also by analyzing the effects of the individual pillars of ESG on risk density and Z-score. The individual pillars had varying effects on these risk measures. The environmental pillar strongly correlated with a reduction of risk in both risk measures. In contrast, the effects of the social and governance pillars were weak. Therefore, the environmental pillar was found to be the driving factor in reducing bank risk. This variation in performance across individual pillars justifies their separate analysis in this thesis.

Basel Committee also emphasizes the importance of CSR in risk management and highlights the connection between risk reduction and CSR in their publication in 2021. (Basel Committee, 2021) This confirms previously presented results that consistently find evidence of CSR and bank risk reduction. However, the number of studies in this area is still limited, as noted in many of the previously presented papers such as Di Tommaso & Thornton (2020), and Neitzert & Petras (2022). The lack of studies concerning CSR and bank risk coupled with mostly small sample sizes in developed countries makes drawing conclusions difficult. Therefore, more evidence is needed to confirm the effects.

4.2 CSR and Bank Financial Performance

The following paragraphs discuss banks' financial performance and its connection to CSR. This problem is more widely studied than CSR's connection to bank risk. It also helps to gain a broader understanding of CSR effects on the banking industry. Additionally, some of the risk measures are connected to banks' financial performance. For example, several previous studies used Z-score as a measure of default risk. The key component of banks' Z-score is the return on assets which is related to the banks' financial performance. Therefore, financial performance influences bank risk which is the focus of this thesis.

One significant study related to bank financial performance was the paper by Wu & Shen (2013). They used return on equity, and return on assets, to represent banks' financial performance. They found a positive connection between the overall CSR and bank financial performance. This indicates that high CSR leads to better financial performance measured by variables such as return on assets which is also a component of the Z-score. Wu & Shen (2013) also record decreases in non-performing loans consistent with multiple studies in the previous section. Agnese et al. (2024) confirm these findings on bank financial performance. They use similar measures for bank profitability, which are return on assets, return on equity, and net interest margin. However, instead of using ESG scores, they used ESG controversies as a proxy for bank responsibility. Still, the results remained consistent with Wu & Shen (2013). They found that a decline in ESG controversies is associated with an improvement in financial performance. Hojer & Mataigne (2024) add to the previous studies by suggesting a non-linear relationship between CSR and financial performance. They argue that small and moderate CSR expenditure does not increase financial performance and can even cause worse performance. Instead, significant emphasis on CSR positively differentiates banks from others and is associated with better financial performance which was measured using return on average equity in this paper.

The second hypothesis of this study is related to the individual pillars of ESG and their relative performance. Multiple studies such as Esteban-Sanchez et al. (2017), study CSR

effects from this perspective focusing on financial performance. Esteban-Sanchez et al. (2017) conclude that the performance of different CSR dimensions varies. They find that the governance pillar is specifically important in generating returns and therefore enhanced financial performance. They also report that the effect of the governance pillar on financial performance diminished during the 2007-2008 global financial crisis. This is a relevant finding concerning the empirical section of this study. Batae et al. (2021) also find that the ESG dimensions have varying effects on financial performance. They find a positive link between the environmental pillar and improved financial performance. In contrast, social responsibility and governance pillars are not related to better performance in their analysis. Nizam et al. (2019) concentrate only on the effects of environmental and social dimensions on banks' financial performance. They found a positive connection between both presented factors and financial performance. These papers find conflicting results highlighting the inconsistencies in ESG dimension performance. These findings support the second hypothesis of this study.

Previous discussed studies mainly used European and North American banks creating possibly a skewed perspective on CSR and bank financial performance. The sample in this thesis is not limited to Europe or the United States. Therefore, the following papers discuss the effects of CSR on the bank financial performance in emerging countries. Azmi et al. (2021) conclude that the amount of CSR spending is important in determining banking performance in emerging countries. They found that low levels of ESG activity led to improvements in performance. In contrast, high levels of ESG spending tend to diminish performance. This is contradictory to the findings of Hojer & Mataigne (2024) who reported an inverse relationship between CSR spending and financial performance in the European banking sector. Siueia et al. (2019) focus on the sub-Saharan African banking sector. They find that the positive CSR disclosure index explains banks' rising financial performance. Additionally, they argue that a country's development is a significant factor in linking CSR and financial performance. Bihari & Pradhan (2011) analyze the connection between CSR and financial performance in the Indian banking sector. They found that CSR awareness and spending have increased significantly in Indian banks. They conclude

that this development has had a positive impact on banks' financial performance in India. Ramzan et al. (2021) focus solely on Pakistan's banking sector. They analyze how CSR practices affect three distinctive figures (financial performance, financial stability, and financial inclusion). The connection between CSR and financial performance is found to be positive also in this paper.

4.3 CSR and Banking Industry During Financial Crises

The impact of CSR on banking during a financial crisis is an underexplored topic. However, some studies have examined this relationship. The following paragraphs present studies with insights into CSR's overall effects on banking during market crises. The studies are not focused on a specific area such as risk, instead the goal is to give an overview of the effects from multiple perspectives.

Tarazi & Danisman (2024) studied the effect of CSR on banking during financial turmoil. They focus on analyzing how CSR affects bank lending during a crisis. The sample consists of European banks and crisis periods are the global financial between 2007-2009 and the European sovereign debt crisis between 2010-2012. They conclude that banks with higher ESG scores perform better than banks with lower ESG scores. Banks with high ESG scores also reduce lending less than low-ESG banks during crises. Danisman & Tarazi (2024) also identify additional findings about the ESG dimensions. They find that the driving factor for the positive effects during crises is the environmental pillar. This result is consistent with Neitzert &Petras (2022) and Batae et al. (2021) who also found the environmental pillar as the most influential factor in bank risk reduction and financial performance. Furthermore, the result provides support to the second hypothesis of this thesis.

Li et al. (2023) conducted another relevant study around this topic. Their focus was on credit and liquidity risk during financial crises. They concentrated specifically on ES activities without including the governance aspect in the study. They found a risk-mitigating effect of ES activities on both liquidity and credit risk during a crisis period. They

argue that stakeholder-centered culture and social capital are avenues that enable the positive effects of ES-activities to transfer into tangible risk reduction in the banking sector. Chiaramonte et al. (2021) report consistent findings with those of Li et al. (2023). They used distance to default as the only risk measure in their analysis. They concluded that overall ESG was found to significantly mitigate default risk during a financial crisis. Additionally, Chiaramonte et al. (2021) finds evidence that all the individual pillars of ESG are related to risk mitigation during a financial crisis. The effect of individual pillars on risk is present only during a financial crisis and diminishes during normal times. They also argue that high levels of CSR are associated with better stakeholder engagement, contributing to risk reduction. This supports the suggestion from Li et al. (2023), which assumed stakeholder-centered culture as a driving risk reduction factor.

Chen & Chen (2024) studied the CSR's effects during a crisis period from a different perspective. Their focus was specifically on liquidity creation in the banking sector. They find evidence that CSR reduces the amount of liquidity creation during a crisis period. This means that banks with high ESG scores tend to avoid risks more during turbulent times compared to low-ESG banks. They argue that the risk reduction in high-CSR banks is driven by concern for local communities and banks' employees. Higher risk-taking could expose these stakeholders to increased risk which is not accepted. This confirms the stakeholder perspective mentioned by Li et al. (2023) and Chiaramonte et al. (2021) as an influential factor in risk reduction. Further, Chen & Chen (2024) find that the effect on liquidity creation is stronger for banks with lower Z-scores before the crisis. This suggests that risky banks with high ESG scores before a crisis tend to be the most cautious about their risk-taking during periods of market distress.

5 Data and Descriptive Statistics

The following section discusses the selected data of this study. The section presents the data and variables in detail. Additionally, the relevancy of variables in bank-related analysis is discussed. The chapter concludes with descriptive statistics and correlation matrix tables.

5.1 Data

The empirical data includes ESG data, banks' fundamental data, and macroeconomic data. The sample consists of banks globally, with the United States representing the largest group, comprising 34 banks. The total amount of separate banks is 158. The table on the following page shows the distribution of banks by country.

Table 1. Banks by country

Country	*Observations*
US	34
Japan	20
China	13
UK	9
Taiwan	8
Australia	6
Malaysia	6
Canada	5
Italy	5
Germany	5
India	5
Thailand	5
Spain	4
The Philippines	4
South Africa	4
Israel	4
France	3
Austria	3
Sweden	3
Poland	3
Switzerland	3
Denmark	2
The Netherlands	2
Indonesia	2
Ireland	2
Türkiye	2
Greece	2

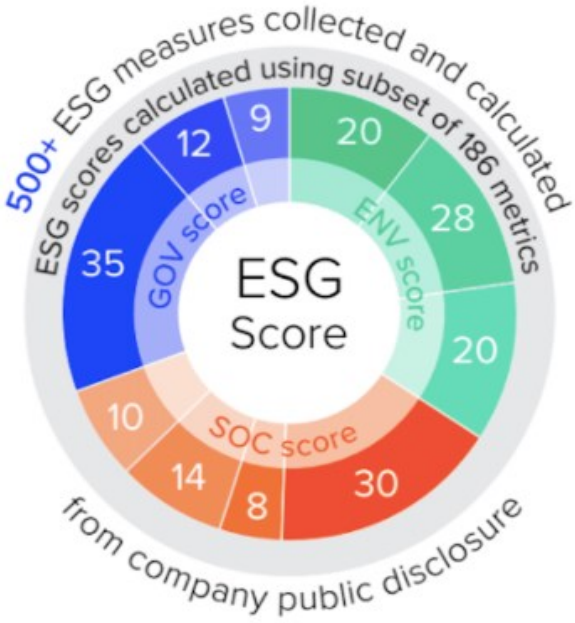
The data covers the period from 2010 to 2021. A longer timeframe would have been beneficial for the analysis. However, the ESG data in the banking sector is scarce before the year 2010. Thus, this period is used in the empirical section. The COVID period refers to the years 2020 and 2021.

5.1.1 CSR data

To study how CSR affects banks' risk, appropriate measures of CSR commitment are required. In this study, banks' responsibility is captured in ESG scores. These include an overall ESG score and three individual dimensions of ESG. The overall ESG score, and the individual pillars are obtained from Thomson Reuters Refinitiv ESG Database. The combined ESG score consists of over 450 metrics that are calculated to assess companies' responsibility. The data for the ESG scores are collected from public disclosures of the analyzed companies (Refinitiv, 2024).

The overall ESG score is a combination of individual pillars and is referred to as ESG-combined. In addition to the overall ESG score and in line with the second hypothesis, individual pillars are used to determine if there are inconsistencies in the effects of subcomponents on banks' risk. The ESG scores are further divided from environmental, social, and governance pillars into ten categories in the Thomson Reuters database. These include categories such as emissions, workforce, and management. These subcategories are given different weights based on the metrics available. For example, the emissions subcategory uses fewer metrics than the management subcategory. As a result, emissions get a lower weight than the management. The figure below the paragraph visualizes the comprehensive ESG score and the construction of environmental, social, and governance pillars. For instance, the environmental score consists of three subcategories, which are resource use, emissions, and innovation. The figure also shows how many metrics each subcategory uses. Resource use is assessed by using 20 individual metrics, while emissions and innovation are evaluated based on 28 and 20 metrics, respectively. (Refinitiv, 2024)

Figure 2. ESG score



5.1.2 Fundamental Data

The empirical study requires fundamental data given the structure of risk measures and control variables. The fundamental data is accounting-based data about banks' financial position. The fundamental data includes total assets, total capital, total liabilities, total equity, total deposits, basic net income, net sales, risk-weighted assets, employees, and total loans. The data is gathered from the same period as CSR data. The source of this fundamental data is the Thomson Reuters DataStream.

5.1.3 Macroeconomic Data

Since the banks are distributed globally, the empirical section uses two types of control variables. The first set consists of bank-specific variables derived from the fundamental

data presented above. The second set consists of macroeconomic variables. These are used in their original form without further transformations. These variables are not bank-specific but country-specific. Macroeconomic data is obtained from the World Bank database.

5.2 Variables

5.2.1 Risk Measures

The risk measures used in this study are RD, FGR, and Z-score. Together they cover a broad range of key bank risk areas. RD measures banks' portfolio riskiness, while FGR focuses on liquidity risk and Z-score on default risk. These measures vary in how they characterize a bank's risk profile. Lower values of RD and FGR indicate lower risk, whereas a higher Z-score suggests a less risky bank.

5.2.2 CSR Variables

The analysis examines the relationship between CSR and bank risk, using specific measures. This study employs four CSR measures: ESG-combined, environmental (E), social (S), and governance (G). The ESG-combined score is a combination variable based on the three separate ESG dimensions. These variables are used in their original form and not scaled. Additionally, interaction variables are presented according to the study of Li et al. (2023) to capture CSR's impact on risk during the COVID period. The interaction variables consist of two separate parts. The First part is the COVID dummy. This is a dummy variable that takes a value of 0 if the year is not a COVID year and a value of 1 if the year is a COVID year. The COVID years are the years 2020-2021 and during these two years, the COVID dummy has a value of 1. The second part is one of the ESG variables. The interaction variable is constructed by multiplying the lagged ESG variable with a COVID dummy. Therefore, the sample includes four individual ESG variables, and four interaction variables.

5.2.3 Control Variables

The following control variables are based on Neitzert & Petras (2022). These variables present key characteristics of banks' financial position. The variables capture banks' size, profitability, and capital structure.

The first bank-specific control variable is bank size. This thesis uses the number of banks' employees as a proxy of its size. As the size of the bank grows, it is expected to increase employee hiring. The proxy for bank size could also be another variable such as total assets which is a highly relevant variable in determining bank size. However, the choice between employees and total assets is unlikely to significantly affect the results. Finally, this study employs a natural logarithm of full-time employees to scale the variable. Therefore, the variable named log-FTE in the analysis refers to the bank size element.

The second control variable is the return on equity (ROE). Like risk measures and other calculated variables in this study, ROE is an accounting-based figure. It is calculated as net income divided by total equity. Net income is disclosed in the income statement and total equity is derived from banks' balance sheets. In this study, ROE is used as a proxy for banks' profitability. Banks' profitability is potentially a highly significant factor in explaining banks' riskiness. For instance, the Z-score is a risk measure that uses risk-adjusted return on assets to assess banks' default risk.

$$(4) \qquad ROE = \frac{Net\ income}{Equity}$$

The next discussed variable is the leverage ratio (LR). The leverage ratio is calculated from the liabilities and equity values derived from banks' balance sheets. The leverage ratio is a value that depicts banks' capital structure. In general, highly leveraged banks are likely riskier. In contrast, banks with higher relative equity could be less exposed to the risks. Therefore, using the leverage ratio as a control variable is highly relevant in analyzing bank risk.

$$(5) \qquad LR = \frac{Liabilities}{Equity}$$

The final calculated value is the loan ratio, defined as total loans divided by total assets. Both figures are derived from banks' balance sheets and therefore, accounting-based. Ayadi et al. (2015) argue that loan ratio is a key indicator of banks' business models. They conclude that the loan ratio helps to distinguish these business models from each other. It is expected that a higher amount of total loans relative to total assets would lead to higher risk levels. The higher risk would be a consequence of the risky nature of the lending business.

$$(6) \qquad LoanRatio = \frac{Total\ loans}{Total\ assets}$$

The study from Neitzert & Petras (2022) uses also an additional calculated bank-specific variable. The variable is the deposit ratio, defined below.

$$(7) \qquad DepositRatio = \frac{Total\ deposits}{Total\ assets}$$

The deposit ratio would also be beneficial for the analysis. Ayadi et al. (2015). Argue that the ratio is another significant variable in determining banks' business models. However, the variable had high correlations with other variables in the study. To avoid multicollinearity, the ratio is excluded from the final model.

In addition to the bank-specific variables, the study employs macroeconomic variables. The analysis includes three specific macroeconomic variables. The first one is inflation, derived from the customer price index (CPI). CPI tracks the development of customer prices over time. The division of the CPI value with the CPI value of the previous period gives inflation as a percentage for the analyzed period. The inflation in this study is yearly inflation per country. Inflation is a highly significant factor for businesses in various industries, including banking. The variable is named as inflation in the empirical section. (World Bank, 2024)

Another macroeconomic variable is Gross Domestic Product (GDP) per capita. This country-specific variable aims to depict the development of the country where a specific bank is located. GDP per capita is calculated by dividing a country's total nominal GDP by the number of citizens. This variable is named GDP-Cap in the empirical section of this study. (World Bank, 2024)

The final macroeconomic variable is GDP growth. While GDP-Cap describes the development of the country, GDP growth aims to capture the economic outlook of the country. High GDP growth would mean that the economy is expanding and likely benefiting the banking sector. The GDP growth percentage is derived by dividing the GDP figure of the current year by the GDP of the previous year. The GDP growth in this study is a yearly growth percentage. The variable referring to GDP growth is named GDP-Gwt. (World Bank, 2024)

5.3 Descriptive Statistics and Correlations

The final part of the methodology section represents summarizing statistics and correlations between variables. Descriptive statistics table and correlation matrix are constructed for visualization. Correlations and statistics are significant for the analysis and result interpretation.

The table below presents the descriptive statistics of the variables, including dependent and independent variables. The dependent variables (risk measures) are Z-score, FGR, and RD. The mean for Z-score is 0,311 and the values range from 0 to 1 due to the normalization. The mean of FGR is -0,035 and the values fall between -0,858 and 1,748. The third risk measure RD has a mean of 0,564 and values range from 0,195 to 1,021. Another key component of the regressions are CSR figures. The combined ESG score has a mean of 53,997 and minimum and maximum values of 8,748 and 90,012. Among the individual pillars, the environmental score has a mean of 53,530 with minimum and maximum values of 0 and 95,803, the social score has a mean of 54,632 with minimum and maximum values of 2,682 and 94,229, the governance score has a mean of 57,003 with a minimum and maximum values of 10,007 and 94,283. A notable factor is that RD and FGR are scaled by total assets while Z-score is normalized to values between 1 and 0. In contrast, CSR figures are not scaled. The difference in scale has a significant effect on the interpretation. Relatively higher CSR figures likely yield small coefficients for ESG variables.

Table 2. Descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
RD	0,561	0,564	1,021	0,195	0,182	0,057	2,341
FGR	-0,040	-0,057	0,741	-0,858	0,171	0,446	4,040
Z-score	0,311	0,265	1,000	0,000	32,049	1,116	4,145
ESG Score	54,849	57,290	90,015	8,750	21,126	-0,351	2,201
S-pillar	54,464	57,980	94,232	2,629	24,238	-0,330	1,201
E-pillar	54,220	58,570	95,803	0,000	28,870	-0,240	1,716
G-pillar	57,959	60,500	94,284	10,010	22,307	-0,340	2,106
COVID	0,167	0,000	1,000	0,000	0,373	1,788	4,197
Log-FTE	15,780	15,866	23,042	9,421	2,662	0,079	3,251
LR	12,577	11,591	28,890	4,574	5,120	0,957	3,619
LoanRatio	0,631	0,642	0,919	0,309	0,130	-0,345	2,784
ROE	0,088	0,091	0,244	-0,248	0,070	-1,691	9,962
Inflation	2,052	1,777	9,479	-0,900	1,910	1,335	5,680
GDP/Cap	40179,710	42291,970	131864,100	4216,184	19547,730	-0,074	3,111
GDP/Gwt	2,697	2,467	10,636	-8,974	3,261	-0,595	4,868

The following table shows the correlation matrix between the independent variables in this study. The matrix does not show significant problems between variables. The high correlation between the combined ESG score and individual pillars is expected, because they are closely related. Due to the high correlation, these figures are not used in the same regressions. Instead, they are placed in different regressions and the results are analyzed separately.

Table 2. Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)ESGScore	1,00											
(2)E-pillar	0,79	1,00										
(3)S-pillar	0,93	0,73	1,00									
(4)G-pillar	0,76	0,44	0,49	1,00								
(5)COVID	0,17	0,03	0,19	0,07	1,00							
(6)Log-FTE	0,10	0,18	0,07	0,05	0,03	1,00						
(7)LR	0,14	0,35	0,05	0,06	-0,04	0,16	1,00					
(8)LoanRatio	-0,23	-0,27	-0,15	-0,20	-0,02	-0,15	-0,31	1,00				
(9)ROE	0,06	-0,03	0,04	0,12	-0,10	0,04	-0,24	0,07	1,00			
(10)Inflation	0,04	-0,02	0,07	0,02	-0,14	0,08	-0,23	0,01	0,34	1,00		
(11)GDPCap	0,02	-0,06	0,01	0,03	0,11	-0,43	0,10	-0,06	-0,23	-0,36	1,00	
(12)GDPGwt	-0,07	-0,09	-0,07	0,01	-0,47	0,03	-0,16	0,00	0,34	0,36	-0,25	1,00

6 Empirical Results

This chapter presents the empirical methodology and the results. It concludes with resolving the hypotheses of the study and presenting broader implications of the findings.

6.1 Regression Model

The relationship between ESG and bank risk is investigated using panel OLS regressions with fixed effects, as specified by the model below:

(8) $$Risk_{i,t} = \alpha_i + \phi CSR_{i,t-1} + nCovid_{i,t} + \Psi CSR_{i,t-1} \cdot Covid_{i,t} + \Upsilon Bank_{i,t-1} + \varepsilon Country_{k,t} + Year\ fixed\ effect + Firm\ fixed\ effect + \varepsilon$$

In the model, risk refers to one of the three alternative risk measures (RD, FGR, or Z-score). The first independent variable depicts the standalone ESG factor. This can be ESG-combined or one of the individual CSR pillars. The next factor is the COVID dummy. The following factor is an interaction variable derived from multiplying the first two variables. Then regression models employ bank-specific and country-specific control variables. The regressions use fixed year and firm effects. The final term is the error term.

6.2 CSR and Default risk

The following regression table has Z-score as a proxy for banks' risk of defaulting. It includes four separate regressions which are depicted in their own columns. Each column presents the regression with one independent CSR measure which can be ESG-combined, E, S, or G. All the following sections follow the same structure.

Table 3. Default risk

Variables				
ESG Score	0,0001*			
ESG * COVID	0,0002**			
E-pillar		0,0000		
E-pillar * COVID		0,0001*		
S-pillar			0,0001**	
S-pillar * COVID			0,0002**	
G-pillar				0,0000
G-pillar * COVID				0,0001
Covid	-0,0336***	-0,0392***	-0,0392***	-0,0336***
Log-FTE	0,0013	0,0013	0,0012	0,0014
LR	-0,0050***	-0,0051***	-0,0049***	-0,0051***
LoansRatio	-0,0096	-0,0120	-0,0096	-0,0133
ROE	-0,0250	-0,0259	-0,0256*	-0,0264
Inflation	-0,0016**	-0,0016**	-0,0016**	-0,0017**
GDP/Capita	0,0000**	0,0000**	0,0000**	0,0000**
GPD/Growth	-0,0031***	-0,0031***	-0,0031***	-0,0032***
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Intercept	0,3594	0,3650	0,3604	0,3659
R-squared	0,9765	0,9764	0,9765	0,9764
N	1894	1894	1894	1894

The coefficients of standalone ESG scores are close to zero in the regressions. The highest figures are ESG-combined and S-pillar with positive 0,0001 coefficients. These are also statistically significant values. As the standard deviation for the ESG score is 21,126, one standard deviation increase in the standalone ESG-combined score would lead to an increase of 0,021 in the Z-score. The result of 0,021 shows that in this data, the ESG score is positively associated with the Z-score. Despite marginal values, this is evidence of ESG's positive influence on bank risk.

The main interest in this study is in the interaction variables. All these values are positive and statistically significant at 10% and 5% levels except for the governance score. The values above zero indicate a positive correlation with the interaction variables and the

Z-score. The interpretations based on the standard deviations of the ESG variables are as follows. One standard deviation increase in the combined ESG score would lead to a 0,0063 increase in the Z-score during the COVID period. Likewise, an increase of one standard deviation in the environmental, social, and governance pillars scores during the COVID would lead to reductions in Z-score of 0,0029, 0,0072, and 0,0022, respectively. In comparison with the standalone ESG scores, the interaction variables show slightly higher coefficients. This is evidence of an increased importance of CSR during a crisis period.

Among the control variables, return on equity, leverage ratio, and loans to assets ratio show significantly negative values, indicating a negative relationship with banks' Z-scores during this period. The negative values may be a result of a variety of factors. One possible explanation could be that all the variables are related to more risky banking practices. The leverage ratio and loans to assets ratio capture banks' loan portfolio structure and liabilities. Increases in these areas could mean that banks are engaging in more risky ventures, negatively affecting banks' stability and the Z-score. Also, while increased return on equity is promoted by the shareholders, the banks could achieve a higher return on equity by engaging in risky business practices. This could lead to a negative association with the Z-score. The leverage ratio is highly statistically significant while the loans to assets ratio and return on equity are not statistically significant in the regressions.

The only positive coefficient among control variables is Log-FTE, which depicts the bank size element. This implies that larger banks in general have less default risk. Again, this can be related to multiple factors, such as their market power and resources to invest in risk management. The size element is not statistically significant.

6.3 CSR and Portfolio Risk

In the second set of regressions, RD is used as a proxy for bank risk. The table below shows the results from the regressions including RD.

Table 4. Portfolio Risk

Variables				
ESG Score	-0,0001			
ESG * COVID	-0,0011***			
E-pillar		0,0000		
E-pillar * COVID		-0,0007***		
S-pillar			0,0000	
S-pillar * COVID			-0,0008***	
G-pillar				0,0000
G-pillar * COVID				-0,0005**
Covid	0,0241	-0,0108	0,0088	-0,0107
Log-FTE	-0,0022	-0,0024	-0,0023	-0,0023
LR	-0,0022***	-0,0021***	-0,0022***	-0,0021***
LoansRatio	0,1564***	0,1573***	0,1556***	0,1638***
ROE	-0,0737**	-0,0744**	-0,0746**	-0,0729**
Inflation	0,0011	0,0011	0,0010	0,0012
GDP/Capita	0,0000	0,0000	0,0000	0,0000
GPD/Growth	0,0020***	0,0018***	0,0020***	0,0021***
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Intercept	0,5336	0,5338	0,5332	0,5213
R-squared	0,8453	0,8453	0,8457	0,8443
N	1894	1894	1894	1894

The coefficients for standalone figures are close to zero. The only non-zero figure is the combined-ESG coefficient with a value of -0,0001. The effect on RD is marginal. The standalone CSR factors are also not statistically significant in any of the regressions. Therefore, making conclusions about their effect on RD is not meaningful.

In contrast, the interaction variables are highly statistically significant in the regressions. The combined score, environmental pillar score, and social pillar score are statistically significant at a 1% level. The governance pillar score is significant at a 5% level. Additionally, all the interaction variables have negative coefficients, implying that they are associated with a lower bank portfolio risk during a crisis period. The results can be interpreted as follows. One standard deviation increase in the combined ESG score would

lead to a -0,0254 decrease in RD during the COVID period. Similarly, an increase of one standard deviation in the environmental, social, and governance pillars scores during the COVID would lead to reductions in RD of 0,0202, 0,0194, and 0,0112, respectively.

Among the control variables, one figure that stands out is the highly positive coefficient for the loans to assets ratio. This finding is not surprising since increases in loans to assets ratio indicate a high value of loans in comparison to total assets. As loans are risky assets, their association with an increased bank portfolio riskiness is not surprising. The loans to assets ratio is also highly statistically significant. The variable is significant at a 1% level in all regressions.

The regressions have also some statistically significant negative control variable coefficients such as leverage ratio and return on equity. Return on equity values are likely higher with banks with lower equity due to its construction (income / equity). These banks would probably need to maintain capital efficiency due to the small amount of equity leading to a decrease in RD. Interestingly, the leverage ratio is also found to have a decreasing effect on RD. This is counterintuitive due to the construction of the variable (liabilities over equity). The avenue could be banks' solvency management. Banks with high leverage relative to equity could hold assets that have less risk weight to control risk exposure.

6.4 CSR and Liquidity Risk

The final set of regressions is related to banks' liquidity risk. The proxy for liquidity risk is FGR. The following table follows the same structure as previous ones including four separate regressions.

Table 5. Liquidity Risk

Variables				
ESG Score	0,0002			
ESG * COVID	-0,0012***			
E-pillar		0,0003		
E-pillar * COVID		-0,0006***		
S-pillar			0,0002	
S-pillar * COVID			-0,0010***	
G-pillar				0,0000
G-pillar * COVID				-0,0009***
Covid	0,0202	-0,0265	0,0082	-0,0005
Employees	0,0027	0,0028*	0,0027	0,0030*
Leverage Ratio	0,0019***	0,0017**	0,0019***	0,0018***
Loans/Assets	0,2894***	0,2953***	0,2897***	0,2930***
ROE	-0,0780**	-0,0796**	-0,0796***	-0,0782***
Inflation	0,0047***	0,0051***	0,0047***	0,0048***
GDP/Capita	0,0000	0,0000	0,0000	0,0000
GPD/Growth	0,0001	0,0002	0,0002	0,0004
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Intercept	-0,2869	-0,2944	-0,2870	-0,2871
R-squared	0,8520	0,8511	0,8522	0,8511
N	1894	1894	1894	1894

The standalone ESG scores in FGR regressions have slightly positive values. The highest coefficient is 0,0003 which is related to the environmental pillar score. The interpretation for the 0,0003 coefficient is that one standard deviation increase in the environmental pillar score is related to a 0,0087 increase in FGR. This increase is modest, considering it is the highest number among the standalone ESG coefficients. The increase in FGR would indicate a connection to increased liquidity risk. However, all the standalone CSR figures are statistically insignificant. Consequently, making conclusions about their effects on FGR is not meaningful.

The interaction variables show similar results with RD regressions. All the interaction variables have negative coefficients. The highest negative coefficient is -0,0012 which is related to the combined ESG score. Similarly, as in previous tables, I will present interpretations for all the interaction variables to understand their effect on liquidity risk. One

standard deviation increase in ESG-combined score would lead to a 0.0211 decrease in FGR during the COVID period. Following this pattern, an increase of one standard deviation in the environmental, social, and governance pillars scores during the COVID would lead to reductions in FGR of 0,0087, 0,0194, and 0,0201 respectively. The interaction variables between all the CSR figures and the COVID dummy are highly statistically significant at a 1% level. Also, the size of the risk mitigation effect on FGR is significant. Since FGR is a proxy for liquidity risk, the results provide evidence of the CSR's ability to mitigate bank liquidity risk during a crisis period.

The control variables show consistently positive coefficients. Specifically, the loans to assets ratio has a high positive coefficient with a 1% statistical significance. This is expected due to the construction of the FGR risk measure. The direction of FGR is defined by loans - deposits subtraction. As the loans to assets ratio increases, loans are likely to grow also relative to deposits. This contributes significantly to the positive coefficient of the variable.

The only negative value in liquidity regressions was the coefficient of return on equity. The coefficient had a negative value of around -0.08, which is quite high. The coefficient is statistically significant at a 1% level. The reason for this is challenging to interpret and out of the scope of this study. One possible reason could be, for example, customers' perception of bank quality due to the high return on equity, leading to increases in deposits in these banks.

6.5 Discussion

The empirical section aims to provide a comprehensive overview of the ESG factors' ability to mitigate risk during a financial crisis. Previous chapters presented the regression tables and an interpretation of the direction and scale of the effects. This section further deepens the analysis in the context of the hypotheses and studies with similar research designs.

H1 = Overall CSR reduces bank risk during a financial crisis.

Considering the first hypothesis, the results from the empirical section are convincing. The interaction variables were found to have a negative effect on bank risk in all regressions. The values were also statistically significant except for the governance interaction variable in the default risk regression. This indicates that CSR significantly decreases banks' default, portfolio, and liquidity risks during the Covid-19 pandemic. Therefore, the evidence is sufficient for rejecting the null hypothesis.

H2 = The environmental, social, and governance pillars of CSR individually had significantly different effects on bank risk during Covid-19.

The second hypothesis of this study assumes inconsistency between ESG dimensions. This indicates that the direction and scale of the impact on bank risk would be substantially different. However, the results of this thesis do not support this assumption. The interaction variables constructed from the individual pillars and the COVID dummy show consistently similar effects between each other. The deviations between the coefficients are small. Therefore, the assumption that focusing on specific pillars would have a larger risk mitigation effect is not supported.

The following paragraphs deepen the analysis of individual risk measures by providing insights from the previous studies. First, the Z-score was used to study default risk, corresponding to a distance from default. The results from the regressions are like those of Neitzert & Petras (2022). The combined score and all the individual pillars were associated with a higher Z-score during a COVID crisis. This implies a positive relationship between CSR and risk-adjusted CAR and risk-adjusted ROA. However, the magnitude of the change is moderate. For example, one standard deviation increase in combined ESG score was found to increase the Z-score by 0,0064 during the COVID. As the mean for the Z-score in the sample is 0,311, the change is relatively small compared to the findings of

Neitzert & Petras (2022). This is surprising, because their paper did not specifically analyze CSR during a crisis period which seems to increase the effects of CSR.

RD was the selected measure for portfolio risk analysis. Neitzert & Petras (2022) found a strong connection between CSR and portfolio risk reduction. However, they identified the environmental pillar as the key factor, while social and governance pillars did not show significant effects. This study adds to this result by analyzing the effects on RD during a crisis period. The results of this thesis differ from those of Neitzert & Petras (2022). The combined ESG score, and all the individual pillars show a highly statistically significant and negative effect on RD. Since RD is the ratio of risk-weighted assets to total assets, the CSR factors seem to be decreasing banks' willingness to hold risk-weighted assets in the portfolio during turbulent times. The magnitude of the change in RD is significant. ESG-combined had the largest effect on RD reduction, while the social pillar was the most significant individual CSR variable during COVID. This finding also deviates from Neitzert and Petras (2022), who found the environmental pillar to be a driving factor in risk reduction.

The final measure was liquidity risk, which was captured by FGR. The empirical section on FGR is similar to the study by Li et al. (2023) with some changes such as the sample, time period, and inclusion of governance dimension. Still, the results are consistent with Li et al. (2023). The combined score and all the individual factors significantly reduce FGR. Since the direction of FGR is calculated as a subtraction of deposits from loans, CSR seems to cause a shift to deposits as a source of funding. Among the individual CSR variables, the environmental pillar had the lowest coefficient, while the social and governance pillars showed a larger effect. While Li et al. (2023) focused only on ES engagement, the governance aspects seem to also explain the liquidity risk reduction. Therefore, leaving out the governance pillar from the analysis has a risk of overemphasizing the role of environmental and social aspects in liquidity risk analysis.

Another relevant finding concerns the effects of CSR variables outside the COVID period. While the interaction variables showed consistently significant risk reduction, the standalone CSR variables were mostly statistically insignificant. The only exception was default risk regressions, where ESG-combined and social pillar scores had a statistically significant effect on risk reduction outside the COVID period. However, the effect of these scores on default risk reduction was marginal. Thus, these findings do not support the idea that CSR would reduce bank risk outside crisis periods.

Overall, the results provide evidence that CSR contributes to bank risk mitigation during a crisis period. The CSR interaction variables significantly influence multiple accounting-based bank risk measures. The effects were significant across all the individual pillars with small changes depending on the specific risk measure. During normal times, CSR does not seem to affect bank risk.

7 Conclusions

The purpose of this thesis was to analyze the effects of CSR on bank risk during a crisis period. The empirical section employed multiple risk measures to assess the effects of CSR and its subsections. This section discusses the findings, the limitations of this study, and suggestions for how the study could be developed further.

The main finding of the empirical section is that CSR is a relevant factor in determining banks' risk during a crisis period. The results show a significant reduction specifically in liquidity and portfolio risks, while the effect on default risk mitigation is moderate. The only exception is the governance pillar in default risk regressions. Similar CSR risk mitigation effects in the banking sector have been recorded by multiple previous studies. This result adds to the previous literature by confirming the high importance of CSR in risk mitigation in the banking sector, specifically during a market turmoil. During normal times the empirical section of this study does not find significant effects. Another main finding is related to the relationship of risk mitigation between all three individual CSR pillars during the COVID period. Previous literature such as Neitzert & Petras (2022) and Tanisman & Tarazi (2024) have found inconsistent effects between pillars. Often some pillars are found to be superior or inferior. This implies that managers should prioritize specific aspects of CSR to optimize performance. The results of this thesis do not support this view since all ESG dimensions showed consistent risk reduction.

While the results from the empirical section are straightforward, some limitations should be considered. A key limitation in this study is CSR data availability. The time interval from 2010 to 2021 is quite short. It could be beneficial to have a longer period and include multiple historical crisis periods. However, the ESG data is not available before the year 2002 on the Thomson Reuters Database. Furthermore, during the first years, ESG data is scarce, causing early years to be excluded from the analysis. Another limitation is the sample's concentration on larger banks and developed economies. The early CSR data covers mainly the most important banks, which tend to be relatively large and based in developed economies. Also, the sample consists only of listed banks. The effects on

risk mitigation may vary asymmetrically between banks with different characteristics, which are not captured by the empirical section. Therefore, the results from this analysis should not be generalized to represent the whole banking sector. Furthermore, the size of the sample is problematic. The final sample consists of 158 banks. This is sufficient for making statistically significant conclusions, but more observations would be beneficial. The limited number of banks could cause biased results.

There are also additional limitations outside the sample. One possible issue is the reliance on accounting-based variables. The risk measures are also potentially flawed and may not capture the risk as intended in the regressions. ESG rating confusion is another factor that could contribute to biased results.

Despite these limitations, this thesis provides valuable information about bank risk. Future research could expand the scope of studying this issue as CSR data availability increases. The relationship between CSR and bank risk could be analyzed across different countries and regions. Analyzing how CSR affects emerging banking sector riskiness during a crisis period would be beneficial. Another avenue could be different types of crises that could cause varying results. This study used the COVID crisis which is a pandemic caused by the Covid-19 virus. In the future, other financial crises and geopolitical conflicts such as conventional and trade wars could be analyzed to expand the conclusions of this thesis.

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