

The Impact of ESG on Firm Risk and Financial Performance: A Systematic Literature Review

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ABSTRACT

As global interest in ESG has skyrocketed, research on the impact of ESG on firm risk and financial performance has also emerged as a trending area of investigation. The aim of this study is to furnish a thorough overview of existing research on the impact of ESG on firm risk and financial performance. We present a systematic literature review of recent published articles. To this end, 35 articles on ESG and firm risk and 120 articles on ESG and financial performance from January 2013 to September 2023 were reviewed. Findings reveal, first, research on the impact of ESG on firm risk and financial performance is increasingly gaining attention. Second, most of the research themes focus on idiosyncratic risk, systematic risk, stock price crash risk and default risk, while market-based and accounting-based financial performance is almost evenly split. Third, scholars have used diverse research methods but most of them use fixed effects of panel model. Moreover, scholars have not reached a consensus conclusion on this topic. For East Asia and ASEAN countries, the research methods employed are not yet sufficiently diverse. This paper comprehensively summarizes the research methods and subdivisions on this topic. This explores research gaps and provides insights for future research. In addition, this study provides a reference for East Asia and ASEAN countries to achieve sustainable economic growth and development.

Keywords: ESG, Firm risk, Financial performance, Systematic literature review, East Asia and ASEAN countries, Sustainable economic development.

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Received: 18-02-2024;

Revised: 15-04-2024;

Accepted: 20-11-2024.

INTRODUCTION

After experiencing the wave of social responsibility in the 90s, in the 21st century, the concept of ESG gradually formed and developed. ESG was first put forth by the United Nations Global Compact in 2004. The primary goal was to mitigate non-financial risks related to investment by integrating environmental, social and governance considerations into investment choices.^[1] Nowadays, ESG is an important focus of attention for global enterprises, investors and regulators. It refers to the use of non-financial data to evaluate a firm's ethical and sustainable impact.^[2]

Businesses are consumers of resources, at the same time, business activities and the environment have a mutually influential and interconnected relationship. The rapid development of the industrial economy in the 20th century brought about a highly advanced material civilization for human beings, but it also led to increasingly prominent environmental problems. For example,

acid rain spreading, ozone depletion, biodiversity loss, global warming, deforestation, water pollution, air pollution and natural disasters.^[3,4] At the same time, capital's pursuit of maximizing economic returns brings about additional social problems, such as gender inequality in workplace, terrible workplace and income disparities. While environmental and social issues may attract media attention, problems with corporate governance cannot be ignored. For example, tax strategy, executive pay, board diversity, board structure, bribery, corruption, trade association, lobbying, donations and so on. It is urgent to solve these problems. In this extent, ESG was widely promoted around the world. Today, "Black Swan" events occur frequently and the risks faced by firms are increasing, thereby impacting the financial performance of firms. This further confirms the necessity for firms and policymakers to consider ESG factors.^[5,6]

The academic world is also paying increasingly close attention to ESG. Especially since 2019, the number of articles published about ESG has increased rapidly.^[7] Considerable research has been carried out on the relationship between ESG and firm risk as well as financial performance.

Within the ESG domain, there are several pieces of research based on literature reviews. Specifically, Gao *et al.* 2021^[8] and



DOI: 10.5530/jscires.20041187

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Wan *et al.* 2023^[7] performed a bibliometric analysis in ESG fields. In a correlative study in this subject area, Ellili 2022^[9] combined with the method of systematic review. After this, Savio *et al.* 2023^[10] control the time frame of the study to the Covid-19 period. In addition, ESG and firm performance were studied by Khan 2022^[11] using bibliometric and meta-analysis techniques. However, to date, based on the information available to us, there is a noticeable absence of systematic literature reviews addressing the effects of ESG on firm risk and financial performance, especially the analysis of research methods and subdivisions. The goal of this study is to fill the current gaps in the existing literature.

This study makes three contributions. First, we provide detailed statistics on the research methods used by scholars to study the impact of ESG on firm risk and financial performance, as well as the types of risks and financial performance involved in different research methods. Second, the actual “ESG-firm risk” and “ESG-financial performance” relationships have not yet been conclusively determined. This study statistically analysis the proportions of different conclusions to discover what conclusions most scholars have reached. Finally, we compare research on this topic in East Asia and ASEAN countries with that in other regions to contribute insights for future research in East Asia and ASEAN countries. In short, our findings contribute valuable information that can guide future studies in this field. Moreover, it will function as a point of reference for firms to integrate ESG knowledge and insights.

The rest of this paper is organized as follows: The methodology and data collection process are covered in Section 2. Subsequently, Section 3 presents the findings and discussions. Section 4 states the conclusion. Finally, Section 5 brings attention to the study’s limitation and indicates potential directions for future research.

METHODOLOGY AND DATA

This study seeks to identify the research focus of scholars and provide new insights into this field of study. To achieve the goal, four research questions are posited.

What are the trends and features of research on the relationship between ESG and firm risk and ESG and financial performance?

What are the main methods used to study this topic?

What are the effects of ESG on firm risk and financial performance in the literature?

What are the key gaps in the current research on this topic?

To answer the research questions, we used systematic literature review as a tool to ensure that all literatures on this topic were covered. A systematic literature review involves gathering and synthesizing multiple studies to address a specific research question, it is more rigorous than other type of reviews.^[12] This approach helps to provide a panorama of the research field

concerning the “ESG-firm risk” and “ESG-financial performance” relationship, supporting newcomers in understanding the research dynamics in this field.

Literature research

The publications were gathered from Scopus and Web of Science (WoS) Core Collection database. They are the two primary bibliographic databases for researchers and are generally considered the most comprehensive data sources.^[13] At the same time, Boolean logic search is used.

For the purpose of investigating how ESG impact firm risk, we looked for "ESG" OR “environmental, social and governance” AND "stock price crash risk" OR “default risk” OR “systemic risk” OR “systematic risk” OR “market risk” OR “idiosyncratic risk” OR “credit risk” OR “financial risk” OR “operating risk” OR “liquidity risk” AND "company" OR "firm" OR "corporate" OR “bank” OR “financial institutions” AND “relationship” OR “impact” OR “affect” AND NOT “ESG risk” (coded in Scopus as TITLE-ABS-KEY). Using WoS, the Boolean logic statement is similar but coded in WoS as Topic. In addition, it's worth mentioning that some search strings were redefined to handle WoS's search format.

Further, to analysis how ESG impact financial performance, we limited the analysis to "ESG" OR “environmental, social and governance” AND “financial performance” OR “profitability” OR “asset quality” OR “solvency” OR “operational” AND "company" OR "firm" OR "corporate" OR “bank” OR “financial institutions” AND “relationship” OR “impact” OR “affect” (coded in Scopus as TITLE-ABS-KEY). In WoS, the Boolean logic statement is similar but searched within Topic. Same as above, some search strings were also different between WoS and Scopus.

Next, we followed the PRISMA protocol to capture eligible research articles in the two databases of Scopus and WoS, respectively. Our data spans January 2013 to September 2023. January 2013 was chosen as the initial point due to the earliest article on the overall impact of ESG on firm risk and financial performance was published in 2013. Before 2013, based on our search, we found only literatures discussing the impact of ESG pillars on financial performance. Yet, this systematic literature review did not focus on ESG pillars. The data was cut off at September 2023 because we downloaded the data on the last day of September 2023. Figures 1 and 2 details the inclusion criteria and the selection process used.

Search output

In the next step, each article was individually read and articles irrelevant to the research topic were excluded. It is worth noting that if the paper studies sustainability, supply chain sustainability or Corporate Social Responsibility (CSR), but the original authors use ESG to measure these items, then we screened out such articles. In addition, if the original authors did not study

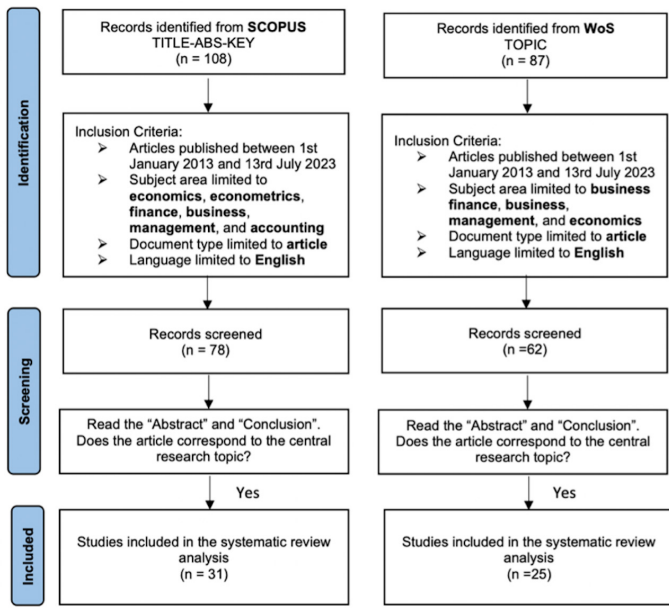


Figure 1: Process of article selection in analyzing the “ESG-risk” relationship.

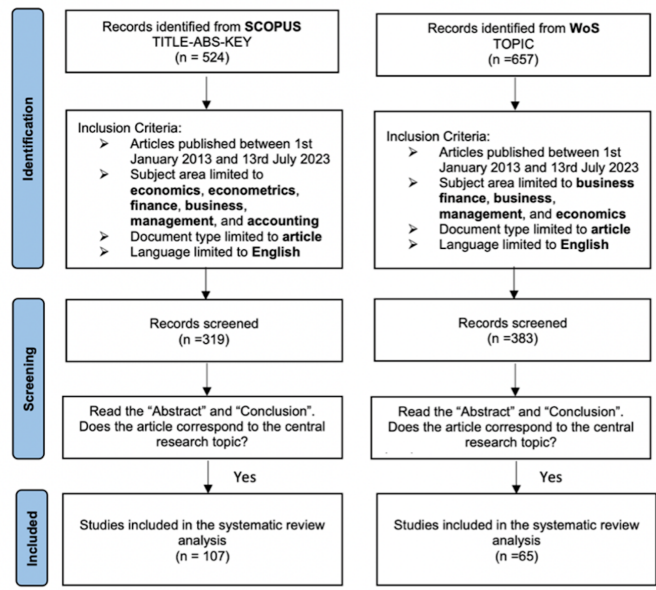


Figure 2: Process of article selection in analyzing the “ESG-financial performance” relationship.

ESG combined, but only studied the three ESG pillars (E, S and G) or just one pillar and then we excluded such articles. What’s more, some scholars studied the moderating variables between ESG and firm risk or financial performance but did not study the direct relationship. Such articles were also excluded during data collection process.

Finally, regarding how ESG affect firm risk, the search yielded a total of 31 articles from Scopus and 25 from WoS. Among them, 21 were overlapped by two databases. Targeting the “ESG-financial performance” relationship, we retrieved more articles, 107 from

Scopus and 65 from WoS. Among them, there are 52 duplicate articles. In the end, the number of articles analyzed under the topic of ESG’s impact on firm risk was 36 and the number of articles analyzed under the topic of ESG’s impact on financial performance was 120. Figures 3 and 4 describe the distribution of articles by the two databases.

Extraction of data

From the review of each original article, the following eight items of information were recorded: (i) author(s), (ii) article title, (iii) publication year, (iv) source title, (v) citations, (vi) country, (vii) research theme, (viii) research method, (ix) conclusion. Among them, the first five items are directly derived from two databases and the last four items are obtained by us through reading articles. Based on these data, we present the review findings and conclusions.

REVIEW FINDINGS

This study delved into 35 research articles collected from a range of 24 journals on the topic of “ESG-firm risk” relationship. When studying the “ESG-financial performance” relationship, 120 articles from 82 different journals were analyzed.

Under the theme of “ESG-firm risk”, more than one half of the articles (59.97%) are from nine journals (see Figure 5). All other journals published only one article. Regarding “ESG-financial performance”, journals are more dispersed, with *Business Strategy and the Environment* having the highest number of published articles, accounting for only 5.00% (see Figure 6).

In general, the sources of papers are relatively scattered and there is no situation in which one or several journals have significantly more publications than others.

Publication trend

The purpose of analyzing the number of articles published every year is to reflect research hotspots and trends in this field. It evident from Figure 7, from January 2013 to September 2023, the number of published papers relating to the “ESG-risk” and “ESG-financial performance” relationships are both generally on the rise. Among them, there were two significant jumps in the number of publications on the “ESG-financial performance” relationship. Once in 2019 and once in 2022 when 11 and 40 studies were published, respectively. As for the number of publications on the “ESG-firm risk” relationship, there was only one significant increase in 2022. In just ten years from 2013 to 2022, the number of publications has increased by 12 times. Moreover, a noticeable trend is the substantial disparity in the volume of publications between the “ESG-financial performance” and “ESG-firm risk” relationship. In East Asia and ASEAN countries, research on such topics started relatively late compared to other regions, only emerging in 2017. However, there has also been a rising research trend in recent years. These results show

that the topic of the impact of firm ESG practices on itself has received more and more attention from scholars, especially from a financial performance standpoint. It also proves that the topic of this paper is worthy of research.

Geographical distribution

The geographical distribution of the reviewed studied on this topic is shown in Figures 8 and 9, respectively.

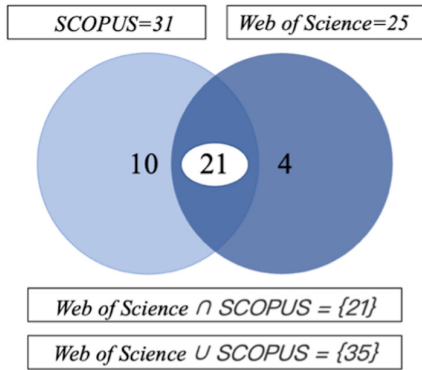


Figure 3: Review article allocation based on databases in the “ESG-risk” relationship.

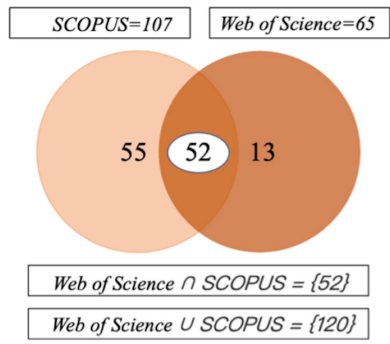


Figure 4: Review article allocation based on databases in the “ESG-financial performance” relationship.

Among the studies that analyzed the “ESG-firm risk” relationship, scholars came mainly from Asia, Europe, Oceania and North America. The primary location of authors contributing the most is China, Germany, followed by United States and Italy. The number of publications is nine, seven, four and four, respectively. The remaining countries only produced one or two studies each. Also, from the map we can see that East Asia and Europe are the leading regions in this research topic.

In contrast, the country-by-country distribution of authors on the “ESG-financial performance” relationship is much broader. Observing Figure 9, it is involved in nearly every continent except Antarctica. United Kingdom and India are countries with notable contributions with 23 and 21 publications, respectively. Followed by Bahrain (12) and Malaysia (9). In a word, Europe and South Asia lead the way in this area.

Overall, there is a broad global distribution of authors investigating this topic, particularly in studies exploring the “ESG-financial performance” relationship. What’s more, East Asia and ASEAN countries are in the upper middle of the world in terms of the amount of publications on this topic. This observation also reflects the widespread interest and engagement with this topic.

The most cited articles

In this section, an analysis is presented for the 10 articles that received the highest number of citations in Scopus and WoS database from January 2013 to September 2023.

Figure 10 presents the 10 most cited articles related to the “ESG-risk” relationship. The most notable study was the one written by Sassen *et al.* 2016,^[14] published in *Journal of Business Economics* with 156 citations. They explored how ESG impact systematic, idiosyncratic and total risk of firms. The study found mixed relationship. Following closely behind the top-ranking article is another highly cited work authored by Stellner *et al.* 2015,^[15] which published in *Journal of Banking and Finance*. The article found weak evidence that corporate social performance, which measured by ESG ratings, consistently led to a reduction in credit risk. Chollet and Sandwidi 2018^[16] received the third-highest citations, with 84 citations over five years. The

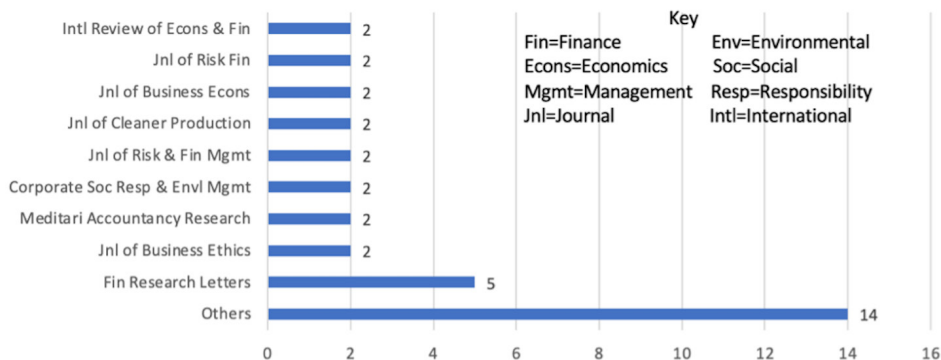


Figure 5: Journal distribution of reviewed articles in the “ESG-risk” relationship.

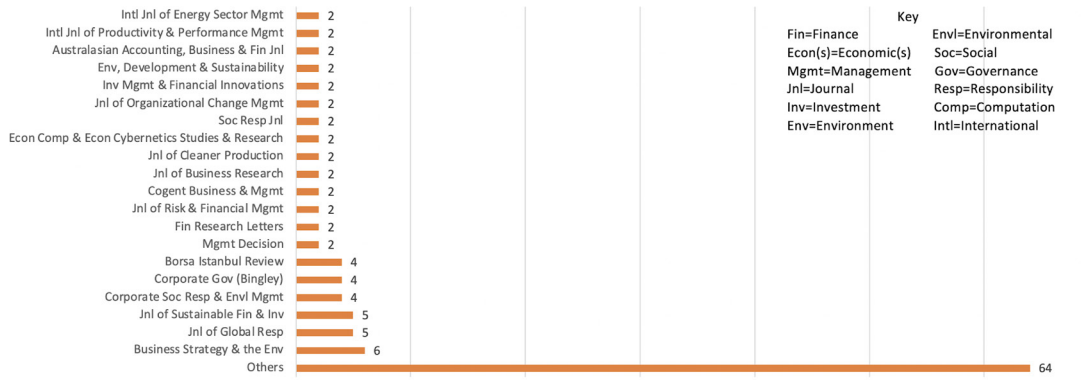


Figure 6: Journal distribution of reviewed articles in the “ESG-financial performance” relationship.

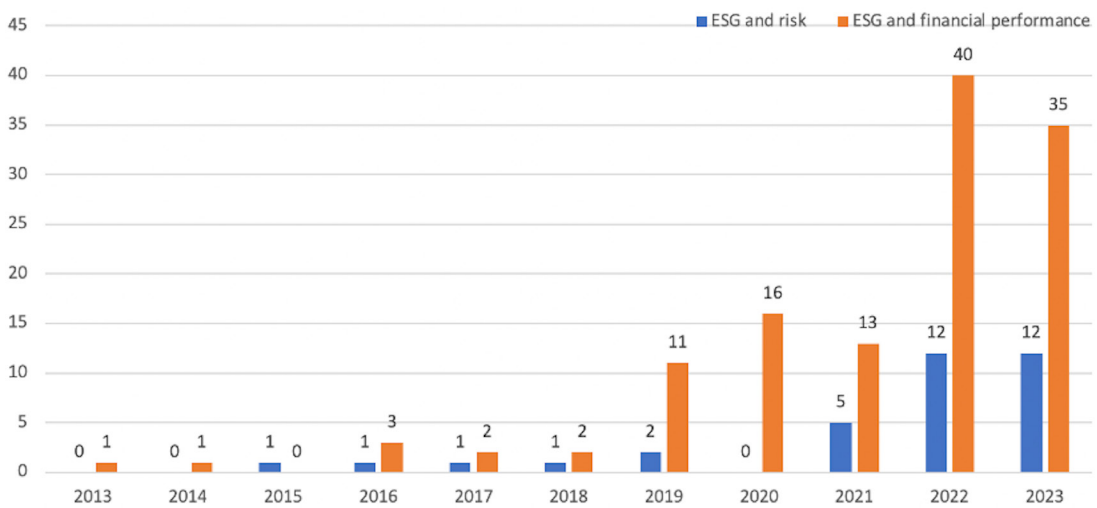


Figure 7: Number of annual published articles in the study (2013.01-2023.09).

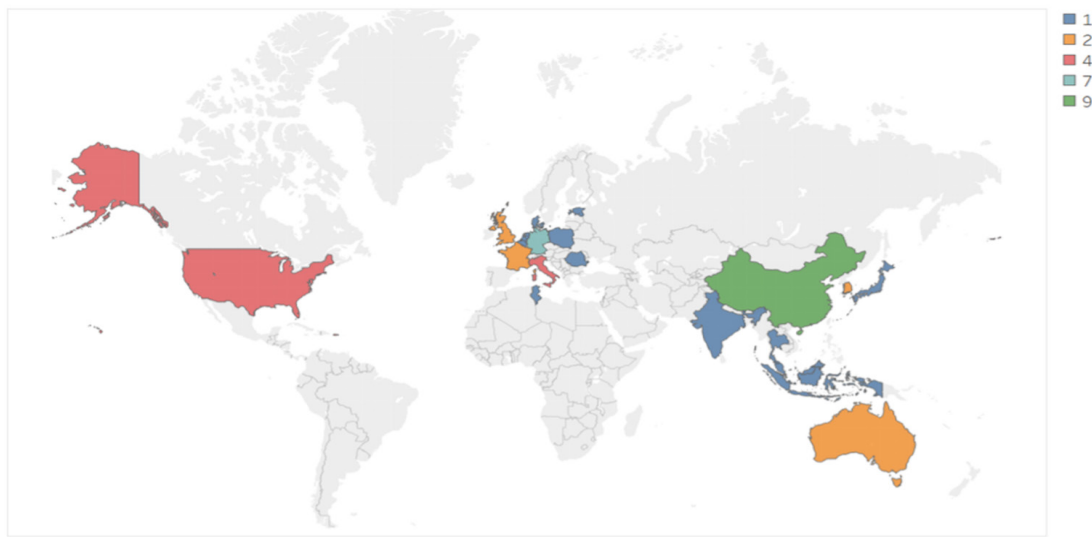


Figure 8: Geographical distribution of publications in the “ESG-risk” relationship.

paper examines the impact of corporate social responsibility on systematic, firm-specific and total risks. The authors used ESG score from Thomson Reuters Asset4 database. Similarly, mixed relationship was found. The article by Feng *et al.* 2022,^[17] published in 2022, has been cited 61 times, with an average of about 40 citations per year and is the most cited article in an average year. This is also a research outcome from East Asia. The authors investigated how ESG was associated with the risk of stock price crashes, revealing negative relationship.

Figure 11 presents the 10 most cited articles related to the “ESG-financial performance” relationship. They receive significantly more citations than articles on the topic of “ESG-firm risk”. The article with the highest citation count was authored by Nollet *et al.* 2016,^[18] published in *Economic Modelling* with 256 citations, which analyzed the connection between corporate social performance and Return on Asset (ROA), Return on Capital (ROC) and Excess Stock Returns. Bloomberg's ESG rating was employed in the analysis as a corporate social performance indicator. Followed by the research in East Asia by Xie *et al.* 2019,^[19] With 230 citations over five and a half years,

they analyzed ESG’s impact on ROA, Tobin’s Q and corporate efficiency. The third most cited article is written by Duque-Grisales and Aguilera-Caracuel 2021,^[20] It was published in 2021 and has 214 citations. Only accounting-based measurement (ROA) was used in their study. The above three articles are the only ones with more than 200 citations. What’s more, there are a total of seven articles that have been cited more than 100 times.

Overall, among the top 10 most cited articles, there is a notable absence of research from ASEAN countries. This suggests a relatively limited international impact for ASEAN countries in articles on this topic.

Research methods and areas

Figures 12 and 13 present the information regarding research methods and areas employed in the research articles. Most scholars use panel data analysis methods when studying “ESG-firm risk” and “ESG-financial performance” relationship. Although some scholars use research methods other than econometrics, the proportion is very small.

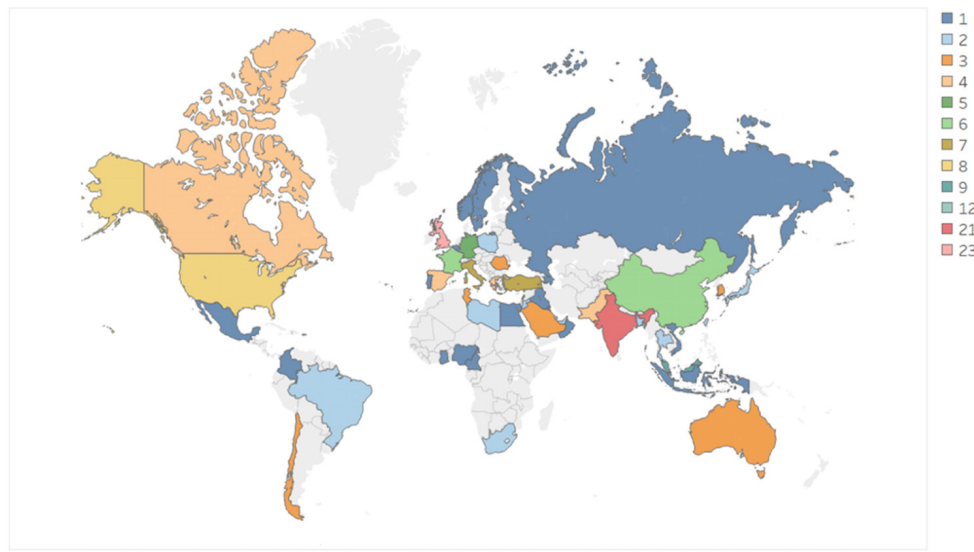


Figure 9: Geographical distribution of publications in the “ESG-financial performance” relationship.

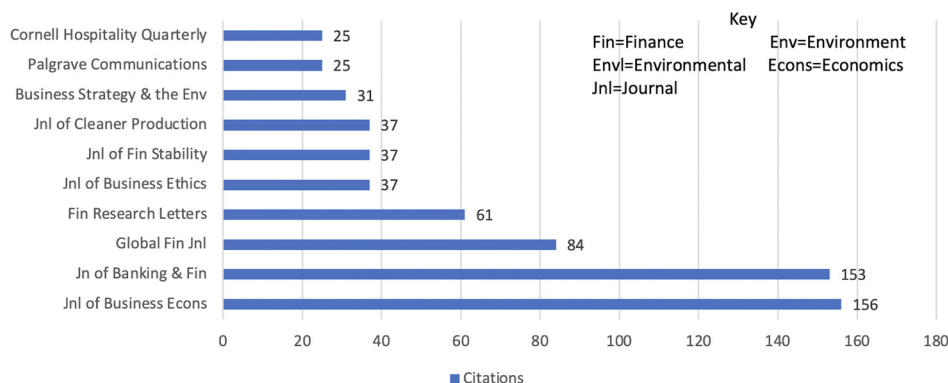


Figure 10: The top 10 most cited journal sources of articles in the “ESG-risk” relationship.

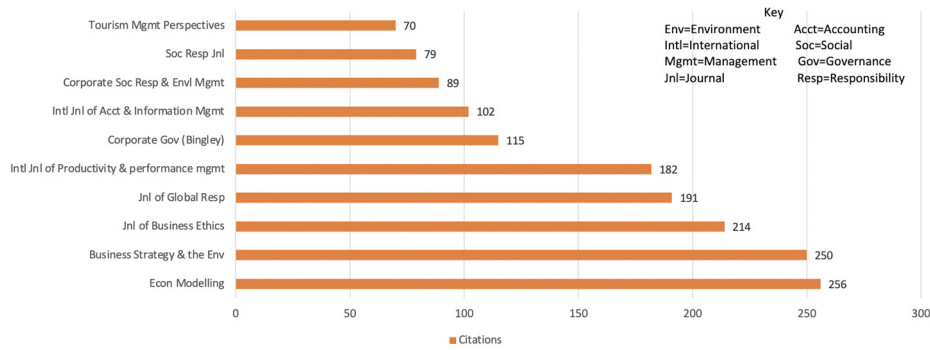


Figure 11: The top 10 most cited journal sources of articles in the “ESG-financial performance” relationship.

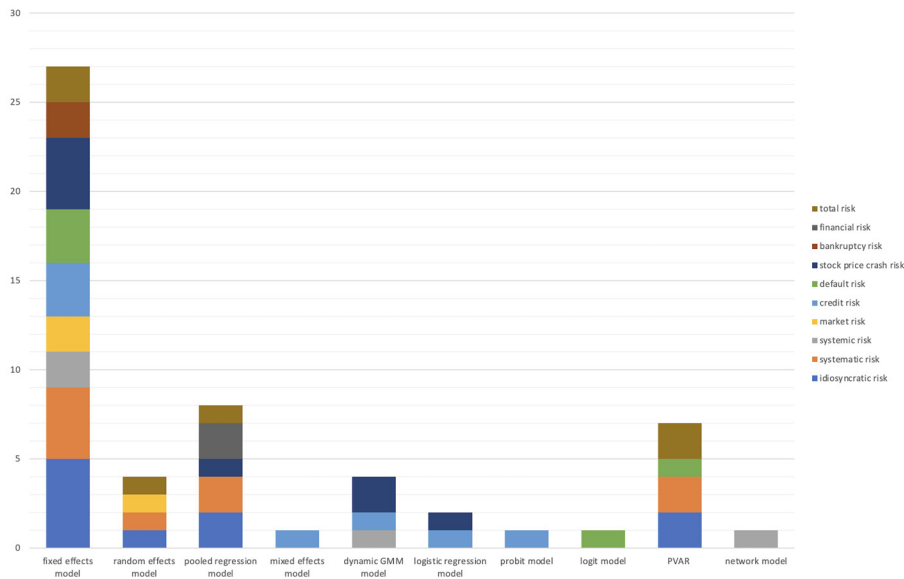


Figure 12: Research method distribution of publications in the “ESG-risk” relationship.

In articles studying the “ESG-financial performance” relationship, according to our statistics, scholars have used 10 different research methods and the types of risks involved include roughly 10 types. More specifically, Figure 12 illustrates that the predominant choice among scholars is the adoption of the fixed effects of panel model. The types of risks they studied included idiosyncratic risk, systematic risk, systemic risk, market risk, default risk, credit risk, stock price crash risk, bankruptcy risk, financial risk and total risk. In addition to the fixed effects model, which occupies the main proportion, some scholars have chosen other panel data analysis models to conduct this research. A pooled regression model is a relatively popular choices among scholars, followed by Panel Vector Autoregression (PVAR) model. Additionally, a very small number of scholars have employed the random effects model, dynamic GMM model, mixed effects model, logistic regression model, probit model and logit model. It is noteworthy that one article stands out. Instead of employing the panel data analysis commonly used by most scholars, it took a distinctive approach by utilizing a network model to investigate the influence

of ESG on systemic risk.^[21] However, according to our statistics, the research by East Asia and ASEAN countries only applied four different methods, namely fixed effects model, pooled regression model, dynamic GMM model and logistic regression model.

Regarding the “ESG-risk” relationship, Figure 14 further shows the proportion of each risk type studied in articles. Some articles delved into a single risk, while others simultaneously examined two or three different risks. More specifically, more scholars pay attention to idiosyncratic risk (20%), systematic risk (16%), credit risk (12%) and stock price crash risk (12%). These four items together account for 60% of the total number of articles. If two types of risk similar to systematic risk (systemic risk and market risk) are added, the proportion will reach 72%. The various types of risks are also basically covered in studies from East Asia and ASEAN countries, except for total risk.

Figure 15 shows the proportion of articles on the “ESG-financial performance” relationship by research areas. By reading each selected article, we found that these articles are either

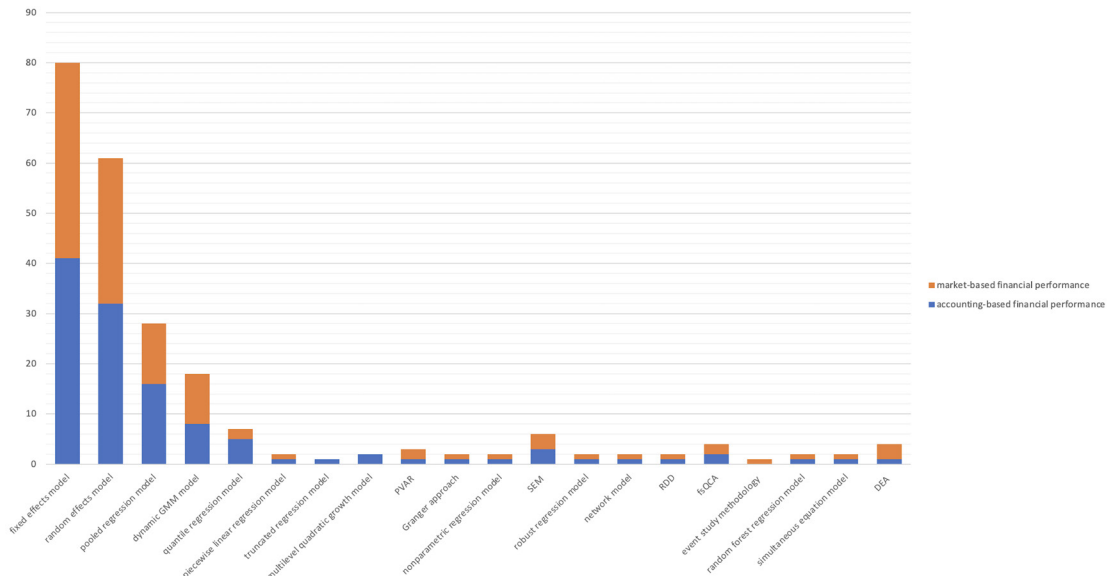


Figure 13: Research method distribution of publications in the “ESG-financial performance” relationship.

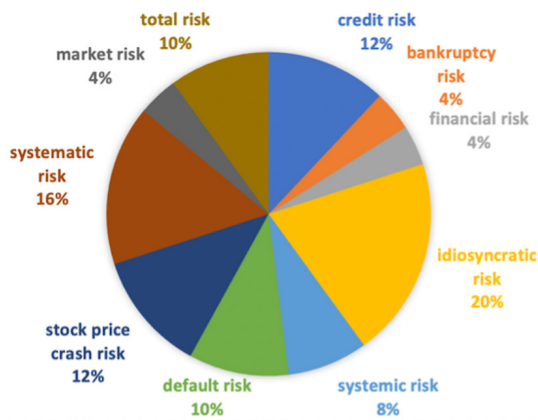


Figure 14: Research area distribution of publications in the “ESG-risk” relationship.



Figure 15: Research area distribution of publications in the “ESG-financial performance” relationship.

based on market-based financial performance, or based on accounting-based financial performance, or consider more comprehensively, both of which were involved. It should be emphasized that when we are doing classification, we classify Tobin’s Q, Earnings per Share (EPS), Dividend per Share (DPS), Price to Book (P/B) ratio, stock return, etc. as market-based financial performance. While Return on Asset (ROA), Return on Equity (ROE), Return on Capital (ROC) and return on investment (ROI), etc. are classified as accounting-based financial performance. The proportions of studies on these two different types of financial performance are relatively close.

Observing Figure 13, the research methods used in articles on the “ESG-financial performance” relationship are more abundant. There are as many as 20 different methods, containing fixed effects model, random effects model, pooled regression model, dynamic GMM model, quantile regression model, piecewise linear regression model, truncated regression model, multilevel quadratic growth model, Panel Vector Autoregression (PVAR) model, Granger approach, nonparametric regression model, Structural Equation Modeling (SEM), robust regression model, network model, Regression Discontinuity Design (RDD), fuzzy set Qualitative Comparative Analysis (fsQCA) approach, event study methodology, random forest regression model, simultaneous regression model and Data Envelopment Analysis (DEA). Most research methods have been used to explore the “ESG-financial performance” relationship, considering both accounting and market perspectives. Among these research methods, fixed effects model is the one used most by scholars, followed by random effects model, pooled regression model and dynamic GMM model. The research methods used by East Asia and ASEAN countries when studying the “ESG-financial performance” relationship are also relatively rich. However,

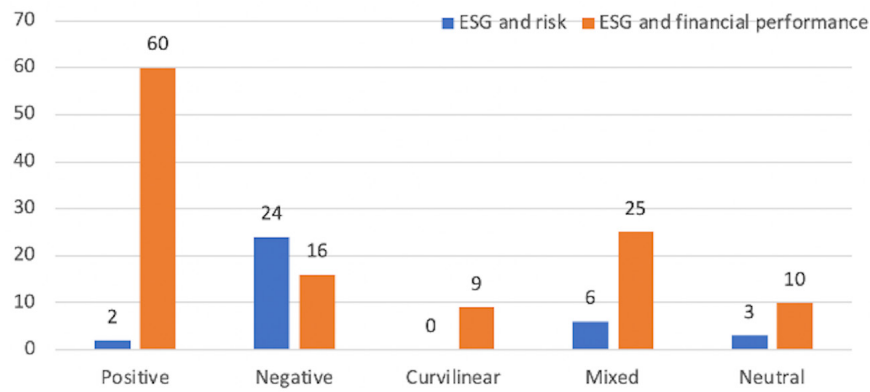


Figure 16: Distribution of publications by research conclusions.

some research methods used in other regions were not used in the research by East Asia and ASEAN countries, such as PVAR, truncated regression model, robust regression model, network model and event study.

Research conclusions

After reviewing the articles in Scopus and WoS database, it is noteworthy that scholars have not reached a consistent result, showcasing a positive, negative, curvilinear, mixed and neutral relationship. The distribution is illustrated in Figure 16.

Most articles believe that ESG will reduce firm risk and there are 24 articles, accounting for about 68.57%. For example, Aevoaie *et al.* 2023,^[22] Barth *et al.* 2022,^[23] Chodnicka-Jaworska 2022,^[24] Eratalay and Cortés Ángel 2022,^[25] Gholami *et al.* 2022,^[26] Gao *et al.* 2022,^[27] Gupta *et al.* 2022,^[28] Jin *et al.* 2023,^[29] Lian *et al.* 2023,^[30] Luo *et al.* 2023,^[31] Liu *et al.* 2023,^[32] Neitzert and Petras 2022,^[33] Suttipun 2023,^[34] and among others. Secondly, there are 6 articles believe that the impact of ESG on firm risk is mixed, the proportion is about 17.14%.^[14,16,21,35-37] The mixed here means that different conclusions will be drawn for different types of firm risks. At the same time, 3 articles (8.60%) did not find any significant impact of ESG on firm risk, alternatively, they got a neutral conclusion.^[38-40] In addition, only 2 articles believed that ESG would increase firm risks, but this proportion only accounted for 5.70%.^[41,42] Finally, in our research sample, there are no articles that draw curvilinear results concerning the impact of ESG on firm risk.

It also appears different results regarding the “ESG-financial performance” relationship. Articles with positive impacts were found to be dominant, with as many as 60 articles, the quantity is precisely half of the total. For example, Ademi and Klungseth 2022,^[43] Cajias *et al.* 2014,^[44] Elmghaamez *et al.* 2023,^[45] Gonçalves *et al.* 2023,^[46] Khanchel *et al.* 2023,^[47] Lee and Isa 2023,^[48] Sinha and Goel 2023,^[49] Tekin and Güçlü 2023.^[50] On the other hand, we can see that 16 articles (13.33%) found a negative relationship between ESG and financial performance. For example, Agarwal *et al.* 2023,^[51] Cerciello *et al.* 2023,^[52] Mohamed Buallay *et al.* 2023,^[53] Menicucci and Paolucci 2023,^[54] Singh *et al.* 2022,^[55]

Zahid *et al.* 2023.^[56] There are also 25 articles (20.83%) that got mixed conclusions, that is, the authors got different conclusions for different financial performance measures. Such as Cheng *et al.* 2023,^[57] El Khoury *et al.* 2022,^[58] Garcia and Orsato 2020,^[59] Kalia and Aggarwal 2023,^[60] Liu *et al.* 2022,^[61] Rao *et al.* 2023.^[62] In addition, there are 10 articles that do not find that ESG has a significant impact on financial performance, accounting for about 8.33%. For example, Matuszewska-Pierzynka 2021,^[63] Sani *et al.* 2020,^[64] Vásquez-Ordóñez *et al.* 2023,^[65] Xu *et al.* 2022.^[66] Besides which, 9 articles found a curvilinear relationship, which is also the lowest proportion. For example, Amin and Tauseef 2022,^[67] Bruna *et al.* 2022,^[68] Kumar *et al.* 2022,^[69] Lee and Li 2022.^[70]

The above inconsistent conclusions may be due to the different countries and industries studied by the authors, or the different method used. Results are also complicated by the lack of standardization of ESG data. This has led to different ESG rating agencies focusing on different aspects when providing ESG information, even for the same firm.

CONCLUSION

In this paper, we reviewed studies focused on the impact of ESG on firm risk and financial performance from various angles. The data applied in this systematic literature view come from Scopus and WoS database from January 2013 to September 2023.

In answer to the first research question, our systematic literature review indicates that the overall trend of research on the “ESG-firm risk” and “ESG-financial performance” relationship has been increasing, especially in 2019 and 2022, the two periods of breakthrough increase. Meanwhile, we were able to ascertain that the research on this topic is relatively extensive globally, especially regarding the impact of ESG on financial performance.

In answer to the second research question, scholars have employed 9 different methods to investigate the impact of ESG on firm risk and utilized 20 methods to study the influence of ESG on financial performance. Although most scholars have used panel data analysis method, there are also very few scholars who have adopted other research methods. However, whether it

is the impact of ESG on firm risk or financial performance, most scholars use fixed effects of panel model. Under different research methods, specific research areas are also relatively scattered. In terms of risk, more scholars pay attention to idiosyncratic risk and systematic risk. In terms of financial performance, market-based financial performance and accounting-based financial performance are nearly evenly matched.

In respond to the third research question, “the research conclusions of this topic”, scholars have not yet reached a consensus conclusion. The conclusions of positive, negative, curvilinear, mixed and neutral relationships have all been obtained. However, more scholars believe that ESG can reduce firm risk and improve financial performance, although their proportion is not high. This finding offers valuable insights for firms and policymakers in East Asia and ASEAN countries. From the perspective of firms, it is necessary for them to strengthen ESG practices and improve the transparency of ESG information, thereby reducing risks and improving financial performance. From the government’s perspective, incentives can be provided for firms to adopt ESG practices and actively participate in them. Additionally, guiding the flow of funds towards firms with strong ESG performance can be instrumental. Thereby promoting sustainable economic development of East Asia and ASEAN countries.

For the last question, “the key research gaps of this topic”, it can be seen from the previous statistics that prior studies have not determined the most appropriate research methodology for this topic. Most scholars use econometric methods to conduct research. Especially within the topic of ESG’s impact on firm risk, scholars have not employed a sufficiently diverse range of research methods. Future research can identify the most suitable research methods by building upon and diversifying the existing research methods. Another major gap comes from the fact that most scholars tend to focus on the unidirectional impact of ESG on firm risk and financial performance, while ignoring whether ESG has a bidirectional causal relationship with them. Future research could fill these gaps.

In addition, we can observe from the statistics that although East Asia and ASEAN countries started relatively late in the study of “ESG-firm risk” and “ESG-financial performance”, they have become a prominent research focus in recent years. In terms of the international influence of articles, East Asian countries have performed well, while ASEAN countries have shown relatively weaker performance. Regarding the research methods used, compared with other regions, the diversity of methods used in East Asia and ASEAN countries is still insufficient. In the future, there is room for innovation in adopting more diverse research methods to explore this topic further. In addition, promoting interdisciplinary collaboration is crucial. East Asia and ASEAN countries should be encouraged to apply some methods in the computing field into ESG research to further increase global

impact in this field. From the perspective of ESG practices, due to the limited resources in certain countries in East Asia and ASEAN countries, ESG practices may initially have a negative impact on firm financial performance. That’s because spending resources to achieve social and environmental goals may increase costs and hurt profitability.^[71] However, in the long term, ESG practices are likely to enhance firm financial performance. This trend may diverge from the experiences in western developed countries. Therefore, East Asia and ASEAN countries can recognize the significance of ESG practices for sustainable economic development from a long-term standpoint.

LIMITATIONS AND FUTURE WORK

The main limitations we faced in conducting this review was the limitations of selected databases and specific criteria. Data extraction was limited to Scopus and Web of Science (WoS) databases. Although they are the two most extensive and high-quality bibliographic databases,^[13] we believe that adding other databases like ResearchGate, OpenCitations, Google Scholar, Microsoft Academic and CrossRef will enhance the dataset. Besides, our study limits subject area to economics, econometrics, finance, business, management and accounting in Scopus and business, business finance, economics, management in WoS. As a result, the research data in this paper may not be comprehensive enough. The systematic literature review may not fully cover all articles related to this topic, leading to incomprehensive research data in this paper. Moreover, due to space limitations, this paper does not consider the impact of ESG evaluation systems in different agencies and different countries on the research conclusions. The last limitation is associated with a potential interpretation bias that may result from the critical analysis.

The paper call for future research on four different directions. First, this study only research on the direct effect, articles on moderating variables or mediating variables of ESG's impact on firm risk and financial performance were not studied this time. Such articles can be analyzed later in a systematic literature review. Second, this article only analyzes articles on the overall ESG, due to article length limitations, articles on the individual impact of the three pillars of ESG (E, S and G) are not considered. Such articles can be analyzed in future systematic literature reviews. Third, this article does not analyze the current research status of different industries but treats them as a whole. The impact of ESG on firm risk and financial performance may vary across industries. Future research can be more detailed by distinguishing between different ESG rating agencies and ESG evaluation systems of different countries and industries. Also separately analyze their impacts on research conclusions. Subsequent research can supplement this aspect. Lastly, bibliometric analysis and meta-analysis can be done on this topic in the future. For example, conduct citation analysis and content analysis.

ACKNOWLEDGEMENT

The authors would like to acknowledge Universiti Kebangsaan Malaysia for providing the necessary resources and a conducive environment for research during the research period.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

WoS: Web of Science; **Fin:** Finance; **Env:** Environment; **Envl:** Environmental; **Econ(s):** Economic(s); **Jnl:** Journal; **Acct:** Accounting; **Intl:** International; **Soc:** Social; **Mgmt:** management; **Gov:** Governance; **Resp:** Responsibility; **Inv:** Investment; **Comp:** Computation.

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Cite this article: Nian H, Said FF. The Impact of ESG on Firm Risk and Financial Performance: A Systematic Literature Review. *J Scientometric Res*. 2024;13(3s):s144-s155.