ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

The Impact of ESG Score on Stock Performance

Kang Zha[1,a,*]

[1]*Business School, University of Nottingham, Nottingham, United Kingdom*
[a]*bbc726590@gmail.com*
[*]*Corresponding author*

Abstract: *As the concept of sustainable development takes root in the hearts of the people, many investment institutions around the world have listed ESG scores as one of the important indicators for investment decisions. The scale of ESG investments continues to expand, and the standards for ESG scores are constantly improving. Therefore, ESG investing is becoming more and more popular and has become a hot investment theme. It is against this background that this article analyzes the relationship between stock returns and volatility in China's A-share market and ESG ratings, explores the impact of ESG ratings on listed companies and investors, and promotes academic research in the field of ESG in China. It also provides suggestions for the development of ESG ratings in China's A-share market, providing a new perspective for related research in the field of ESG and corporate performance.*

Keywords: *ESG investments, ESG rating, corporate performance, stock performance*

1. Introduction

1.1 Background

With the rise in popularity of the concept of sustainable development, many investment institutions around the world have incorporated ESG into their investment decisions, and the scale of sustainable investment is increasing, along with the proportion of sustainable investment in total specialized assets under management. By 2020, sustainable investment in the world's five largest markets is expected to reach USD 35.3 trillion, up 15% from 2018, and sustainable investment will account for more than one-third of the total scale of assets under management, up to 35.9%, as reported in the Global Sustainable Investment Review 2020 published by the Global Sustainable Investment Alliance (GSIA). In Europe, ESG investments accounted for 45% of total asset management, in the United States for 33%, and in China for less than 2%, which is far below the developed market average.

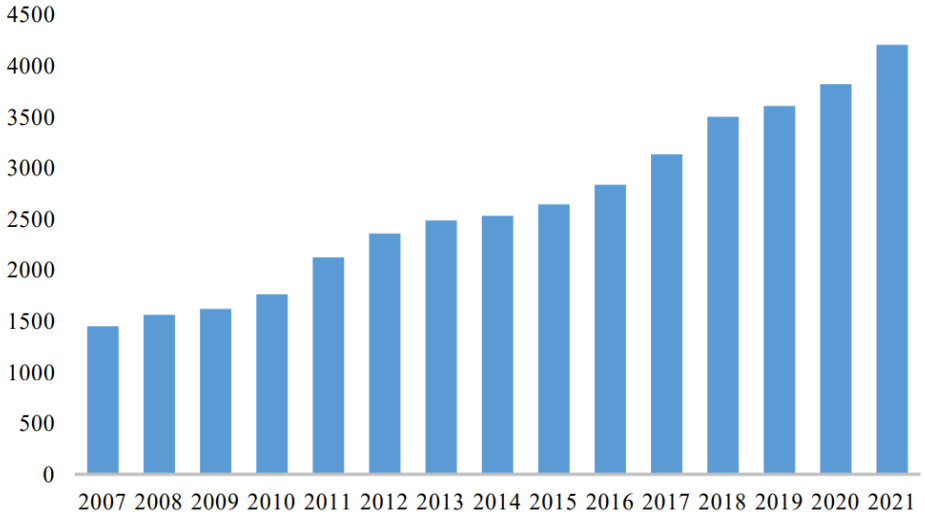

Figure 1: No. of Chinese listed companies disclosing social responsibility reports.

Against the backdrop of sustainable development gradually becoming a global consensus, ESG disclosure has become a mainstream international non-financial information disclosure system that is receiving increasing attention [1], and the number of Chinese listed companies disclosing their social

ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

responsibility reports is also rising. As shown in **Fig.1**, the number of Chinese listed companies disclosing social responsibility reports increased steadily from 2007 to 2021, from 1,148 to 4,204. The concept of ESG was introduced as early as 2004 in the Global Compact report, but it is still in its infancy in China, and the majority of companies are still far from understanding and implementing ESG [2]. Only 29.42% of all listed companies have disclosed their 2021 social responsibility reports as of 30 April 2022, excluding companies newly listed in 2022. Therefore, the empirical study of ESG is of great importance to both corporations and the growth of the ESG concept in China.

There is still a lot of room for the development of ESG investment and institutional infrastructure in China, as most individual investors have a shallow understanding of ESG concepts and ESG investment ideas, and domestic ESG-related research is relatively lacking in comparison to international advanced academic research. ESG ratings, as a significant tool utilized in practical investment and financial research today, impact investors' investment decisions and are a vital component of the ESG ecosystem [3]. The scale of ESG investments is growing, and investors are increasingly relying on the ESG ratings of third-party rating agencies as ESG's influence continues to develop and expand. In light of the widespread use of ESG ratings, investors must understand the potential market consequences of ratings. This paper uses the A-share market as a starting point to conduct an empirical investigation. The correlation between environmental, social, and governance (ESG) ratings and A-share market returns and volatility in China is examined. This paper aims to investigate the effects of ESG ratings on listed companies and investors, advance academic research in the field of ESG in China, and offer recommendations for the infrastructure development of China's ESG system and ESG investors.

1.2 Significance

1.2.1 Theoretical implication

This paper investigates the impact of ESG performance on stock returns and volatility and provides a new perspective for related research in the field of ESG and corporate performance by analyzing and exploring information on rating agencies' ESG ratings. In contrast, behavioral finance, based on the theory of information asymmetry, links ESG ratings with investors' heterogeneous beliefs, etc., to explain the internal logic of ESG ratings influencing stock performance.

2. Literature Review

2.1 ESG performance and the stock market

2.1.1 Relevance

Found a correlation between stock returns and firms' ESG ratings for ESG investments in the stock market [4][5]. This may be because a firm's ESG rating partially reflects the firm's ability to tap into sustainable emerging markets, which boosts the firm's operating performance. Firms with lower sustainability ratings have a higher capital cost [6][7]. Used a variety of methods to estimate the cost of equity for firms, all of which find that firms with better social responsibility performance have a lower cost of equity financing, and the authors' study suggests that firms that actively improve employee relations, invest more in the area of social responsibility, improve their product strategies, and implement environmental protection measures will significantly contribute to reducing the cost of equity for their firm[7]. In addition, the company's involvement in the tobacco and nuclear energy industries raises its cost of equity. All of these findings support the literature's contention that firms with superior social responsibility performance have higher valuations and greater risk mitigation capabilities.

The majority of the aforementioned studies looked into the connection between companies with strong environmental, social, and governance (ESG) traits and corporate financial performance. The findings were very insightful, and the majority of the studies from academics strongly backed the positive correlation between ESG and corporate performance. Studies in the past have not only focused on the correlation between the two; many academics now attempt to explain the economic principles at play as well as the transmission mechanism and causality between ESG ratings and corporate performance.

2.1.2 Mechanisms of influence

By breaking down expected profitability, long-term growth potential, and cost of capital, investigated the mechanism of corporate social responsibility (CSR) on firm value [8]. He also examines the function of CSR in lowering risk and its implications for financial performance indicators. The results demonstrate

ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

that, despite some variation in the effects of all CSR-related factors, CSR performance linked to better long-term growth prospects has a significant driving effect on raising firm valuation, with lower costs also making a small but significant contribution.

By measuring corporate credit risk with credit ratings and zero volatility spreads, empirically analyzed whether superior corporate social responsibility performance (CSR) reduces credit risk [9]. The test results indicate that the evidence supporting the claim that superior CSP reduces systemic risk is weak. However, the relevant environmental, social, and governance (ESG) performance of the corresponding country significantly moderates the relationship between CSP and credit risk, with z-spreads on corporate bonds decreasing by about 9.64 basis points if the firm's CSP reflects the ESG performance of the nation in which it operates. Examined the three transmission channels (cash flow, idiosyncratic risk, and valuation) in a common discounted cash flow model by first confirming the relationship between ESG data and firm valuation and performance, and then testing the proposed three transmission channels using ESG rating information from Morgan Stanley Capital International and the firm's financial variables[10]. The empirical findings demonstrate that a firm's systemic risk profile and idiosyncratic risk profile act as conduits for the ESG information to be communicated to its valuation and performance.

3. Research Methodology

3.1 Research hypotheses

The significance of the link between corporate environmental, social, and governance (ESG) performance and stock returns are impacted by the stock price. Investors' views on ESG practices are reflected in their investment choices, which in turn influence stock prices through changes in supply and demand. The stock price will be undervalued if investors are pessimistic and fear that the company's efficiency will decrease as a result of the investment in ESG practices. However, if investors are optimistic and view ESG practices as adding to the long-term value of the company, the stock price will be at or above value. This rise in stock price and value will have a positive effect on stock returns. Therefore, this paper proposes the following hypotheses:

H1: Firms' ESG performance is positively related to their stock return.

In the field of behavioural finance, the idea that investors are not purely rational economic beings whose investment strategies are unaffected by their beliefs and emotions is central. Research in the field of behavioural finance has shifted its focus to the role that investors' biases and emotions play in determining asset prices and other investment decisions. Investors' beliefs are a major influence on their investment decisions; accordingly, investors with different beliefs develop distinct investment strategies and conduct a variety of buying and selling transactions. Asset prices fluctuate as a result of the clash and mingling of investors' various worldviews in the market.

Therefore, this paper proposes the research hypothesis:

H2: Firms' ESG performance and stock volatility are positively correlated.

4. Data Selection

4.1 Variables selection

4.1.1 Explained variables

In this paper, stock volatility and stock return are two indicators to measure stock market performance.

Stock volatility refers to the degree of stock price volatility, a measure of the uncertainty of an asset's return that reflects the level of risk associated with a financial asset and, to some extent, the investment risk associated with an equity. The greater the volatility of an asset, the greater the price fluctuations and the greater the unpredictability of its returns. There are several methods for calculating stock volatility, including using the annual standard deviation of a stock's closing price, the annual standard deviation of the stock's yield, or the sum of the squares of the daily or monthly stock returns during the year. The establishment of stock volatility metrics begins with the presumption that numerical stock return metrics have already been established. The calculation of stock volatility in this article is accomplished by using the sum of squares of monthly stock returns as the variable.

ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

Stock return refers to the rate of return of a stock, which is one of the most important indicators of stock market performance and is the core indicator of investors' attention. In this paper, the abnormal return of a stock is used as an indicator of the rate of return, calculated as the difference between the annual rate of return of an individual stock considering the reinvestment of cash dividends and the risk-free interest rate, where the risk-free interest rate is selected from the bank's one-year fixed interest rate, and the data of the abnormal return is taken from the CSMAR database.

4.1.2 Control variables

In addition to ESG, other factors can influence the stock price and volatility of a company, so control variables are required. In light of the fact that factors such as the company's size and its assets and liabilities will influence its stock market performance, this paper introduces a number of control variables, including five control variables for firm size, gearing ratio, ROA, cash to assets ratio, and P/E ratio, as well as one dummy variable for industry, in order to ensure the accuracy of this study.

The *size* of a company is one of the most influential determinants of stock market performance.

The greater an enterprise's return on assets (*ROA*), the greater its ability to operate its assets and the greater its success in increasing revenue and controlling expenses.

Leverage can reflect the enterprise's financial repayment capacity.

The price-earnings ratio (*PE*) is one of the most frequently employed indicators for determining the reasonableness of a stock's price level, and it reflects the investment risk of a stock to some extent.

Cash is an indicator of a business's cash flow.

In addition, this paper includes the "*Industry"* dummy variable in the regression. Different industries vary in numerous ways and have distinct effects on stock prices.

Therefore, according to Wind's industry classification standard and the assignment method of related research, this paper sets industry as a dummy variable [11]. Relatively asset-heavy industries such as transport, materials and real estate are assigned as 1; relatively asset-light industries such as retail, food, beverage and tobacco, and consumer services are assigned as 2.

Table 1: Variable definition

Variable type	**Variable symbol**	**Variable name**
Explained variables	*Return*	Stock yield
	Vol	Stock volatility
Explanatory variables	*ESG*	ESG Ratings
Control variables	*Size*	Company size
	ROA	Earnings per share
	Leverage	Gearing
	PE	PE ratio
	Cash	Cash to assets ratio
	Industry	Dummy variable

In conclusion, this paper makes use of a total of nine variables: two explanatory, one core explanatory, five control, and one dummy. Table 1 lists the variables along with their respective symbols and definitions.

4.2 Modelling

In order to study the correlation between stock return and ESG performance, combined with relevant theories and variable design, this paper constructs the following regression model:

$$Return = \beta_1 ESG + \beta_2 Industry + \beta_3 Firm\_Control + \alpha \quad (1)$$

This paper also develops another panel linear regression model to test the hypothesis related to the effect of ESG rating variability on stock price volatility:

$$Vol = \beta_1 ESG + \beta_2 Industry + \beta_3 Firm\_Control + \alpha \quad (2)$$

This paper builds a model of the relationship between ESG ratings and stock market performance using stock volatility and stock abnormal return as explanatory variables, as shown in models (4.1) and (4.2), while controlling for industry effects.

ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

4.3 Sample data

As the development of ESG ratings in China is relatively slow, in order to ensure the validity of ESG data, taking into account the number of ESG rating agencies and the time of establishment, this paper takes the listed enterprises in the Shanghai and Shenzhen A-share markets in 2020-2022 as the research object, and in order to ensure the validity and accuracy of the samples, the data are processed as follows, resulting in a total of 2119 samples:

(1) Listed enterprises treated by ST and ST* are excluded.

(2) enterprises without ESG ratings and other financial data are excluded; (3) enterprises in the insurance, banking, and financial industries are also excluded.

The ESG rating data in this paper comes from SynTao Green Finance, whereas the other data comes primarily from the Wind database and the Rexis database, and the subsequent empirical analyses are conducted primarily with the Stata17.0 software.

5. Empirical Analyses

5.1 Correlation analysis

Multiple explanatory variables are included in this paper, some of which may be correlated with one another and thus affect the reliability of the regression results. As a result, Pearson correlation analysis is used to quantify the issue of multicollinearity between variables in this paper. Initial evidence that the entire sample of explanatory variables correlates with the explanatory variables and the control variables is established by using the results of the correlation analysis of key explanatory and interpreted variables without controlling for other factors. The following is a breakdown of the overall sample's correlation test results.

Table 2: Pearson's correlation analysis

	ESG	Vol	Return	Size	Cash	Leverage	PE	ROA
ESG	1							
Vol	0.040***	1						
Return	0.033***	0.531***	1					
Size	-0.091***	-0.068***	0.083***	1				
Cash	0.107***	0.050***	0.035***	-0.142***	1			
Leverage	-0.104***	-0.026**	-0.026**	0.511***	0.333***	1		
PE	-0.038***	0.142***	0.075***	-0.096***	0.001	-0.050***	1	
ROA	-0.009	-0.007	0.002	-0.017*	0.084***	-0.060***	-0.012	1

Note: *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

ESG performance is significantly correlated with stock volatility and abnormal return in Table 2. The second hypothesis of this article is initially supported by the correlation coefficient between ESG performance and stock volatility, which is 0.040 and statistically significant at the 1% level. This correlation coefficient shows a positive relationship between ESG performance and stock volatility.

Since there is a positive correlation between ESG performance and stock volatility and this correlation coefficient between ESG performance and abnormal return is 0.033, which is statistically significant at the 1% level, hypothesis 1 is initially supported.

When looking at the control variables, company size has a positive association with abnormal stock return and a negative correlation with stock volatility. There is a significant positive correlation between the cash asset ratio and the price-earnings ratio and the volatility and abnormal return of stocks. Significant negative correlations exist between gearing ratio, stock volatility, and stock abnormal return. *ROA* has a negative correlation with stock volatility and a positive correlation with abnormal stock return. In this paper's research model, there is little evidence of a serious multicollinearity issue, and the linear correlation between the variables is weak. This paper then applies the regression model to the sample data and conducts a regression analysis.

ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

5.2 Regression results analysis

5.2.1 ESG performance and stock return

In order to investigate the relationship between ESG performance and abnormal stock return based on Hypothesis 1, the regression results of model (1) are presented in Table 3.

Table 3: Multiple regression results for Model 1

Varibles	**(1)**	**(2)**
	Return	**Return**
ESG	0.173***	0.169***
	(3.02)	(3.36)
Size		0.053***
		(10.55)
Cash		0.120**
		(2.22)
Leverage		-0.112***
		(-3.26)
PE		0.000***
		(2.67)
Constant		-0.001
		(-0.79)
Adjusted R^2	0.001	0.346
Industry	No	YES

Note: t-values are enclosed in parentheses; *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Column 1 of Table 3 displays the results of the regression without any controls, indicating that the regression coefficient of ESG ratings on abnormal return on stocks is 0.173, which is statistically significant at the 1% level and suggests a positive relationship between ESG ratings and excess return on stocks. Column 2 indicates that the regression results are still statistically significant after the industry effect and the addition of several control variables, and the conclusion is consistent: the regression coefficient of ESG ratings on abnormal stock returns is still positive, with a magnitude of 0.169, which is statistically significant at the 1% level, demonstrating a positive correlation between ESG ratings and abnormal stock returns. The regression model's adjusted R2 is 0.346, indicating that it has some explanatory power.

Therefore, hypothesis **H1** is supported and ESG performance is positively associated with a company's stock return.

5.2.2 ESG performance and stock volatility

The regression results of model (2) are displayed in Table 4 to examine the link between ESG performance and stock volatility in light of hypothesis 2.

The regression results without any control variables are presented in Column 1 of Table 4 and show that ESG performance's regression coefficient on market volatility is 0.104, significant at the 1% level and in support of Hypothesis 2. After adjusting for the industry effect and adding a number of control variables, the regression results are shown in Column 2. They show that the correlation between ESG performance and stock volatility is positive, with the higher the difference between ESG ratings, the more volatile the stock, with a regression coefficient of ESG performance on stock volatility of 0.078, significant at the 1% level.

As previously discussed in the theoretical analysis, investors are not completely rational economic beings, and asset prices are influenced by investors' beliefs, emotions, and other factors. Investors with heterogeneous beliefs have inconsistent expectations about the future returns of stocks, which leads to the formation of corresponding investment strategies, different trading behaviors, and stock price volatility.

The market's heterogeneous beliefs about non-financial information of enterprises are reflected in the ESG rating discrepancy. As investors rely more and more on ESG rating agencies' ratings, the heterogeneous beliefs of ESG rating agencies will be transmitted to investors via ESG rating discrepancy, which will have an impact on stock volatility. The greater the disparities in ESG ratings, the more differentiated the market's heterogeneous beliefs about firms' ESG levels, resulting in higher stock volatility. The regression results in Table 4 support Hypothesis 2 of this paper.

ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

Table 4: Multiple regression results for Model 2

Varibles	**(1)**	**(2)**
	vol	**vol**
ESG	0.104***	0.078***
	(3.82)	(2.80)
Size		-0.017***
		(-6.48)
Cash		0.042
		(1.20)
Leverage		0.057***
		(2.84)
PE		0.000***
		(3.36)
Constant	0.181***	0.606***
	(35.32)	(6.54)
Adjusted R ²	0.002	0.262
Industry	No	YES

Note: t-values are enclosed in parentheses; *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

5.3 Robustness Test

This paper replaces the explanatory variables and reruns the regression model in order to make the empirical results more robust and reliable. The specific operation of replacing the explanatory variables is to add the Runling Global (RKS) ESG rating data. RKS is one of the well-known ESG rating agencies, and its rating data is primarily derived from relevant information disclosed by enterprises and public data on the Internet, such as CSR reports, ESG reports, environmental reports, annual reports, etc., with the purpose of assisting investors in identifying the ESG risks and sustainability of enterprises, and providing decision-making support to investors.

To verify the relationship between ESG performance and stock market performance, this paper conducts regression analyses of the reselected ESG performance with stock volatility and stock abnormal return based on models (1) and (2), and the regression results are presented in Table 5.

Table 5: Robustness test results

Varibles	**(1)**	**(2)**
	value	***vol***
ESG'	0.109*	0.045*
	(1.81)	(1.75)
Size	-0.013***	-0.013***
	(-3.89)	(-3.89)
Cash	0.003	0.003
	(0.10)	(0.10)
Leverage	0.082**	0.082**
	(2.30)	(2.30)
PE	0.000***	0.000***
	(2.75)	(2.75)
ROA	0.184	0.184
	(0.93)	(0.93)
Adjusted R ²	0.400	0.288
Industry	Yes	Yes

Note: t-values are enclosed in parentheses; *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

The regression results of ESG ratings and abnormal returns are presented in Column 1 of Table 5. The regression coefficient associated with ESG ratings is estimated to be 0.109. This coefficient remains statistically significant, suggesting a meaningful relationship between ESG ratings and the dependent variable. Additionally, the adjusted R2 value of 0.4 indicates that the model possesses a moderate level of explanatory ability. The regression analysis demonstrates that there is a significant positive relationship between ESG performance and stock abnormal return. Specifically, as the ESG performance improves, the stock abnormal return also increases. This finding aligns with the previous regression analysis and provides further support for hypothesis 1 in this research paper.

The regression analysis presented in column 2 of Table 5 reveals that the coefficient estimate for the

ISSN 2616-5902 Vol. 6, Issue 1: 252-259, DOI: 10.25236/AJBM.2024.060137

relationship between ESG rating and stock volatility is 0.045. This coefficient remains statistically significant, suggesting a meaningful association between these variables. Additionally, the adjusted R-squared value of 0.288 indicates that the model possesses a moderate level of explanatory capability. The findings indicate that there is a persistent positive correlation between ESG performance and stock volatility. Moreover, the magnitude of volatility increases as the disparity in ESG ratings widens, aligning with the outcomes of previous regression analyses. Consequently, this paper provides additional support for Hypothesis 2.

6. Conclusion

In recent years, with the widespread acceptance of sustainable and green development concepts, the ESG performance of companies has garnered significant attention. However, ESG development in China is still in its early stages, with most companies yet to achieve ESG disclosure in their reports. The development of ESG investment and institutional infrastructure in our country still holds significant potential for growth. Most individual investors have a relatively shallow understanding of the ESG concept and investment approach, and domestic ESG-related research lags behind international advanced academia.

Against this backdrop, this study focuses on companies listed on the Shanghai and Shenzhen stock markets from 2020 to 2022. Through data processing, a total of 2119 samples were generated for empirical analysis. The relationship between corporate ESG ratings and stock performance was empirically tested. Additionally, the study applies the theory of heterogeneous investor beliefs and finds that there is a positive correlation between ESG performance and stock volatility. Theoretical analysis suggests that investors do not act entirely rationally in their investments. Asset prices are influenced by investors' subjective thoughts, and investors with heterogeneous beliefs have inconsistent expectations of future stock returns. This leads to the formation of various investment strategies and trading behaviors, ultimately affecting stock price volatility. The study further conducts a Robustness Test on the data, introducing the new RKS ESG rating report as an explanatory variable. The results confirm a sustained positive correlation between ESG performance and stock volatility.

Hence, ESG ratings can potentially impact a company's long-term operations, affecting both stock return rates and volatility. Companies should place greater emphasis on ESG development, enhance their social and environmental performance, establish a positive corporate image, and attract more investors to engage in their activities, thereby increasing their stock value.

References

[1] Geng, Y., Sarkis, J. & Bleischwitz, R. (2019). How to globalize the circular economy. Nature, 565, 153-155.
[2] Ju, B., Shi, X. & Mei, Y. (2022). The current state and prospects of China's environmental, social, and governance policies. Frontiers in Environmental Science, 10, 999145.
[3] Lamont, M. (2012). Toward a comparative sociology of valuation and evaluation. Annual review of sociology, 38, 201-221.
[4] Eccles, N. & Viviers, S. (2011). The origins and meanings of names describing investment practices that integrate a consideration of ESG issues in the academic literature. Journal of business ethics, 104, 389-402.
[5] Kurtz, L. (2011). The long-term performance of a social investment universe. The Journal of Investing, 20, 95-102.
[6] Bauer, R., & Hann, D. (2010). Corporate environmental management and credit risk. Available at SSRN 1660470.
[7] El Ghoul, S., Guedhami, O., Kwok, C. C. & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? Journal of banking & finance, 35, 2388-2406.
[8] Gregory, A., Tharyan, R. & Whittaker, J. (2014). Corporate social responsibility and firm value: Disaggregating the effects on cash flow, risk and growth. Journal of business ethics, 124, 633-657.
[9] Stellner, C., Klein, C. & Zwergel, B. (2015). Corporate social responsibility and Eurozone corporate bonds: The moderating role of country sustainability. Journal of Banking & Finance, 59, 538-549
[10] Giese, G., Lee, L.-E., Melas, D., Nagy, Z. & Nishikawa, L. (2019). Foundations of ESG investing: How ESG affects equity valuation, risk, and performance. The Journal of Portfolio Management, 45, 69-83.
[11] LIU, L. (2021). A Study on the Effectiveness of China Bond Market ESG Investment Practice. Bond Monthly, October.