

SUSTAINABLE METAMORPHOSIS: EXAMINING SUSTAINABILITY TRANSFORMATION INTO VALUE OF FINANCIAL INSTITUTIONS

Indrė LAPINSKAITĖ^{✉*}, Viktorija SKVARCIANY^{ORCID}

*Institute of Dynamic Management, Faculty of Business Management,
Vilnius Gediminas Technical University, Vilnius, Lithuania*

Received 24 September 2023; accepted 25 October 2023

Abstract. The relevance of sustainable development in the financial institution and its value is significant in today's financial landscape. This research aims to evaluate the efficiency of converting sustainable development outcomes, quantified through ESG, into a financial institution's valuation, measured by the P/E ratio. In order to reach the aim, the DEA method was applied. The results reveal that only one financial institution has an efficiency score of 1, signifying a notable efficiency level. Most financial institutions in the dataset possess efficiency scores (represented by theta) below 0.1, indicating a relative inefficiency in converting their E, S, and G scores into P/E ratios. The results reveal that high E, S, and G scores do not result in higher P/E ratios. It might be advisable to diversify investments across different financial institutions with diverse ESG profiles to mitigate risk and optimise returns. These potential research perspectives offer opportunities for a more profound understanding of the connection between ESG factors and the valuation of financial institutions. They allow for an examination of the quality and transparency of ESG reporting, considering the specific internal factors relevant to international financial institutions, as ESG continues to gain recognition as an integral component of a company's intangible assets.

Keywords: ESG, P/E ratio, financial institutions, diversified financial services and capital markets, insurance companies, banks, efficiency, data envelopment analysis (DEA).

JEL Classification: G21, G22, G32.

Introduction

As the world faces growing environmental and social challenges, there is a heightened focus on sustainable practices within the financial sector. Financial institutions increasingly integrate environmental, social, and governance (ESG) factors into their decision-making processes, including investment and lending strategies.

*Corresponding author. E-mail: indre.lapinskaite@vilniustech.lt

At the moment, in the world's deteriorating situation, sustainability is no longer questionable and unattainable, but also tangible, actions and results a continuous long way required phenomenon. In an ever-evolving world, sustainable development is transitioning from a mere luxury to a vital necessity for business survival. The escalating crisis of climate change, encompassing resource scarcity, pollution, and emerging social challenges, poses a substantial threat not only to the planet's overall well-being but also to the continuity of businesses (United Nations Secretary General, 2019). Consequently, a growing imperative is to adopt longer-term investment strategies encompassing a broader spectrum of considerations beyond purely financial metrics (Sun & Qiu, 2022). Therefore, it is necessary to carefully evaluate sustainable development results using more profound, more realistic indicators than financial ones. Accordingly, Sokolova and Teymurov (2021) stated a significant surge in scrutiny from institutions, investors, and the public regarding businesses' contributions to climate change consequences. As a result, numerous regulations and initiatives, such as Environmental, Social, and Governance (ESG) reporting, are being developed to enhance the transparency of business investment strategies.

Nevertheless, many companies grapple with the dilemma of allocating capital to sustainable development endeavours due to their limited tools and knowledge for assessing the outcomes and returns of such investments. Moreover, the concept of sustainability encompasses various pillars, including environmental, social, and governmental dimensions, each demanding a distinct approach to the development and execution of sustainability strategies (Landi et al., 2022). The complexity of this topic is further magnified when accounting for diverse industries and the specific ways sustainability concerns influence them (Sanchez-Planelles et al., 2022). Therefore, in consideration of financial institutions and their potential role in sustainable development, as well as their influence on these institutions' ultimate performance, the Price-to-Earnings (P/E) ratio has been selected as a vital financial metric for assessing financial institutions' value. Investors often see companies with strong ESG performance as more sustainable and less risky. They may be better positioned to manage environmental and social risks and are more likely to have robust governance structures in place. As a result, such companies may command higher valuations, leading to higher P/E ratios compared to their industry peers.

Consequently, the research *aims* to assess how efficiently sustainable development results, expressed as ESG scores, transform into a financial institution's value, expressed as the P/E ratio.

In order to evaluate the efficiency of the chosen companies, Data Envelopment Analysis (DEA) was opted. In the context of DEA, it is crucial to recognise and correctly define the inputs and outputs. In this study, E, S, and G scores are selected as inputs, each collected independently for the respective environmental (E), social (S), and governance (G) aspects. Simultaneously, the P/E ratio has been designated as the chosen output measure.

The findings indicate that Danske Bank stands alone among financial institutions, boasting an efficiency score of 1. The other is a group of financial institutions with efficiencies above 0.2 but not exceeding 0.27. This means that efficiency is just over 20 per cent, but not even 30 per cent. Consequently, it should be said that none of the financial institutions examined in the study is efficient in terms of E, S, G and P/E.

The rationale for this research lies in the growing recognition that sustainable practices contribute not only to environmental and social well-being but also to the long-term resilience and profitability of financial institutions.

The current paper is structured as follows. Firstly, the theoretical background is presented. Secondly, the methodology is explained. After the methodology, the results obtained from the research are presented along with the discussion. Finally, conclusions and limitations are provided.

1. Theoretical background

In order to evaluate and measure the results of sustainability activities, many tools, indices, accounting systems and matrices are offered. As the demand and need for sustainability reporting grows, companies start looking for various sustainability strategies, such as ESG, which is seen as the future of sustainability reporting standards (Ernst & Young [EY], 2021). Chen et al. (2023) stated that ESG inputs increase the short-term costs of a company but improve medium- and long-term performance. Atkins et al. (2023) stressed out the popularity of ESG increases due to the fact that various investors and representatives of interested companies expect companies to comply with strict ESG criteria. Important disclosures in ESG reports are not only environmental measures but also social issues, especially after the COVID-19 pandemic, which brought worldwide concerns about income inequality and workers' safety (MSCI ESG Research, 2021). The importance of the use of ESG in this study can be highlighted by Duque-Grisales and Aguilera-Caracuel (2021), who emphasise ESG as the essential basis for corporate social responsibility (CSR) in the development of sustainability strategies that affect the financial performance of companies.

In order to have a more comprehensive unified company's sustainability value, various organisations, based on their own methodology, estimate ESG scores for corporations. ESG concept is used in this paper as a basis for analysing a company's sustainable development. S&P Global ESG score (S&P Global, 2022) is used for the purpose of this thesis research. S&P Global is chosen because it utilises one of the most advanced ESG scoring methodologies in the market today by drawing upon over 20 years of experience (S&P Global, 2022). When assessing how efficiently sustainability transforms to a company's value, which is expressed as the P/E ratio, special attention must be paid not only to the structure of its sustainability strategy and different sustainability aspects such as E, S and G but also to the emphasise of the government aspect should be taken into consideration, as an essential phase of sustainability strategy (Rasmussen, 2020).

When talking about the concept of company value in the context of sustainable development, the first question is which dimension is the most correct and most reflective of the real situation. For evaluation of the company's value, which can have and reflect at least a fraction of the result of sustainable development, so far, there is no consensus. Therefore, various aspects across a broad spectrum should be examined. For instance, the assessment of a company's value often revolves around its market reputation, as explored by various researchers (Lo & Kwan, 2017; Zhang et al., 2019). For example, Hunt et al. (2017) delve into aspects such as employee productivity, talent acquisition, and innovation levels as indicators

of company value. Simultaneously, the most prevalent method for evaluating a company's value remains the examination of its financial ratios. Accordingly, taking into account the object under consideration – financial institutions, and reflecting the possible contribution of sustainable development, but also the impact on the final results of these institutions, P/E ratio is an important financial metric for evaluating financial institutions was chosen. The ratio combines a market-based component, represented by the stock price, with an accounting-based component, which encompasses the earnings included in the denominator of the earnings per share. Consequently, this ratio can be viewed as a hybrid blend, incorporating both market-based and accounting-based measures of financial performance (Isaacs, 2015). The primary rationale for utilising this ratio is its utility in helping stakeholders assess the value of a company's shares in comparison to those of its competitors, as highlighted by (Du Toit & Lekoloane, 2018). Lower P/E ratios are typically associated with companies characterised as having low growth prospects and higher risk. If companies boasting higher ESG scores exhibit correspondingly higher P/E ratios compared to those with lower ESG scores, it would imply that investors view them as safer investments with greater growth potential. Conversely, if these companies with higher ESG scores feature lower P/E ratios, the opposite inference would hold true (Kriek et al., 2008). While the P/E ratio is a valuable metric for assessing the valuation of financial institutions, it should be used in conjunction with other financial indicators and considered within the context of the unique factors that affect these institutions; this research assumes a valid *ceteris paribus* condition.

Theoretically speaking, the relationship between ESG factors and the P/E ratio is complex and multifaceted. Strong ESG practices can help companies mitigate various risks (Cornell, 2021), may be linked to reduced information asymmetry or improved disclosure quality (Lopez-de-Silanes et al., 2020), and lower risk profiles may translate into more stable earnings, which can, in turn, support higher P/E ratios. As sustainable goals are inherently long-term in nature, their impacts also manifest over an extended time horizon. Many authors (Henisz et al., 2019; Gary, 2019; Cappucci, 2018; Aich et al., 2021; Larcker et al., 2022) examine long-term perspective, and ESG-conscious investors tend to have a longer-term investment horizon. They are often willing to pay a premium for companies that prioritise sustainability because they believe these companies are better positioned to weather long-term challenges. This can contribute to higher P/E ratios for ESG leaders.

Investor sentiment can also play a role in the relationship between ESG and the P/E ratio. Some authors (Dhasmana et al., 2023) establish a connection between the ESG index and investor sentiment, though it is asymmetric and influenced by extreme market conditions; others (Ford et al., 2022) revealed that companies in the top ESG-rated portfolio receive notably more optimistic sentiment compared to those in the lowest portfolio, and other (Schmidt, 2019) examined ESG-related news, which appears to be correlated with a stock's financial performance. Therefore, on the whole, it can be stated that positive news or developments related to a company's ESG efforts can lead to increased investor interest and a higher stock price, potentially elevating the P/E ratio.

In summary, while there is no one-size-fits-all relationship between ESG and the P/E ratio, strong ESG performance can positively influence a company's valuation. Companies that prioritise ESG factors may enjoy a premium on their stock prices, resulting in higher P/E

ratios. However, the impact can vary depending on industry dynamics, investor sentiment, and the materiality of ESG issues for each specific company. Investors should consider both financial and ESG factors when evaluating the investment potential of a company.

2. Methodology

For assessing the efficiency of the selected companies, Data Envelopment Analysis (DEA) was chosen. The research covered 83 financial institutions. The financial institutions were selected based on the following criteria: 1) the companies that are listed on the S&P Global database (S&P Global, 2022) and provide free access to the Environmental, Social and Governmental (ESG) scores and separate Environmental (E), Social (S) and Governmental (G) scores were selected; 2) the companies that publish their P/E ratios in the same database (Wall Street Journal, 2023).

Only financial institutions that submitted both data were selected, so in the final, 23 companies from diversified financial services and capital markets, 24 insurance companies and 36 banks, covering 83 financial institutions from 18 countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, and the United Kingdom of Great Britain and Northern Ireland.

DEA was selected as it is indeed a powerful tool for efficiency assessment, particularly in the context of evaluating the relative efficiency of multiple decision-making units (DMUs), such as organisations, departments, or branches. DEA is designed to determine the relative efficiency of DMUs within a given set. DEA provides a benchmark for each DMU, which is the most efficient unit in the set. Other DMUs are compared to this benchmark, allowing companies to identify areas for improvement. In DEA, it is essential to identify and specify the inputs and outputs for the DMUs being evaluated. Inputs are the resources or factors that a DMU consumes or uses in its operations, while outputs are the products, services, or outcomes that a DMU produces or achieves. These inputs and outputs are fundamental to the DEA analysis and are used to assess the relative efficiency of the DMUs. In the present research, inputs are presented by E, S and G scores (collected separately for E, S and G), while the P/E ratio was selected as the output.

DEA is indeed a versatile and widely used technique in various research fields. For instance, DEA is often used in bank efficiency measurement (Chaudhary & Arora, 2022; Ferreira, 2020; Horvat et al., 2023; Thaker et al., 2022; Wu et al., 2022). Another field in which scholars apply DEA methodology is circular economy (Ding et al., 2020; Fan & Fang, 2020; Guo et al., 2023; Wang et al., 2021). There are works where DEA is used for companies' efficiency evaluation (Huang et al., 2021; Lin & Hong, 2020; Maziotis et al., 2020). Hence, the current research employs DEA for companies' efficiency evaluation. However, in the current research, unique inputs and outputs are used. As it was mentioned above, the inputs are E, S, and G, and the output – P/E ratio. The usage of selected indicators in the complex is underestimated, and this could be considered as a research gap. Therefore, the present research covers the mentioned gap and contributes to the existing knowledge in the field of efficiency calculation.

Before the efficiency calculations, the descriptive statistics were computed and provided in Table 1 (the initial data is provided in the Appendix).

Table 1. Descriptive statistics (source: authors' calculations)

Variable	Obs	Mean	Std. dev.	Min	Max
P/E ratio	83	16.19964	33.16165	1.4	291.74
E	83	54.46988	18.90047	14	93
S	83	53.19277	20.58857	12	94
G	83	58.72289	17.74914	26	91

For the present research, the DEA constant return to scale (CRS) output-oriented technique was chosen. The CRS assumption in DEA implies that the scale of operations is held constant. In other words, it assumes that the DMUs are operating at an optimal scale, neither underutilising nor overutilising their resources. This assumption is used to assess pure technical efficiency, focusing on how well a DMU utilises its resources to produce outputs. In an output-oriented DEA model, the goal is to assess the efficiency of DMUs in producing as many outputs as possible, given their input levels (Skica et al., 2019). This means that DMUs are evaluated based on their ability to maximise output production while holding their inputs constant. In practical terms, the DEA CRS output-oriented model evaluates the efficiency of each DMU by comparing their actual output levels to a “frontier” of best-performing DMUs, which are considered to be 100% efficient. DMUs that fall below this frontier are considered inefficient and may have opportunities to improve their operations. This model provides a benchmark for inefficient DMUs to strive for greater efficiency without changing the scale of their operations. The DEA CRS output-oriented model is particularly useful when assessing how efficiently companies are using their resources to produce outputs and identify areas where improvements can be made to enhance productivity. The primal equations for the CRS output-oriented model are given below:

$$\begin{aligned}
 & \text{Minimise } \sum_{i=1}^m v_i x_{ik}; \\
 & \text{s.t. } \sum_{i=1}^m v_i x_{ik} - \sum_{r=1}^s u_r y_{rj} \geq 0 \quad j = 1, \dots, n; \\
 & \quad \sum_{r=1}^s u_r y_{rk} = 1; \\
 & \quad u_r, v_i > 0 \quad \forall r = 1, \dots, s; \quad i = 1, \dots, m,
 \end{aligned}$$

where: y_{rk} – quantity of output r produced by company k ; x_{ik} – quantity of input i covered by company k ; u_r – the weights of output r ; v_i – the weights of input i ; n – number of countries to be evaluated; s – number of outputs; m – number of inputs.

As was mentioned above, E, S, and G indicators are used as inputs, and the P/E ratio values are used as output.

3. Results and discussion

In order to assess how efficiently the inputs represented by the E, S, and G scores transform to the output represented by the P/E ratio, DEA was completed, and the results are provided in Table 2.

Table 2. DEA results (source: authors' calculations)

Company	theta ¹	Rank	Company	theta	Rank
Danske Bank A/S	1	1	Eurobank Ergasias Svcs & Amp	0.030972	43
Quilter plc	0.264	2	Zurich Insurance Group AG	0.030804	44
Allfunds Group plc	0.258912	3	IG Group Holdings Plc	0.03007	45
Nordnet AB (publ)	0.21717	4	Intermediate Capital Group plc	0.029765	46
Groupe Bruxelles Lambert	0.206537	5	Storebrand ASA	0.029535	47
London Stock Exchange Group plc	0.201798	6	Piraeus Financial Holdings S.A	0.02941	48
SCOR SE	0.155255	7	Standard Chartered PLC	0.027181	49
Avanza Bank Holding AB (publ)	0.129007	8	Alpha Services And Holdings S.A	0.026546	50
Tryg A/S	0.105951	9	Banco BPM S.p.A.	0.026214	51
Schroders Plc	0.098688	10	AIB Group plc	0.026136	52
Partners Group Holding AG	0.091897	11	OTP Bank Nyrt.	0.025822	53
Admiral Group plc	0.088704	12	UnipolSai Assicurazioni S.p.A.	0.025268	54
Hargreaves Lansdown Plc	0.069436	13	DNB Bank ASA	0.024713	55
Amundi S.A.	0.069171	14	Legal & General Group Plc	0.023676	56
Azimut Holding S.p.A.	0.065603	15	ageas SA/NV	0.023664	57
Bank Handlowy w Warszawie S.A.	0.06227	16	Mapfre, S.A.	0.022618	58

¹ theta denotes efficiency score.

Continued Table 2

Company	theta ¹	Rank	Company	theta	Rank
NN Group N.V.	0.057013	17	Commerzbank AG	0.022554	59
Hannover Rück SE	0.054285	18	3i Group plc	0.022436	60
Helvetia Holding AG	0.05035	19	National Bank of Greece S.A.	0.02228	61
Talanx AG	0.049941	20	CaixaBank, S.A.	0.022255	62
Virgin Money UK PLC	0.048791	21	Nordea Bank Abp	0.021887	63
FinecoBank Banca Fineco S.p.A.	0.047645	22	AXA SA	0.021319	64
Gjensidige Forsikring ASA	0.047521	23	ASR Nederland N.V.	0.021183	65
Prudential Plc	0.046594	24	Banco de Sabadell, S.A.	0.018177	66
SpareBank 1 SR-Bank ASA	0.046326	25	Crédit Agricole S.A.	0.018	67
Wendel	0.046021	26	Intesa Sanpaolo S.p.A.	0.01781	68
Banca Mediolanum S.p.A.	0.044607	27	Poste Italiane Spa	0.017545	69
Bawag Group AG	0.043478	28	Investor AB (publ)	0.017399	70
Beazley plc	0.042194	29	Swedbank AB (publ)	0.017397	71
Santander Bank Polska S.A.	0.041055	30	Svenska Handelsbanken AB (publ)	0.01738	72
Man Group Plc	0.038346	31	HSBC Holdings plc	0.016696	73
Mediobanca Banca di Credito Finanziario S.p.A.	0.038195	32	Assicurazioni Generali S.p.A.	0.016082	74
Powszechny Zakład Ubezpieczeń SA	0.037913	33	NatWest Group plc	0.01567	75
MONETA Money Bank, a.s.	0.037496	34	BPER Banca SpA	0.015639	76
Julius Bär Gruppe AG	0.037113	35	UniCredit S.p.A.	0.015331	77
Swiss Re AG	0.036077	36	KBC Group NV	0.014826	78
Eurazeo SE	0.035549	37	Banco Santander, S.A.	0.014049	79
Erste Group Bank AG	0.034767	38	BNP Paribas SA	0.012874	80

End of Table 2

Company	theta ¹	Rank	Company	theta	Rank
Skandinaviska Enskilda Banken AB (publ)	0.034149	39	Deutsche Bank Aktiengesellschaft	0.011662	81
Vienna Insurance Group	0.033849	40	UBS Group AG	0.005361	82
Deutsche Börse AG	0.033687	41	Raiffeisen Bank International AG	0.003691	83
Swiss Life Holding AG	0.033649	42			

As shown in Table 2, the only financial institution that could be considered efficient is Danske Bank (theta is 1). This could be explained by the fact that the mentioned company has the highest P/E ratio (291.74). At the same time, the E, S and G scores are correspondingly 50, 31 and 39, which is not the highest compared to the remaining dataset. This means that not the highest E, S, and G scores transform to the highest P/E ratio, which leads to absolute efficiency. Another is the group of financial institutions, which theta is approx. 0.2 or higher, but no higher than 0.27. These are Quilter plc, Allfunds Group plc, Nordnet AB (publ), Groupe Bruxelles Lambert and London Stock Exchange Group plc. The efficiency scores are very similar; however, the initial data is different. For instance, for Nordnet AB (publ), the E score is 14, S – 18, G – 26, and the P/E ratio is 17.74. At the same time, for Allfunds Group plc, the E score is 43, S – 48, G – 64, and the P/E ratio is 64.96. The initial data is different, but the thetas are similar. This is due to the fact that in Nordnet AB's (publ) case, quite low inputs produce low output; in the second case, the high input values produce high output. So, the transformation process is almost the same. It should be noted that the majority of financial institutions' efficiency scores are lower than 0.1, i.e. lower than 10%. This is due to the fact that relatively high E, S, and G scores produce a low P/E ratio. It means that the financial institutions are inefficient.

The results obtained were surprising but were not exceptional. Because there are no similar studies, and the interaction between the results of sustainable development and the assessment of financial institutions has been vaguely examined, only a few authors who have examined this relationship even slightly are worth mentioning. Junius et al. (2020) seek to explore the relationship between ESG performance, firm performance, and market value. The study's key finding is that the ESG score does not significantly influence firm performance and market value, possibly due to the ESG score not being integrated into the measurement of firm performance at this stage. Ball (2020) analysed the connection between the ESG performance of listed companies on the stock exchange and their financial performance. The results revealed a negative relationship and correlation between a firm's ESG performance and its P/E ratio.

Some positive results have been obtained by Do and Pham (2020), who assessed the durability of earnings and investigated the correlation between sustainable earnings and the P/E ratio. The findings indicate that both the sustainable and non-sustainable segments of earnings growth have been empirically demonstrated to impact the P/E ratio.

Since, as already mentioned, there are very few studies combining and analysing the synergy of P/E and ESG, it is worth mentioning a few authors who have examined ESG and the performance of financial institutions as additional contributions to this analysis. Mouffy et al. (2021) explored four dimensions of sustainability and assessed their impact on bank performance. The findings unveiled a noteworthy positive correlation between the internal social dimensions of sustainability and bank performance. However, the study did not identify any conclusive evidence supporting a relationship between the environmental dimensions of sustainability and bank performance. Meanwhile, Rahi et al. (2022) investigated how ESG scores influence financial performance and discovered both positive and negative impacts. The study revealed a negative correlation between ESG practices and return on invested capital, return on equity, and earnings per share. Conversely, a positive correlation was identified between only one part of ESG scores – governance and return on assets.

Looking at the narrow range of studies that have been carried out, it is clear that there is no single answer and that more of the results are negative. It is therefore worth continuing and deepening the research in this area and seeking an answer as to why ESG is not as strongly reflected and manifested in the performance of financial institutions, particularly in terms of the P/E ratio, as sustainability practitioners would like.

Conclusions

Although theoretical analysis states that strong ESG performance has the potential to have a favourable impact on a company's valuation, the results reveal a different reality.

The research suggests that Danske Bank is the only financial institution with an efficiency score of 1 and the highest P/E ratio, indicating a high efficiency level in this specific context. However, other financial institutions in the dataset also exhibit varying degrees of efficiency in transforming their inputs into P/E ratios, as reflected by their theta values. Most financial institutions in the dataset have efficiency scores (theta) lower than 0.1, implying that they are relatively inefficient in transforming their E, S, and G scores into P/E ratios. This suggests that high E, S, and G scores do not necessarily lead to high P/E ratios for these financial institutions. It is essential to consider that efficiency and valuation can be influenced by various factors and metrics beyond just E, S, and G scores and P/E ratios.

It is important to note that other factors potentially leading to these results are the limitations of the research. Due to the lack of data availability, two criteria for selection of the companies were applied:

- The companies that are listed on the S&P Global database (S&P Global, 2022) and provide free access to the Environmental, Social and Governmental (ESG) scores and separate Environmental (E), Social (S) and Governmental (G) scores were selected.
- The companies that publish their P/E ratios in the same database (Wall Street Journal, 2023).

Only financial institutions that submitted both data were selected, so in the final, 23 companies from diversified financial services and capital markets, 24 insurance companies and 36 banks, covering 83 financial institutions from 18 countries.

Indeed, the research findings open up several avenues for further investigation and exploration in ESG and financial valuation of financial institutions. Some potential research directions could cover market anomalies when financial institutions with seemingly low ESG scores achieve high valuations or vice versa, consideration of broader macroeconomic trends and global events that may be influencing the relationship between ESG scores, P/E ratios and financial institutions' valuation, and analysis of the quality and transparency of ESG disclosure considering the internal company's factors, as ESG is increasingly recognised as an integral component of a company's intangible assets.

It should not be excluded that these negative results may also be influenced by intermediate internal institutional factors, which may mutually affect both the sustainability performance, in this case, expressed in terms of the ESG score and the P/E ratio, the financial institution's actual value proposition.

These research possibilities can provide deeper insights into the complex relationship between ESG factors and financial institutions' valuation, offering valuable guidance to investors, analysts, policymakers, and other stakeholders seeking to navigate the intersection of sustainability and companies' results.

The findings from this research have several practical implications for investors, financial analysts, and policymakers. Investors should be cautious about solely relying on ESG scores when making investment decisions, especially in the financial sector. Diversification across different financial institutions with varying ESG profiles may be prudent to manage risk and optimise returns. While ESG scores provide valuable insights into a financial institution's sustainability and ethical practices, they should be considered alongside other financial metrics and industry-specific factors influencing valuation. As varying efficiency levels in transforming ESG scores into P/E ratios suggest potential risk factors, stakeholders should consider how efficiently a financial institution converts ESG efforts into market value and whether this aligns with its risk tolerance and investment objectives. Policymakers and regulatory bodies should recognise that ESG factors may not solely determine financial institution valuation. Regulations and standards should be designed to encourage transparent reporting of ESG practices while considering the broader financial landscape.

References

- Aich, S., Thakur, A., Nanda, D., Tripathy, S., & Kim, H.-C. (2021). Factors affecting ESG towards impact on investment: A structural approach. *Sustainability*, 13(19), Article 10868. <https://doi.org/10.3390/su131910868>
- Atkins, J., Doni, F., Gasperini, A., Artuso, S., La Torre, I., & Sorrentino, L. (2023). Exploring the effectiveness of sustainability measurement: Which ESG metrics will survive COVID-19? *Journal of Business Ethics*, 185(3), 629–646. <https://doi.org/10.1007/s10551-022-05183-1>
- Ball, R. (2020). *Examining the relationship between ESG performance and financial performance of firms listed on the JSE*. <https://open.uct.ac.za/handle/11427/33634>
- Cappucci, M. (2018). The ESG integration paradox. *Journal of Applied Corporate Finance*, 30(2), 22–28. <https://doi.org/10.1111/jacf.12296>
- Chaudhary, R., & Arora, H. D. (2022). Efficiency evaluation of public and nationalized Indian banks using data envelopment analysis. *International Journal of System Assurance Engineering and Management*, 13(1), 469–478. <https://doi.org/10.1007/s13198-021-01297-3>

- Chen, S., Song, Y., & Gao, P. (2023). Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance. *Journal of Environmental Management*, 345, Article 118829. <https://doi.org/10.1016/j.jenvman.2023.118829>
- Cornell, B. (2021). ESG preferences, risk and return. *European Financial Management*, 27(1), 12–19. <https://doi.org/10.1111/eufm.12295>
- Dhasmana, S., Ghosh, S., & Kanjilal, K. (2023). Does investor sentiment influence ESG stock performance? Evidence from India. *Journal of Behavioral and Experimental Finance*, 37, Article 100789. <https://doi.org/10.1016/j.jbef.2023.100789>
- Ding, L., Lei, L., Wang, L., & Zhang, L. (2020). Assessing industrial circular economy performance and its dynamic evolution: An extended Malmquist index based on cooperative game network DEA. *Science of The Total Environment*, 731, Article 139001. <https://doi.org/10.1016/j.scitotenv.2020.139001>
- Do, N. H., & Pham, N. V. T. (2020). The influence of sustainable earnings on stock price: evidence from publicly listed Vietnamese business enterprises. *Asian Academy of Management Journal of Accounting and Finance*, 16(2), 101–121. <https://doi.org/10.21315/aamjaf2020.16.2.5>
- Du Toit, E., & Lekoloane, K. (2018). Corporate social responsibility and financial performance: Evidence from the Johannesburg stock exchange, South Africa. *South African Journal of Economic and Management Sciences*, 21(1), Article 1799. <https://doi.org/10.4102/sajems.v21i1.1799>
- Duque-Grisales, E., & Aguilera-Caracuel, J. (2021). Environmental, social and governance (ESG) scores and financial performance of multinationals: Moderating effects of geographic international diversification and financial slack. *Journal of Business Ethics*, 168(2), 315–334. <https://doi.org/10.1007/s10551-019-04177-w>
- Ernst & Young. (2021). *The future of sustainability reporting standards*. EY. Oxford Analytica. https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/sustainability/ey-the-future-of-sustainability-reporting-standards-june-2021.pdf
- Fan, Y., & Fang, C. (2020). Circular economy development in China-current situation, evaluation and policy implications. *Environmental Impact Assessment Review*, 84, Article 106441. <https://doi.org/10.1016/j.eiar.2020.106441>
- Ferreira, C. (2020). Evaluating European bank efficiency using data envelopment analysis: Evidence in the aftermath of the recent financial crisis. *International Advances in Economic Research*, 26(4), 391–405. <https://doi.org/10.1007/s11294-020-09807-y>
- Ford, J. M., Gehricke, S. A., & Zhang, J. E. (2022). Option traders are concerned about climate risks: ESG ratings and short-term sentiment. *Journal of Behavioral and Experimental Finance*, 35, Article 100687. <https://doi.org/10.1016/j.jbef.2022.100687>
- Gary, S. N. (2019). Best interests in the long term: Fiduciary duties and ESG integration. *University of Colorado Law Review*, 90, 731–801. <https://ssrn.com/abstract=3149856>
- Guo, C., Zhang, R., & Zou, Y. (2023). The efficiency of China's agricultural circular economy and its influencing factors under the rural revitalization strategy: A DEA–Malmquist–Tobit approach. *Agriculture*, 13(7), Article 1454. <https://doi.org/10.3390/agriculture13071454>
- Henisz, W., Koller, T., & Nuttall, R. (2019). *Five ways that ESG creates value*. McKinsey Quarterly.
- Horvat, A. M., Milenković, N., Dudić, B., Kalaš, B., Radovanov, B., & Mittelman, A. (2023). Evaluating bank efficiency in the West Balkan countries using data envelopment analysis. *Mathematics*, 11(1), Article 15. <https://doi.org/10.3390/math11010015>
- Huang, H.-L., Liang, L.-W., Chang, H.-Y., & Hsu, H.-Y. (2021). The influence of earnings management and board characteristics on company efficiency. *Sustainability*, 13(21), Article 11617. <https://doi.org/10.3390/su132111617>
- Hunt, N. D., Hill, J. D., & Liebman, M. (2017). Reducing freshwater toxicity while maintaining weed control, profits, and productivity: Effects of increased crop rotation diversity and reduced herbicide usage. *Environmental Science & Technology*, 51(3), 1707–1717. <https://doi.org/10.1021/acs.est.6b04086>

- Isaacs, W. (2015). *What is a PE ratio?* AllanGrey. <https://www.allangray.co.za/latest-insights/investment-insights/what-is-a-pe-ratio/>
- Junius, D., Adisurjo, A., Rijanto, Y. A., & Adelina, Y. E. (2020). The impact of ESG performance to firm performance and market value. *Jurnal Aplikasi Akuntansi*, 5(1), 21–41. <https://doi.org/10.29303/jaa.v5i1.84>
- Kriek, J. H., Beekman, E., & Els, G. (2008). *Fundamentals of finance: A practical guide to the world of finance* (4th ed.). LexisNexis Butterworths.
- Landi, G. C., Iandolo, F., Renzi, A., & Rey, A. (2022). Embedding sustainability in risk management: The impact of environmental, social, and governance ratings on corporate financial risk. *Corporate Social Responsibility and Environmental Management*, 29(4), 1096–1107. <https://doi.org/10.1002/csr.2256>
- Larcker, D. F., Tayan, B., & Watts, E. M. (2022). Seven myths of ESG. *European Financial Management*, 28(4), 869–882. <https://doi.org/10.1111/eufm.12378>
- Lin, Y.-H., & Hong, C.-F. (2020). Efficiency and effectiveness of airline companies in Taiwan and Mainland China. *Asia Pacific Management Review*, 25(1), 13–22. <https://doi.org/10.1016/j.apmr.2019.04.002>
- Lo, K. Y., & Kwan, C. L. (2017). The effect of environmental, social, governance and sustainability initiatives on stock value – examining market response to initiatives undertaken by listed companies. *Corporate Social Responsibility and Environmental Management*, 24(6), 606–619. <https://doi.org/10.1002/csr.1431>
- Lopez-de-Silanes, F., McCahery, J. A., & Pudschedl, P. C. (2020). ESG performance and disclosure: A cross-country analysis. *Singapore Journal of Legal Studies*, 217–241. <https://search.informit.org/doi/10.3316/agispt.20200715033349>
- Maziotis, A., Villegas, A., Molinos-Senante, M., & Sala-Garrido, R. (2020). Impact of external costs of unplanned supply interruptions on water company efficiency: Evidence from Chile. *Utilities Policy*, 66, Article 101087. <https://doi.org/10.1016/j.jup.2020.101087>
- Moufty, S., Clark, E., & Al-Najjar, B. (2021). The different dimensions of sustainability and bank performance: Evidence from the EU and the USA. *Journal of International Accounting, Auditing and Taxation*, 43, Article 100381. <https://doi.org/10.1016/j.intaccudtax.2021.100381>
- MSCI ESG Research. (2021). *Climate reality bites: Actually, we may not always have Paris. Beyond boom and bust. ESG investment finds its footing. To bee or not to bee: Investors tackle the biodiversity crisis.* MSCI.
- Rahi, A. F., Akter, R., & Johansson, J. (2022). Do sustainability practices influence financial performance? Evidence from the Nordic financial industry. *Accounting Research Journal*, 35(2), 292–314. <https://doi.org/10.1108/ARJ-12-2020-0373>
- Rasmussen, J. (2020). The role of structural context in making business sense of investments for sustainability – A case study. *Sustainability*, 12(17), Article 7006. <https://doi.org/10.3390/su12177006>
- S&P Global. (2022). *ESG scores.* <https://www.spglobal.com/esg/solutions/data-intelligence-esg-scores>
- Sanchez-Planelles, J., Segarra-Oña, M., & Peiro-Signes, A. (2022). Identifying different sustainable practices to help companies to contribute to the sustainable development: Holistic sustainability, sustainable business and operations models. *Corporate Social Responsibility and Environmental Management*, 29(4), 904–917. <https://doi.org/10.1002/csr.2243>
- Schmidt, A. (2019). Sustainable news – A sentiment analysis of the effect of ESG information on stock prices. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3809657>
- Skica, T., Leśniowska-Gontarz, M., & Miszczyńska, K. (2019). Measuring the efficiency of Polish municipalities – Data envelopment analysis approach. *South East European Journal of Economics and Business*, 14(2), 54–66. <https://doi.org/10.2478/jeb-2019-0013>

- Sokolova, N. A., & Teymurov, E. S. (2021). Correlation of sustainable development goals and ESG principles. *Courier of Kutafin Moscow State Law University (MSAL)*, 12, 171–183. <https://doi.org/10.17803/2311-5998.2021.88.12.171-183>
- Sun, Y., & Qiu, Z. (2022). Positive performance feedback and innovation search: New ideas for sustainable business development. *Sustainability*, 14(4), Article 2086. <https://doi.org/10.3390/su14042086>
- Thaker, K., Charles, V., Pant, A., & Gherman, T. (2022). A DEA and random forest regression approach to studying bank efficiency and corporate governance. *Journal of the Operational Research Society*, 73(6), 1258–1277. <https://doi.org/10.1080/01605682.2021.1907239>
- United Nations Secretary-General's. (2019). *Roadmap for financing the 2030 agenda for sustainable development 2019–2021*. United Nations.
- Wall Street Journal. (2023). *WSJ Markets*. <https://www.wsj.com/market-data/quotes/FR/XPAR/MF/financials/annual/balance-sheet>
- Wang, S., Lei, L., & Xing, L. (2021). Urban circular economy performance evaluation: A novel fully fuzzy data envelopment analysis with large datasets. *Journal of Cleaner Production*, 324, Article 129214. <https://doi.org/10.1016/j.jclepro.2021.129214>
- Wu, H., Yang, J., Wu, W., & Chen, Y. (2022). Interest rate liberalization and bank efficiency: A DEA analysis of Chinese commercial banks. *Central European Journal of Operations Research*. <https://doi.org/10.1007/s10100-022-00817-1>
- Zhang, G., Fang, C., Zhang, W., Wang, Q., & Hu, D. (2019). How does the implementation of the new environmental protection law affect the stock price of heavily polluting enterprises? Evidence from China's capital market. *Emerging Markets Finance and Trade*, 55(15), 3513–3538. <https://doi.org/10.1080/1540496X.2019.1648250>

APPENDIX

	Company	PE	E	S	G
1	Storebrand ASA	15.51	90	88	87
2	Danske Bank A/S	291.74	50	31	39
3	DNB Bank ASA	8.94	62	44	57
4	Svenska Handelsbanken AB (publ)	7.2	71	71	66
5	Nordea Bank Abp	7.79	61	57	79
6	Swedbank AB (publ)	7.41	73	74	78
7	Gjensidige Forsikring ASA	18.3	66	45	58
8	SpareBank 1 SR-Bank ASA	8.92	33	21	37
9	Santander Bank Polska S.A.	10.54	44	45	48
10	Skandinaviska Enskilda Banken AB (publ)	7.97	40	46	46
11	Allfunds Group plc	64.96	43	48	64
12	Avanza Bank Holding AB (publ)	16.56	22	29	31
13	BNP Paribas SA	6.31	84	90	80
14	Crédit Agricole S.A.	5.79	56	45	43
15	Deutsche Bank Aktiengesellschaft	4.1	65	74	47
16	HSBC Holdings plc	6.04	62	59	64
17	NatWest Group plc	5.76	63	65	58

	Company	PE	E	S	G
18	Nordnet AB (publ)	17.74	14	18	26
19	Standard Chartered PLC	9.04	57	42	48
20	UBS Group AG	2.44	78	86	74
21	AIB Group plc	9.76	64	66	73
22	Bank Handlowy w Warszawie S.A.	5.45	15	31	26
23	Powszechny Zakład Ubezpieczeń SA	7.3	33	37	41
24	Tryg A/S	24.11	39	39	53
25	Investor AB (publ)	4.67	46	44	50
26	Virgin Money UK PLC	5.51	41	12	50
27	Vienna Insurance Group	5.53	28	29	40
28	Bawag Group AG	9.64	38	41	55
29	Erste Group Bank AG	5.68	28	40	43
30	Raiffeisen Bank International AG	1.4	65	57	63
31	ageas SA/NV	7.18	52	42	57
32	Groupe Bruxelles Lambert	59.05	49	53	54
33	KBC Group NV	7.18	83	69	75
34	MONETA Money Bank, a.s.	8.97	41	32	41
35	AXA SA	10.2	82	94	91
36	Amundi S.A.	10.09	25	26	35
37	Eurazeo SE	7.18	65	24	27
38	SCOR SE	61.6	68	55	68
39	Wendel	16.38	61	71	77
40	Hannover Rück SE	14.57	46	39	46
41	Deutsche Börse AG	18.28	93	78	75
42	Commerzbank AG	6.58	50	42	48
43	Talanx AG	12.53	43	35	43
44	Piraeus Financial Holdings S.A	5.72	51	38	26
45	Alpha Services And Holdings S.A	6.97	45	52	41
46	Eurobank Ergasias Svcs &Amp	5.06	28	58	54
47	National Bank of Greece S.A.	4.81	37	51	43
48	OTP Bank Nyrt.	4.52	30	45	48
49	BPER Banca SpA	5.11	56	52	54
50	Banca Mediolanum S.p.A.	9.63	37	54	56
51	UnipolSai Assicurazioni S.p.A.	10.91	74	77	78
52	Assicurazioni Generali S.p.A.	8.07	86	93	89
53	Azimut Holding S.p.A.	6.89	18	48	33
54	Banco BPM S.p.A.	6.73	44	58	59
55	FinecoBank Banca Fineco S.p.A.	13.9	50	70	73
56	Intesa Sanpaolo S.p.A.	7.69	74	85	81

	Company	PE	E	S	G
57	Mediobanca Banca di Credito Finanziario S.p.A.	10.92	49	59	67
58	Poste Italiane Spa	7.78	76	89	90
59	UniCredit S.p.A.	4.92	55	66	67
60	ASR Nederland N.V.	9.27	75	85	83
61	NN Group N.V.	26.28	79	73	86
62	Banco Santander, S.A.	6.23	76	83	86
63	Banco de Sabadell, S.A.	7	66	76	76
64	CaixaBank, S.A.	8.83	68	82	84
65	Mapfre, S.A.	9.37	71	85	82
66	Helvetia Holding AG	12.32	56	26	40
67	Julius Bär Gruppe AG	11.91	55	49	54
68	Partners Group Holding AG	26.81	50	56	74
69	Swiss Life Holding AG	11.78	60	46	61
70	Swiss Re AG	16.84	80	86	91
71	Zurich Insurance Group AG	13.48	75	70	79
72	3i Group plc	4.32	33	37	60
73	Admiral Group plc	19.15	37	38	58
74	Beazley plc	10.34	42	38	58
75	Hargreaves Lansdown Plc	14.18	35	40	47
76	IG Group Holdings Plc	7.72	44	29	47
77	Intermediate Capital Group plc	13.72	79	56	67
78	Legal & General Group Plc	9.67	70	58	80
79	London Stock Exchange Group plc	64.57	79	34	48
80	Man Group Plc	8.3	44	23	40
81	Prudential Plc	16.04	59	56	66
82	Quilter plc	40.05	26	44	53
83	Schroders Plc	14.86	63	16	34