Sustainable Finance in Financial Institutions: A Literature Review of the Integration of ESG Factors and Balancing Profitability Goals

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ABSTRACT,
This research aims to investigate the impact of sustainable finance on the financial performance of banks and other financial institutions. Several studies in the literature have shown positive relationships between corporate social performance, environmental responsibility, and financial performance. However, some studies have found no significant relationship or negative associations. It is also discussed what the importance of information transparency, non-economic motives, reputation, and investment risk in sustainable finance is. The study's findings contribute to the existing research on the impact of ESG factors on banks risk and financial performance. The findings of this study discuss how investors can balance the goals of sustainability and profitability, the benefits and downsides of sustainable finance, the role of ESG factors in balancing sustainability and profitability goals, and alternative methods for achieving these goals. By assessing the literature on sustainable finance, the research provides valuable insights for investors, financial institutions, and policymakers interested in understanding the implication of incorporating ESG criteria into investment decision-making processes. The research also offers a comprehensive summary of the reviewed studies in an appendix table for further reference.

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Keywords
Sustainable Finance; ESG; Financial Institutions; CSR; Banks; Financial Performance

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1. INTRODUCTION

Although the Environmental, Social and Governance (ESG) factors emerged since 1980's as a way for investors to evaluate a company's performance (Andrieș & Sprincean, 2023), their impact on firm's or banks' financial performance has been investigated empirically more recently and is still debated heavenly. The majority of studies done concerning ESG factors and performance, concern non-financial corporations, whereas financial institutions have received much less attention. Therefore, the scope of this research will be mainly focused on financial institutions.

The message "Action Plan: Financing Sustainable Growth" (Commission, 2018) published by the European Commission in March 2018, describing the community's long-term policy related to changing the financial system so it may become a stimulus for a greener transition among the economic actors. For financial enterprises, such as banks and investment firms, whose activities have a significant impact on the establishment and development of enterprises, have been affected by the publication of this document and has led to changes around their legal environment. The environmental and social cost of doing business, which up to now has not been considered in business analyses, is not taken as a significant factor. Due to changes like these, the concept of Environmental, Social, and Governance (ESG) evolved, and was meant to replace and expand on the concept of Corporate Social Responsibility (CSR) (Rozwoj, 2021).The primary distinction between these two concepts is that ESG explicitly includes the issue of corporate governance, whereas CSR only partially covers it (Fillan, et al., 2021). In this research, both terms will be used together.

As for the term sustainable finance, it takes ESG criteria into consideration for investment decision-making processes (Bakken, 2021).

The sustainable development goals (SDGs) and the necessity to address broader sustainability challenges gave the banking industry the need to adopt certain principles during the past decade (Stocker, et al., 2020). As part of the primary areas of CSR in the banking sector, financial institutions are exploring novel approaches related to sustainability to include non-financial information beyond ethical considerations (Chang, et al., 2019). In order to effectively communicate its ESG performance to various stakeholder groups, conventional banking has developed towards making green investments and implementing sound information frameworks (Elalfy & Weber, 2019).

Currently there is a growing association between the financial sector and climate change, primarily driven by the influence of clients. This connection arises from the impact of extreme weather events on clients or the increasing demand from clients for sustainability-focused investment portfolios related to fixed assets (Hunt & Weber, 2019).

According to studies (Hamilton & Eriksson, 2011), (Schaeffer, et al., 2012) and (Zerbib, 2019), that even though activities such as mitigating climate change and environmental degradation are initially intended to be non-profitable, businesses are still able to benefit from them. In addition, these non-pecuniary motives are the key elements that set green assets apart from other financial assets and are what mainly attract investors' activities.

ESG investment is a strategy that considers ESG criteria while making investment choices in the financial market. The growing concerns surrounding climate change and environmental degradation highlight the critical role of ESG investment (Liu, et al., 2023).

This study provides a systematic literature review on sustainable finance in the financial institutions. It aims to address the following main research questions through this review of literature:

1) What is the impact of sustainable finance on the financial performance of banks and financial institutions?

To support finding an answer to this main research question, several sub research questions has been identified and will be explored:

2) How can banks balance the goals of sustainability and profitability?
3) How does environmental, social and governance (ESG) support investors to balance sustainability and profitability goals?
4) What are other main methods available for banks to balance sustainability and profitability goals?

Sustainable finance is a broad field that encompasses various subjects and disciplines. In this research I will focus on some of the key subjects of sustainable finance, and how the ESG factors are integrated in these subjects. The subjects that will be researched are stock portfolio optimization, green bonds, green finance, volatility modelling and green digital finance.

By answering these research questions, the study complements the existing research on the impact of ESG factors on bank risk and the financial performance of banks.

2. METHODOLOGY

A systematic literature review methodology has been adopted by this article (Kumar, et al., 2021). I selected the Scopus database to analyze sustainable finance which has been published in Social Sciences, Environmental Science, Business Management and Accounting, and Economics, Econometrics and Finance. Further, Scopus provides various options in which users can search for the relevant literature through advances search, which gives the opportunity to have a focused search for the literature. The key search terms that were used are "sustainable finance", "ESG factors", "CSR", "banks", "financial institutions" and "performance". The Boolean "AND" and "OR" were used in the search terms to combine the search terms. To limit the search, the extracted literature was focused on the years 2010-2023, written in English.

To be able to read and analyze the articles, the results were limited to "all open access". Open Access (OA) publications reduce permission requirements and eliminate price barriers for readers. OA allows access for researchers, teachers, journalists, policy makers and the general public without a subscription (McCullough, 2022).

After this initial search, the articles were screened based on their title and abstract. The articles that meet the inclusion criteria will be subjected to a full-text review. The inclusion criteria are based on the titles and abstracts of the articles. Articles that were not relevant to the objective were excluded. The articles that passed the full-text review are selected for data extraction. At the end, there were 109 articles left for data extraction. Data extraction involved creating a standardized form in Excel to extract their relevant data. This extracted data includes authors, year of publication, research design, methodology, main finding, and limitations. This gives a good overview of what data the read article will contribute and will also help with retracking certain data.

After the data extraction, a thematic analysis was conducted to identify and analyze the themes that emerge from the data. The themes were related to the main research question and the sub-research questions.

Figure 1 will show the stages of the study selection process for the literature review. Due to limited time this research is conducted in, the last phase shows, that from the 109 articles available, only 44 have been reviewed on random basis.

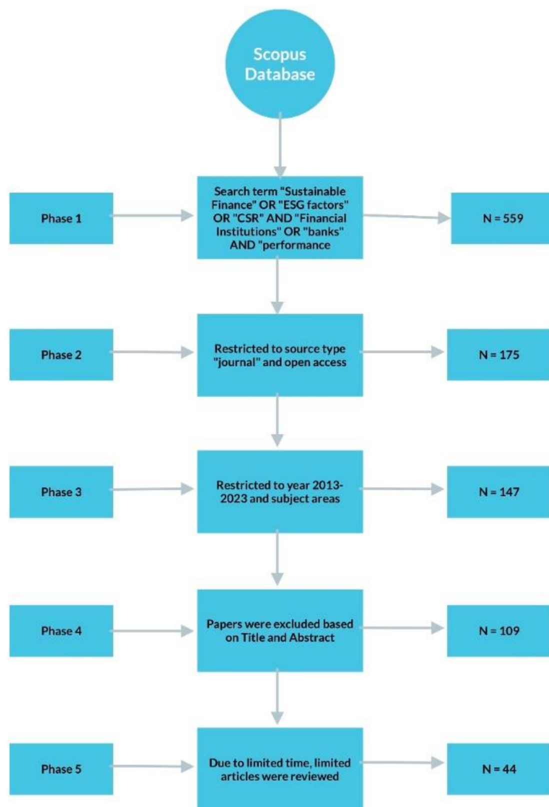

Figure 1: Phases of the study selection process for the literature review

3. FINDINGS & DISCUSSION

This section contains five subsections based on the sub research questions: balancing profitability and sustainability, benefits and downsides of sustainable finance, how ESG factors affect banks' performance, other methods for balancing sustainability and profitability goals, and key challenges for financial institutions to deal with ESG risks.

Also, a Table that contains a summary of the studies review used in this section is presented in Appendix A. This Table contains papers used in this section that analyze sustainable finance from different perspectives, their main problems along with the industry, geographical location of case explored, and the main finding are clearly presented for further consultation.

3.1 Balancing profitability and sustainability

Investors face the challenge of balancing the goals of sustainability and profitability when using sustainable finance. While sustainable finance aims to promote environmentally and socially responsible investing, investors also need to generate financial returns. To achieve these dual goals, investors can adopt several strategies.

Long-term financial performance can be enhanced by engaging with companies that support sustainability and social responsibility (Pertseva, 2022). (Singh, 2020) suggests that organizations that practice sustainability and social responsibility are frequently better positioned to foresee and respond to new trends and dangers in their fields, such as alterations in consumer preference or changes in regulatory requirements. By doing this, they can protect themselves from harm and take advantages of new opportunities.

A framework for balancing profitability and sustainability goals can be found in stock portfolio optimization. The process of continuously reallocating funds to a selection of stocks is known as stock portfolio optimization (Maree & Omin, 2022). A three-step framework was created by (Chen, et al., 2021), by integrating ESG performance into portfolio optimization. They tested their approach on the industrial stock market in the United States, and the results suggested that the obtained SRI portfolio may outperform conventional investment strategies in a number of key areas and may simultaneously achieve the balance of investment and social values. As a result, it demonstrates how incorporating ESG, into a company's financial decisions, could improve both sustainability goals and profitability goals.

3.2 Benefits and downsides of sustainable finance

Literature suggests several benefits of being socially responsible from an investors perspective when allocating money to financial markets.

- Information asymmetry: in order to attract ESG-focused funds, it is essential for a listed company to submit an ESG report outlining its ESG performance, as this provides valuable information to ESG investors for them to make ESG investment decisions. This way, ESG investment reduces information asymmetry and improves the information transparency between listed companies and investors, which leads to reducing the uncertainty of financial assets (Jun, et al., 2022).
- Sustainable diversification: it is highly advised to diversify portfolios with ESG-related assets, particularly during a time of financial crisis (Rubbaniy, et al., 2021). Investors are often less inclined to sell their assets in the short term, as solving ESG issues a log-term strategy is. And therefore, ESG investment is a long-term strategy as well (Liu, et al., 2023). Therefore, a main reason driving investors to allocate money to financial markets with ESG elements can be non-economic motives (Liu, 2022). This research thus suggests that during a time of monetary crisis, investors tend to hold onto their ESG-related assets rather than selling them in the short term. This can be attributed to the understanding that addressing ESG issues requires a long-term strategy. Therefore, investors who prioritize ESG investments are likely to have a long-term perspective and are motivated by non-economic factors.
- Reputation: according to (Cui, et al., 2016), a useful tool for establishing and maintaining a good reputation could be ESG engagement. This research discovered a negative relationship between assessing reputational risk and CSR activity. Indicating that companies with higher CSR activity are less likely to experience negative publicity and related reputational harm. CSR complex concept that involves many different parties, including shareholders, customers, creditors, employees, suppliers, and the community. It becomes easier for internal and external third-party stakeholders

to achieve their goals, when a company has a generally positive reputation. (Halov & Heider, 2011).

- Investment risk; as suggested earlier, during times of economic turbulence, the level of investment risk can be severely mitigated. However, other research indicates contrasting results. Concluding that ESG assets may not provide protection against economic turbulence caused by major shocks, such as the COVID-19 pandemic (Yi, et al., 2021) and (Liu, 2022).

Additionally, while sustainable finance aims to promote environmentally and socially responsible practices in the financial sector, it should be acknowledged that there can be downsides or challenges associated with its implementation.

First, in recent years there has been a rise in reported cases of "greenwashing" despite the expansion of ESG products offered by numerous asset managers and investment firms. In other words, at least part of investment portfolios did not align with announced sustainability objectives, even though the financial products were promoted as sustainable (Bruhl, 2022).

A study done by (Tettamanzi, et al., 2022) studied the steps that IFRS Foundation and EFRAG have been taking towards issues to propose disclosure standard which are more in line with sustainability and environmental needed improvements. And stated "the willingness of both institutions (EFRAG and IASB/ISSB) to manage ESG dynamics also from an accounting and reporting perspective. As a result, companies are now progressively required to provide high quality, clear and comparable information, contrasting the "greenwashing" allegations."

Second, (Belasri, et al., 2020) argues that sustainable finance could limit the investment options. While the range of sustainable investment opportunities is growing, the available options may still be limited compared to traditional investments. Financial institutions may face challenges in finding suitable sustainable projects or assets that align with their investment objectives and risk appetite. This limited pool of opportunities can impact diversification and potentially limit returns.

Additionally, many studies in the literature have been done on the subject to analyze the relationship between corporate social performance, environmental responsibility management activities, including CSR or ESG criteria and firm performance; financial, operational or its impact on financial effectiveness and shareholder value creation. Several of these studies have been analyzed and listed underneath:

- A study done by (Shen, et al., 2016), found that "CSR banks overwhelmingly outperform non-CSR banks in terms of return on assets and return on equity". (Broadstock, et al., 2020), who studied a sample of 320 Japanese firms during the period of 2008-2016, concluding that firms committed to CSR/ESG policies "initially enhances their ability to pursue innovation activities and , then, eventually affects positively their value creation and financial/operational performance". This may lead to a reduction of banks' environmental impact by creating new financial products and services that align with its sustainable financial practices.
- According to a study done by (Belasri, et al., 2020), who investigated 184 banks from 41 countries during the period of 2009-2015, the impact of CSR activities on bank efficiency was found to be positive only in developed countries, with no significant effect observed in developing countries.
- (Nizam, et al., 2019), studied a sample of 713 banks from 75 different countries during the years of 2013-2015 to assess the impact of social and environmental indicators on banks' financial performance. And concluded that banks' financial performance benefits from having access to financing for environmental impact projects. The authors also point out that, in comparison to larger banks, access to financing measures will have a more significant effect on the profitability of smaller banks (those with a total asset below the threshold of USD 2.07 billion).
- (Buallay, 2019) conducted research on the relationship between ESG and operational, financial, and market performance on a sample of 235 banks from 22 countries listed on the stock exchange of European Union countries between 2007 and 206. He found a negative association between corporate governance disclosure and financial and operational performance.

Thus, many studies have found a positive relationship between corporate social performance, environmental responsibility management activities, including CSR or ESG criteria and firm performance. However, some other studies have revealed that the two are negatively related or no significant relationship. Nevertheless, the literature does still reveal that a number of empirical studies on the ESG and financial performance relationship is positive.

3.3 How ESG factors affect bank's performance

The impact of management decisions regarding corporate responsibility and sustainable finance on a firm's performance and value is a highly debated topic in ESG literature. Additionally, there is a discussion about whether ESG decisions are driven by performance or valuations. In this section, I provide an overview of this extensive literature.

A company is said to be able to reduce its exposure to reputational, political, and regulatory risks by integrating ESG responsibilities (Dhaliwal, et al., 2014). This may lead to lower uncertainty of cash flow and profitability (Kumar, et al., 2016). Consequently, ESG companies often exhibit better financial performance compared to non-ESG companies.

Furthermore, companies that engage in social responsibility activities are expected to benefit from this. According to (Gillan, et al., 2021), investors with eco-friendly preferences are willing to accept lower rates of return in case they finance an organization that considers ESG issues. This leads to a lower capital cost for a company, if they engage with ESG issues (Ghoul, et al., 2011).

Since banks hold a dominant position in the economy by mobilizing significant financial resources, it is crucial to research how ESG impacts bank operations (Komarnicka & Komarnicki, 2022). As said by (Komarnicka & Komarnicki, 2022), "the activity and initiatives undertaken by financial institutions to protect the environment are now the goal of evolution of the entire financial market".

A study done by (Torres, et al., 2023), examined the extent to which aspects of labor and working conditions are included in current ESG standards and framework. As a result, they identified several ESG instruments and categorized them according to the related topics. They ended up with six main theme categories and twenty-six second-order themed. The themes included corporate governance; business and human rights; diversity, equity, and inclusion; industrial relations; occupational health, safety, and wellbeing; and human resource

practices. They concluded that managing employee issue and working conditions are progressively included as core components of ESG instruments. Therefore, it shows that including ESG factors in your business practices automatically accounts non-economic motives as well.

3.4 Other methods to balance sustainability and profitability goals

According to (Feng, et al., 2022), countries that are still developing face more challenges concerning the development of ESG investment than developed countries. This is caused due to a lack of regulation and weak market transparency. Therefore, other methods not necessarily focused on ESG criteria are relevant to discuss as well.

One example of sustainable finance that does not rely on ESG factors is green bonds. Green bonds are fixed-income securities that are issued to finance environmentally sustainable projects, such as renewable energy project or energy-efficient buildings. While green bonds do not explicitly focus on ESG criteria, they do support sustainable development by financing projects that have a positive environmental impact (Liu M. , 2022).

The green bond market has helped lowering financing costs, even though it is a fairly new financial instrument. This by providing long-term liquidity and attracting investors who prioritize eco-friendly financial instruments, as well as those seeking portfolio diversification (Flammer, 2021). Green financial instruments play a substantial role in lowering or avoiding financial market risk, according to research done by (Elsayed, et al., 2022), who examined the dependence structure and dynamic connection between green bonds and financial markets.

Additionally, green finance. Green finance is usually defined as a subset of sustainable finance. It does entail the financing investment aimed at achieving on or more environmental goals, including climate change mitigation and adaption (Bruhl V. , 2022).

With increasing awareness of the growing unpredictability in financial markets, investors are becoming more conscious of the trade-off between profits and potential risk when making investment decisions. Therefore, volatility has gained significant importance (Liu M. , 2022). Capturing the nature of return series, volatility modeling has been proposed. (Pham, 2016) found that shock in the overall conventional bond market tend to have varying spillover effects on the green bond market. These results were found when investigating the volatility dynamics in the green bond market.

Volatility modelling can also be used for ESG factors. One common approach to modeling ESG volatility is through the use of time-series models, such as autoregressive integrated moving average (ARIMA) models or generalized autoregressive conditional heteroskedasticity (GARCH) models. These models can be used to analyze historical data on ESG factors and predict future volatility based on trends and patterns in the data (Wilhelmsson, 2016).

Another approach to modeling ESG volatility is through the use of machine learning techniques, such as neural networks or support vector machines. These machines can be used to analyze large and complex datasets on ESG factors and identify patterns and relationships that may not be apparent through traditional statistical analysis (Lee, et al., 2022).

In a study done by (Bruhl V. , 2023), the use of Green Asset Ratio (GAR) calculations was analyzed as a means to enhance transparency regarding the sustainability of financial activities. The aim was to provide stakeholders, including investors, with a clear understanding of the level and progression of sustainability in different operations. Specific key performance indicators (KPIs) were established, which need to be regularly reported. They found that credit institutions must publish disaggregated data that distinguishes between environmental objectives and counterparty types in addition of a single aggregated GAR. This detailed information allows stakeholders to discern the extent of sustainability in different company operations and observe how these figures evolve over time. However, due to the complicated nature of the disclosure requirements, smaller credit institutions may be disproportionately burdened with the costs associated with gathering, analyzing, and reporting sustainability data for financial and non-financial undertakings.

Green digital finance is yet another tool that can be used. The use of digital financial technologies and solutions expressly for advancing and supporting sustainable financial objectives is referred to as “green digital finance”. It combines capabilities of digital finance with the principles of green finance, which focuses on financing environmentally friendly projects and initiatives (Taghizadeh-Hesary & Hyun, 2022). Investors can use green digital finance to balance their objectives for profitability and sustainability. As it offers a number of advantages: By leveraging digital platforms, investors can access projects and assets that have positive environmental and social impacts while also offering financial returns, and thus improving their investment opportunities (Taghizadeh-Hesary & Hyun, 2022). An ideal solution for banks to owe up to their fiduciary duty, it is using blockchain. Since blockchain ensure transparency, traceability, security, immutability, and unique identification for projects (Casion, et al., 2018).

But in addition to the advantages, it also comes with risks and unforeseen consequences. The safety and protection of customized data have been questioned. But also, its environmental effect through production, use, and termination of software and hardware, whereas its mining operations may harm the ecosystem. Additionally, a concern was raised considering the energy use that could increases the data centers’ already enormous carbon footprint (Taghizadeh-Hesary & Hyun, 2022).

3.5 Key challenges for financial institutions to deal with ESG risks

Even though the European Union Law has stated regulation on how to implement ESG factors, the implementation still comes with many risks (Law, 2020). (PricewaterhouseCoopers, 2023) has identified six key challenges that came with implementing ESG solutions into their credit analyses and risk management strategies. These top six challenges for the banking sector are displayed in Figure 2.

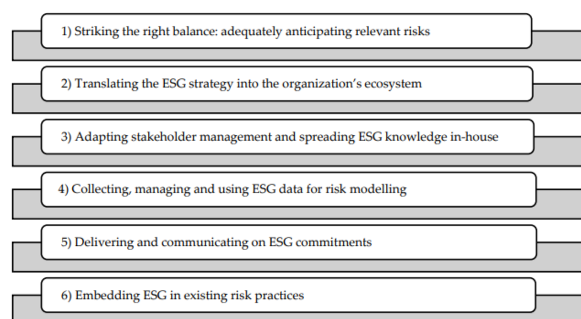

Figure 2: Six key challenges for European financial institutions to deal with ESG risks. Source: (PricewaterhouseCoopers, 2023)

This analysis is also in line with the general view of European Banking Federation (EBF). (Komarnicka & Komarnicki, 2022) explored the challenges faced by the EU banking sector in implementing ESG and sustainable finance practices. The study revealed that European banks encountered similar difficulties in the implementation of ESG solutions. The main factors hindering progress in this area were identified as follows:

1) Lack of international convergence, which points to a lack of standardized approaches and consensus among different countries regarding ESG practices and regulations.
2) Lack of methodologies, which accounts for the absence of established methodologies for assessing and integrating ESG factors poses a challenge for banks in implementing ESG solutions effectively.
3) Lack of data and lack of resources, which includes insufficient availability of relevant data and limited resources hindering banks to fully embracing ESG practices.

The SME sector, which is seen as the foundation of the economies of European nations, has overall been exempted from the enforcement of the previous mentioned laws by the European legislation. According to (Komarnicka & Komarnicki, 2022) this exemption negatively impacts the implementation of ESG regulations, particularly in areas such as credit exposure management and risk management. The authors advocate for the inclusion of the SME sector and local banking institutions in the transformation process by imposing specific obligations under EU law. They argue for the inclusion of all economic operators in the European market in reporting obligations and the assessment of climate-related risks.

4. CONCLUSION

This research focused on sustainable finance in the context of financial institutions, specifically banks. The study aimed to explore the impact of sustainable finance on the financial performance of banks and address related sub-research questions. A systematic literature review methodology was adopted, and a total of 44 articles were selected for data extraction and analysis.

Across the ESG/CSR literature and within studies, some of the contrasting results about the positive or negative influence of ESG criteria, could be caused by the differences in how ESG/CSR performance is measured, for example differences in measuring the whole profile of the firm or a specific sub-measure, the particular dataset that is used, and the geographic focus. Thus, the extent to which certain aspects of ESG/CSR drive the empirical findings remains an open issue.

Sustainable finance has gained significant traction in recent years, partly driven by the European Commission's Action Plan and the need to address environmental and social challenges. The integration of ESG factors into investment decision-making processes has become a key focus for financial institutions. This shift has resulted in a transformation of the legal environment, with a new concept of ESG emerging as an extended version of CSR.

Balancing profitability and sustainability are a challenge for investors, but strategies such as engaging with companies, stock portfolio optimization and incorporating ESG performance into financial decision can help achieve both goals. Sustainable finance offers several benefits, including reduced information asymmetry, non-economic motives for long-term investment, reputation building, and risk reduction during economic turbulence. However, the issue of greenwashing and possible other downsides, remains a concern, highlighting the need for clear and comparable information disclosure standards.

Numerous studies have explored the relationship between CSR/ESG activities and financial performance, with finding indicating a positive correlation in many cases. However, the literature also reveals mixed results and no significant relationship in some instances. Nevertheless, it is evident that considering ESG factors can contribute to a company's financial success and value creation.

While ESG investment faces challenges in developing countries due to weak regulation and market transparency, other methods like green bonds and green finance provide avenues for sustainable financing. Green bonds, specifically designed to fund environmentally sustainable projects, offer benefits in terms of lower financing costs and risk reduction in financial markets.

Overall, this systematic literature review on sustainable finance highlighted the importance of ESG factors in financial decision-making process and their impact on the financial performance of banks and financial institutions. By exploring the various aspects of sustainable finance, including balancing sustainability and profitability, the benefits and downsides, ESG factors, and alternative methods, this research contributes to a deeper understanding of the field and complements the existing studies in the area.

4.1 Limitations and future research

While the research provides valuable insights into sustainable finance and the integration of ESG factors in financial institutions, it also has some limitations that should be considered. These limitations highlight areas where further.

This paper represents just a 'frozen photograph' in today's context. CSR/ESG instruments keep evolving, new ones are continuously appearing, emphasizing new areas, or improving current topics. Clearly there exists a need for more research regarding corporate finance and financial institutions' ESG/CSR performance.

One of the main limitations of this research is the reliance on a literature review and theoretical discussions without empirical data. While the comprehensive overview of existing research offers a solid foundation, the absence of empirical data limits the ability to draw concrete conclusion or establish causal relationships.

While this research has touched upon the downsides of sustainable finance, such as the issue of greenwashing, a more comprehensive analysis of the limitations, barriers and unintended consequences associated with implementing sustainable finance practices would be valuable. Future research could delve deeper into this aspect to provide a more balanced perspective on the challenges and risk faced by financial institutions in adopting sustainable finance strategies.

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6. APPENDIX A

Author	Paper	Year	Perspective	Main findings	Main problem with industry	Geographical location
Belasri, S., Gomes, M., & Pijourlet, G.	Corporate social responsibility and bank efficiency. Journal Multinational Finance and Management	2020	CSR and bank efficiency	CSR has a positive impact on bank efficiency only in developed countries, in countries where investor protection is high and in countries featuring a high degree of stakeholder orientation. Thus, asserting that some institutional characteristics must be present for the positive impact of CSR on bank efficiency to materialize	Using ratios to assess the performance of banks has some limitations --> the univariate nature of ratio analysis may be problematic when analyzing complex multidimensional organizations, such as banks, which produce multiple outputs using multiple inputs	Worldwide
Broadstock, D. C., Matousek, R., Meyer, M., & Tzeremes, N.	Does corporate social responsibility impact firms' innovation capacity? The indirect link between environmental & social governance implementation and innovation performance	2020	ESG and corporate social performance	Findings are consistent with a process of “indirect value-creation” under which firms' CSR/ESG policy adoption initially enhances their ability to pursue innovation activities and then, eventually affects positively their value creation and financial/operational performance	Only focuses on large firms, leaves SME out of context	Japan
Bruhl V.	The Green Asset Ratio (GAR): a new key performance indicator for credit institutions	2023	Green Asset Ratio (GAR)	breakdown of the total GAR by type of counterparty, environmental objective and type of asset allows stakeholders to conduct an analysis of the sustainability of the particular credit institution along different dimensions	The scope of the GAR for credit institutions is somewhat limited & the GAR per definition relates solely to on-balance-sheet exposures	EU

Buallay, A.	Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector	2019	ESG and performance	There is significant positive impact of ESG on the performance. However, the relationship between ESG disclosures is vary if measured individually	Controversial results when measuring ESG disclosures individually	Europe
Casion, F., Dasaklis, T., & Patsakis, C.	A systematic literature review of blockchain-based applications: current status, classification and open issues	2018	Blockchain-based applications	The use of big data and AI enable numerous interesting and innovative blockchain-based applications which could augment the transparency of such technologies.	The features they offer are not unique if judged individually, and the bulk of the mechanisms they are based on are well-known for years. Wait for the mechanisms to mature.	N/A
Chen, L., Zhang, L., Huang, J., Xiao, H., & Zhou, Z.	Social responsibility portfolio optimization incorporating ESG criteria	2021	Portfolio optimization	Using ESG factors within portfolio can be an effective tool for pursuing better expected returns, variance of returns, and social responsibility performance, simultaneously.	Diversification effect is limited + limited testing of proposed model	USA
Cui J., Jo H. & Na H., 2016	Does Corporate Social Responsibility Affect Information Asymmetry?	2016	CSR and information asymmetry	The CSR–information asymmetry relation is amplified in high-risk firms due to managers’ efforts to build a good reputation & CSR engagement is inversely associated with reputational risk measure and lower predicted value of reputational risk is positively associated with lower information asymmetry measures	Looks only at the influence of CSR engagement on information environment. There are other factors influencing information environment as well.	USA

Dhaliwal, D., Li, O. Z., Tsang, A., & Yang, Y. G.	Corporate social responsibility disclosure and the cost of equity capital: The roles of stakeholder orientation and financial transparency	2014	Cost of equity and CSR	Negative association between CSR disclosure and the cost of equity capital & financial and CSR disclosures act as substitutes for each other in reducing the cost of equity capital	First researchers doing empirical work on the link between CSR and cost of equity & a significant loss of information with regard to CSR disclosure quality to prevent researcher bias which lead to a huge loss of information	Worldwide
Elsayed, A., Naifair, N., Nasreen, S., & Tiwari, A.	Dependence structure and dynamic connectedness between green bonds and financial markets: Fresh insights from time-frequency analysis before and during COVID-19 pandemic	2022	Green bonds	The diversification benefit of green bonds is shown at all investment horizons, yet we notice the decreased hedging property of green bonds in the long run. In other words, the allocation across green bonds, stocks, and energy market would give more benefit to active investors (who actively trade in the short-term) as opposed to passive investors (who normally invest in the long-term).	Research limited to effect during COVID-19	N/A
Ghoul, S. E., Guedhami, O., Kwok, C. C., & Mishra, D. R.	Does corporate social responsibility affect the cost of capital?	2011	Cost of equity and CSR	Ceteris paribus, high CSR firms should have lower cost of equity capital than low CSR firms owing to low CSR firms having a reduced investor base and higher perceived risk.	Scarcity of empirical work on the link between CSR performance and the cost of capital	USA
Gillan, S. L., Koch, A., & Starks, L. T.	Firms and social responsibility: A review of ESG and CSR research in corporate finance	2021	ESG in Corporate Finance	Risk and cost of capital, with a few exceptions, the empirical evidence generally supports the view that higher ESG/CSR attributes lower both	Mixed or contrasting findings in literature, conclusions often require assumptions	N/A

Jun, W., Shiyong, Z., & Yi, T.	Does ESG Disclosure Help Improve Intangible Capital? Evidence From A-Share Listed Companies	2022	ESG disclosure	When the ESG score of a company is raised to a certain level, the marginal effect of continuing to increase ESG investment will reduce the increase in intangible capital	"Compared with foreign countries, domestic ESG-related research is still in the initial stage. Not only are there relatively few studies dedicated to the evaluation of ESG indicators for listed companies, and the definition and connotation of ESG have not yet reached a consensus, but there are also limitations in the research on the individual evaluation of listed companies' fulfillment of social responsibility and green development by relevant rating research institutions."	China
Komarnicka A., Komarnicki M.	Challenges in the EU Banking Sector as Exemplified by Poland in View of Legislative Changes Related to Climate Crisis Prevention	2022	ESG in banking sector	The climate awareness in the area of SMEs and the agricultural sector in Poland is low, and there is a certain skepticism in the transformation plan presented by the EU. In this aspect, it becomes necessary to properly prepare bank employees to act not only as financial advisors but also as ambassadors of the ESG idea among their customers. It is only this approach that guarantees that the law will not just be a legislated law, but primarily a living law that reflects the actual EU climate policy and involves citizens in its implementation	The EBA report offers a set of guidelines for the incorporation of ESG factors in banking but does not address the problematic lack of data for the proper application of the taxonomy	Poland

Kumar, N. C., Smith, C., Badis, L., Wang, N., Ambrosy, P., & Tavares, R.	ESG factors and risk-adjusted performance : a new quantitative model	2016	ESG factors & risks	Companies that incorporate Environmental, Social and Fair Governance (ESG) factors show lower volatility in their stock performances than their peers in the same industry, that each industry is affected differently by ESG factors, and that ESG companies generate higher returns	Could include longer time horizons, control for the size and geography of companies, and account for other ESG performance benchmarks beyond the Dow Jones Sustainability Index	Asia
Lee, O., Joo, H., Choi, H., & Cheon, M.	Proposing an Integrated Approach to Analyzing ESG Data via Machine Learning and Deep Learning Algorithms	2022	Machine learning ESG	Proposes the possibility of applying the AI algorithms to ESG datasets in an integrated approach	No real-life experiments yet	N/A
Liu., Guo T., Ping W., Luo L.	Sustainability and stability: Will ESG investment reduce the return and volatility spillover effects across the Chinese financial market?	2023	ESG spillover effect	The Chinese capital market is the main source of uncertainty concerning the relationship between ESG investment and financial market risk spillover effects in China + sustainability and stability are positively correlated and can be achieved concurrently	Preliminary investigation - ESG investment is still in its early stages in China, only a small number of listed companies are involved in ESG disclosure. And low quality of ESG disclosure	China
Liu, M.	The driving forces of green bond market volatility and the response of the market to the COVID-19 pandemic	2022	Green Finance	Non-pecuniary motives are key elements that distinguish green assets from other financial assets	Studies on quantifying the risk level of the green bond market are quite limited	Worldwide

Nizam, E., Ng, A., Dewandaru, G., Nagayev, R., & Nkoba, M.	The impact of social and environmental sustainability on financial performance: A global analysis of the banking sector	2019	Sustainability and financial performance	Access to finance has significantly positive effects on banks' financial performance in most estimation models controlling for both bank-specific and macroeconomic variables. The positive impact on financial performance is channeled through loan growth and management quality.	Lack of use of extended data period, research could employ time series estimation which may derive different estimation results	Worldwide
Pertseva, S. Y.	Socially Responsible Investing in the Context of a Green Economy	2022	Green finance	Developed countries are the drivers of socially responsible investing + Some SRI funds outperform traditional instruments in terms of their performance due to that ethical funds avoid many of the risks inherent in their classic counterparts.	Lack of the necessary liquidity on the domestic market + short history in Russia concerning SRI	Russia
Pham, L.	Is it risky to go green? A volatility analysis of the green bond market	2016	Volatility	The 'labeled' segment of the green bond market experiences large volatility clustering while the pattern of volatility clustering is weaker in the 'unlabeled' segment of the market	New market, first research to be done on volatility in green bond market	N/A
Rubbaniy, G., Khalid, A., Samitas, A., & Ali, S.	Are ESG stocks safe-haven during COVID-19?	2021	ESG in COVID-19	Findings show that the safe-haven properties of ESG indices hold over the long horizons and are affected by the choice of proxy of COVID-19 uncertainty	Controversial results between different indexes	Worldwide

Shen C., Wu M., Chen T., Fang H.	To engage or not to engage in corporate social responsibility: Empirical evidence from global banking sector	2016	Banking and CSR	Regardless of the methods used, CSR banks overwhelmingly outperform non-CSR banks in terms of return on assets and return on equity.	Compares "identical" banks do their research but makes assumptions on the identical part.	Worldwide
Singh A.	COVID-19 and safer investment bets	2020	Investment decisions	The relative outperformance of the ESG approach comes from the fact that the probability of its returns getting affected by the other two safer investment strategies increases during crisis periods. It implies the capital flowing away from the defensive and EAFE portfolios to the ESG portfolio. Investors find refuge in the ESG approach as it focuses on the long-run sustainability of firms.	Research limited to effect during COVID-19 with its implications	Worldwide
Taghizadeh-Hesary, F., & Hyun, S.	Green Digital Finance and Sustainable Development Goals	2022	Green digital finance	Besides the environmental benefit, green digital financing can increase financial inclusion and benefit the financial sector broadly. By the active collaboration between stakeholders on a national and global level and directing recourses in the right direction, the benefits of green digital finance to the world can be substantial	the requirement of regulation of ESG framework by governance may eventually result in overregulation or at best it may create additional compliance costs or a decline in competitiveness	EU

Tettamanzi, P., Venturini, G., & Murgolo, M.	Sustainability and Financial Accounting: A Critical Review on the ESG Dynamics	2022	The role of corporate governance is sustainability growth	IFRS Foundation (at global level) and EFRAG (at European one) have been taking steps toward the aforementioned issues so to propose disclosure standards more in line with sustainability and environmental needed improvements.	Limited focus on 2 institutions	Global level and European level
Torres, L., Ripa, D., Jain, A., Herrero, J., & Leka, S.	The potential of responsible business to promote sustainable work – An analysis of CSR/ESG instruments	2023	Aspects of labor and ESG frameworks	Managing employee issues and working conditions are progressively included as core components of CSR/ESG instruments	This paper did not consider sector/industry specific standards & 'frozen photograph' in today's context	Worldwide
Wilhelmsson, A.	Garch Forecasting Performance under Different Distribution Assumptions	2016	Garch Forecasting	Additional important insights can be gained by using forecasting performance as a model selection criterion and thus not by solely relying on in-sample estimation results.	Skewness present in financial returns	N/A
Yi, X., Bai, C., Lyu, S., & Dai, L.	The impacts of the COVID-19 pandemic on China's green bond market	2021	Green bonds	the COVID-19 pandemic has significant impacts on China's green bond market and increases the cumulative abnormal return (CAR) of the green bonds greatly. After the pandemic is relieved, the CAR drops significantly; the impacts of bond issuers' governance capacity, information asymmetry and debt-paying ability on the CAR of green bonds are significantly heterogeneous before and after	Research limited to effect during COVID-19 with its implications	China

				the pandemic due to their property rights and whether they are listed or not.		