How ESG Impacts Firms' Performance? Evidence from China

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Abstract. As the ESG concept further develops and deepens, ESG investment gains significance for many investors, agencies, and companies nowadays. The objective of this paper is to investigate ESG scores and its influence on firms' performance. This paper chooses 82 Chinese corporations from two sectors-technology and mining-to be the selected sample. Using ROA, ROE, and growth rate as indicators of firms' performance measures, and ESG scores deriving from Bloomberg financial company as indicator of firms' ESG engagement, result demonstrates that there is a slightly positive correlation between ESG level and financial performance in technology sector. In mining sector, the result contrary to the hypothesis, revealing that the correlation between ESG scores and financial performance is weak. The findings of this paper provide empirical evidence for corporate managers to properly perceive ESG, and help investors evaluate corporation performance using ESG indices.

Keywords: ESG; Financial Performance; Sustainable Investment; Socially Responsible Investment.

1. Introduction

The ESG concept, originating from socially responsible investing, is different from traditional financial indicators. It cares for the three dimensions of environmental, social and governance in the analysis of investments to assess the sustainability and social impact of a company's operations, which aims for achieving stable long-term returns. Since 2014, when the concept of ESG was first introduced by the UN global compact, this principle has gradually gained global significance for its economic and sustainable values. Van, Plantinga and Schotens (2014) find that many traditional investors incorporat responsible investment into the investment process by conducting a survey among international fund managers . The ESG strategy has developed rapidly especially in Europe. However, the unclear policies of information disclosure and the difficulty of accessing relevant information make ESG investment strategy not being widely known and used in China .

Although China is a late starter in the field of ESG investment, investigating and realizing ESG has important implications for the following reasons. Firstly, led by the context of "carbon neutrality" and "emission peak", there is a growing public concern in sustainable development issues. Environmental theme is a major hot topic. New energy- such as photovoltaic, hydroelectric, tidal, geothermal energy, etc.- have been sought after by Chinese investors over the past few years and are currently one of the most popular investment sectors in China's primary and secondary market. Secondly, ESG investment has a huge market size, and the growth rate accelerates. Global Sustainable investment Alliance indicates that at the start of 2020, global sustainable investment reached nearly 35 trillion dollars in the five markets (Japan, Europe, United States, Australia and New Zealand, Canada), a 15% increase from 2018 to 2020 and 55% increase from 2016 to 2020 , far beyond the overall growth rate of the global investment. It reflects that sustainable investment has a significant market potential and investment value. Moreover, Sahut and Pasquini-Descomps yield that socially responsible investment (SRI) is a safer investment strategy during economic recession, for example, during the financial crisis in 2008, as it brings a certain moral satisfaction to investors, thus becoming a seductive alternative portfolio . Thus, in a volatile market, considering both morally and practically, SRI tends to be more sought-after in the investment market. Puzzonia (2018) states that ESG criteria are bound to be an important factor in the success of companies, the discrimination of investments, policies orientation of large funds and of reputation of entrepreneurs . Therefore, for individual enterprises, sustainable strategy needs to be emphasized more than opportunistic gains. Entrepreneurs

and managers should be aware that enterprises' performances are no longer judged solely on their profitability, but also on their social responsibility.

ESG investment has also received a broad range of attention from academical field. It is still controversial whether ESG criteria has a major impact on the financial performance of a company, especially in the investment market. Ioannou and Serafeim (2017) demonstrate that there is no conclusive evidence indicating the linkage between ESG level and companies' financial performance . Jain, Sharma and Srivastava's research (2019) suggests that the difference in the financial returns between the sustainable and conventional indices is not significance . Atan, Razali and Said (2016) also confirm this result with the data from Malaysia and Denmark . Triyani, Setyahuni and Kiryanto (2020) find that ESG disclosure has a positive influence on firms' financial performance . Peng and Isa (2020) deduce the conclusion that ESG is positively related to firm performance, as well as its individual dimensions by analyzing Shariah-compliant firms [10].

Therefore, whether a high level of ESG criteria will indirectly promote the performance of the enterprise in the investment market, and whether there is a correlation between the two would be the main focus of the present paper. The sample of this paper consists of 82 A-share companies in China from 2 sectors (46 in technology sector and 36 in mining sector). The study analyzes the investment market performance by three dimensions-ROA, ROE and growth rate, collecting the ESG scores of these companies and exploring how ESG score impact the above three indicators of the performance of these companies. This study uses SPSS to perform a correlation analysis on the two sets of data, investigating the correlations between ESG scores and the three performance indicators respectively. Our hypothesis is that there is a slightly positive correlation between firms' ESG rating and their market performance.

This study links up ESG and companies' performance, which shed lights on how ESG indices impact the investment value of companies. From theoretical perspective, this paper enriches ESG-related literatures. Additionally, it provides important reference for enterprises to conduct ESG transformation.

2. Data and Methodology

2.1 Sample data

The sample is derived from the 82 A-share companies. The ESG level of each company correspond to a ESG score. The Bloomberg ESG Rating can provide a great insight into the ESG scores. The rating comprehensively covers environment, society, and corporate governance dimensions, with each of the dimension accounts for 33.3% equally. At environment level, the rating concerns relation with air quantity, climate change, ecological and biodiversity impacts etc. At social level, the rating focus on community, diversity, ethics and compliance, health and safety, supply chain etc. At governance level, the rating relates to audit risk and oversight, board composition, compensation, diversity, independence etc. Bloomberg's quantitative model reduces noise through sustainability and industry framework, analysis, and research, standardizes data, and deals with scale deviation and insufficient disclosure. Therefore, it provides accurate reflection of firms' ESG engagement and level.

Firms' performance on stock market can be reflected by profitability ratio. The following characterizations are used in this paper: ROA (return on asset), ROE (return on equity) and revenue growth rate. This study gathers firms' profitability information from CSMAR, and Wind databases, which are two of the largest financial databases in China.

2.2 Variables

2.2.1 Dependent variables

The dependent variable is the variable impacted by the independent variable. Here the dependent variables are the firms' market performance indicators-revenue growth rate, ROA, ROE.

2.2.2 Independent variables

The independent variable is the variable that would not be impacted by other variables.

Here, the independent variables are the ESG scores. The Bloomberg ESG Rating further divided the ESG scores into three sub-scores, environmental scores, social scores, and governance scores. So, this study can analysis the effect of ESG more comprehensively on which dimension has the greatest impact on firms' performance in specific industries.

2.2.3 Control Variables

To take into account the specificities of the companies, in Sahut and Pasquini's research, they consider two control variables for the analysis of the result within the same market: firm and sector. Since selected sample in this paper consists of A-share companies that take the lead in making ESG disclosures in China. The market sizes of these firms are large or medium. Sector is an important control variable since the extent to which the ESG index affects the performance of companies varies across different sectors. Thus, this study may choose the companies from the two different sectors and analysis the date in each sector separately. This study will choose the technology and mining sectors, because firms from these two sectors account for a large proportion of A-shares.

2.3 Methodology

This study tests our hypothesis by the correlation analysis between the financial ratios from different dimensions and the ESG scores. SPSS is used to analysis the correlation of the two datasets. The analysis steps are as follow:

Step 1. Draw a scatter plot. The scatter plot can show roughly the correlation information of the two variables.

Step 2. Choose the appropriate correlation coefficient formula by conducting normality test. Pearson correlation coefficient is a measurement of the correlation of continuous variables. It has the restriction that the variance of the two variables follows a normal distribution. Spearman correlation coefficient is used for variables that do not conform to normal distribution. This study need to determine whether both variables follow a normal distribution. Using K-S test and Shapiro-Wilk test in SPSS, this study gets a normal test results form. When sample size is greater than 50, this study uses the K-S test. Otherwise, the Shapiro-Wilk test is applicable.

Step 3. Calculate the correlation coefficient. This study then could get a correlation coefficient matrix.

Step 4. Significance test. Checking the significance in the correlation coefficient matrix. If $P<0.05$, according to significance test, it shows that the two variables have significant linear correlation.

3. Results

3.1 descriptive statics

The descriptive statics of the variables in technological industry is presented as table 1. From the table below, it is observed that, for independent variables, the mean value of ESG score is 21,85. The mean value of environmental, social and governance scores are 11.10, 27.68 and 45.53 respectively. It indicates that those companies do best in governance dimension, followed by social governance. Environmental score is the lowest among the three dimensions. The standard deviation of social governance is 10.5, which is relatively high among the three dimensions. It means that companies performance varies in social governance. The average ESG score of Mining industry is relatively higher than technological industry's. It means companies in mining industry perform better in ESG engagement. But the individual elements of ESG shows similar results as technological industry. The mean value of environmental, social and governance scores are 20.52, 31.82 and 49.06 respectively. The governance score is also the highest score among the three.

Regarding dependent variables, in technology industry, the mean value of ROA is 1.5%, while the mean value of ROE is 0.1%. The ROA varies between -0.19 to 0.29. The average growth rate is 3.3%,

varying from -0.92 to 0.66. In terms of mining industry, the mean value of ROA reaches 2.03%, and the mean value of ROE reaches 3.69%.

In terms of control variables, the sizes of the technological firms are well control between 19.83 and 27.09, with a standard deviation of 1.09. Similarly, the size of mining firms varies from 21.73 to 28.54, with a standard deviation of 1.49.

Table 1. Descriptive statistics of key variables (technological industry)

	Minimum	Maximum	Mean	Std. Deviation
ESG	9.09	42.79	21.8520	6.98414
E	2.32	31.78	11.1072	7.43867
S	7.01	54.69	27.687	10.4095
G	33.92	57.14	45.5357	5.52964
ROA	-0.19	0.29	0.0152	0.08801
ROE	-0.89	0.45	0.0012	0.21633
Growth	-0.92	0.66	0.0329	0.27085
Size	19.82	27.09	23.0197	1.09140
Leverage	0.045	0.98	0.4063	0.20598

Table 2. Descriptive statistics of key variables (mining industry)

	Minimum	Maximum	Mean	Std. Deviation
ESG	13.22	55.37	29.7927	11.27027
E	1.55	55.81	20.5177	14.17515
S	8.77	59.38	31.8234	13.0474
G	39.29	62.5	49.0575	5.4077
ROA	-0.1	0.08	0.0203	0.03347
ROE	-0.35	0.15	0.0369	0.09595
Growth	-0.42	0.65	-0.0274	0.21106
Size	21.73	28.54	24.4885	1.48968
Leverage	0.11	0.93	0.5143	0.17582

3.2 Results of correlation

Then this study need to choose an appropriate correlation coefficient formula. Since our sample size is less than 50, so this study may choose Shapiro-Wilk test in this case. Table 3 shows that Sig<0.05, so the two variables do not follow normal distribution. Thus, this study use the Spearman correlation coefficient in the following step.

Table 3. Test of normality

Shapiro-Wilk	Statistic	df	Sig.
ESG (tech)	0.909	46	0.002
ROA (tech)	0.917	46	0.003
ESG(mining)	0.924	36	0.017
ROA(mining)	0.844	36	0

As shown in figure 1 and figure 2, there seems to be no linear correlation between ESG scores and ROA. In other words, ESG has no effect on firms' ROA. However, the correlation needs to be further calculated by the measurement of correlation coefficient.

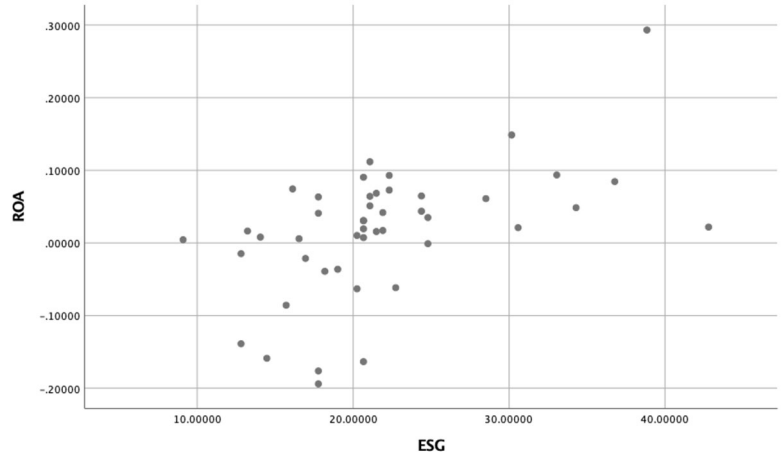


Figure 1. Scatter plot of ESG scores and ROA (technological industry)

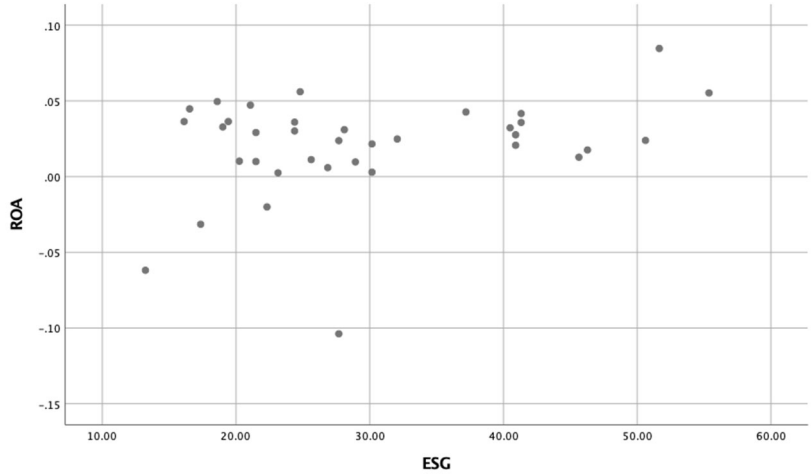


Figure 2. Scatter plot of ESG scores and ROA (mining industry)

In terms of Technology industry, table 4 shows the Spearman correlation coefficient matrix. This study also take all the ESG individual element scores into account to analysis their relations with firm's performance. As shown in Row 5, when this study consider ROA as the dependent variable, the correlation coefficient of the overall ESG and ROA reaches 0.577, which means they are moderately correlated. For each individual elements, the correlation coefficients of ESG and ROA are 0.399, 0.404, 0.494 respectively. They are all close to 0.5 and may refer to a moderate or low correlations. It reveals a slightly positive correlation between ESG and ROA.

This study further investigates another indicator of firms' performance measurement-ROE. As shown in Row 6, using ROE as the dependent variable, the correlation coefficient associated with ESG is 0.54, which is also greater than 0.5. This study may classify it into moderate correlation. This study find this result is quite consistent with ROA. This means that there is also slightly positive relationship between ESG and ROE.

Regarding to growth rate, using growth as dependent variable, Row 7 shows the correlation coefficient of growth rate and ESG is 0.332. In this case, however, we may consider it a weak correlation between them. Overall, the three indicators of firms' performance measurements show moderate or slightly weak correlations with ESG scores.

To do the significant test, this study check the sig. (2-tail) row in each element row. For the correlation of ESG and ROA, the significance level is P=0.000 (0 is displayed due to the accuracy of SPSS), it is less than 0.05 obviously. Using the significance test, it demonstrates that the linear correlation between ROA and ESG is significant. Similarly, the significance level of correlation of ESG and ROE is also P=0.000. Thus, there is also a significance linear correlation between ROE and ESG.

Overall, it reports that there is slightly positive relationship between ESG and firms' performance. Thus, this study could further conclude that the ESG engagement, to some extent, can improve firms' performance in the investment market. This is consistent with our original hypothesis advanced in this paper.

The result of the Spearman correlation coefficient matrix of different variables in mining industry is summarized in table 5. The coefficient correlation between ROA, ROE, growth rate and ESG score are all around 0.1. It means that there is weak correlation between those with ESG scores. Consequently, our hypothesis is rejected. This consequence is consistent with Balatbat's research on Australia evidence [11]. it suggests ESG has varying degrees of impact on corporate performance across different industries.

Correlations

			ESG	E	S	G	ROA	ROE	Growth	Size	Leverage
Spearman's rho	ESG	Correlation Coefficient	1.000	.819**	.805**	.465**	.577**	.540**	.332*	.302*	-.096
		Sig. (2-tailed)	.	.000	.000	.001	.000	.000	.024	.041	.526
		N	46	39	45	46	46	46	46	46	46
	E	Correlation Coefficient	.819**	1.000	.510**	.224	.399*	.444**	.187	.151	-.006
		Sig. (2-tailed)	.000	.	.001	.170	.012	.005	.253	.358	.971
		N	39	39	39	39	39	39	39	39	39
	S	Correlation Coefficient	.805**	.510**	1.000	.176	.404**	.385**	.220	.242	-.109
		Sig. (2-tailed)	.000	.001	.	.247	.006	.009	.147	.109	.475
		N	45	39	45	45	45	45	45	45	45
	G	Correlation Coefficient	.465**	.224	.176	1.000	.494**	.482**	-.015	.366*	.013
		Sig. (2-tailed)	.001	.170	.247	.	.000	.001	.922	.012	.931
		N	46	39	45	46	46	46	46	46	46
	ROA	Correlation Coefficient	.577**	.399*	.404**	.494**	1.000	.929**	.424**	.261	-.179
		Sig. (2-tailed)	.000	.012	.006	.000	.	.000	.003	.079	.235
		N	46	39	45	46	46	46	46	46	46
	ROE	Correlation Coefficient	.540**	.444**	.385**	.482**	.929**	1.000	.399**	.308*	-.002
		Sig. (2-tailed)	.000	.005	.009	.001	.000	.	.006	.037	.990
		N	46	39	45	46	46	46	46	46	46
	Growth	Correlation Coefficient	.332*	.187	.220	-.015	.424**	.399**	1.000	-.032	.116
		Sig. (2-tailed)	.024	.253	.147	.922	.003	.006	.	.833	.443
		N	46	39	45	46	46	46	46	46	46
	Size	Correlation Coefficient	.302*	.151	.242	.366*	.261	.308*	-.032	1.000	.209
		Sig. (2-tailed)	.041	.358	.109	.012	.079	.037	.833	.	.164
		N	46	39	45	46	46	46	46	46	46
	Leverage	Correlation Coefficient	-.096	-.006	-.109	.013	-.179	-.002	.116	.209	1.000
		Sig. (2-tailed)	.526	.971	.475	.931	.235	.990	.443	.164	.
		N	46	39	45	46	46	46	46	46	46

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4. Spearman correlations among variables (technological industry)

Correlations

			ESG	E	S	G	ROA	ROE	growth	size	lev
Spearman's rho	ESG	Correlation Coefficient	1.000	.976**	.864**	.720**	.119	.187	.113	.740**	-.124
		Sig. (2-tailed)	.	.000	.000	.000	.490	.275	.512	.000	.470
		N	36	36	36	36	36	36	36	36	36
	E	Correlation Coefficient	.976**	1.000	.773**	.682**	.135	.210	.071	.708**	-.081
		Sig. (2-tailed)	.000	.	.000	.000	.432	.219	.681	.000	.640
		N	36	36	36	36	36	36	36	36	36
	S	Correlation Coefficient	.864**	.773**	1.000	.592**	.124	.135	.123	.640**	-.200
		Sig. (2-tailed)	.000	.000	.	.000	.469	.432	.476	.000	.242
		N	36	36	36	36	36	36	36	36	36
	G	Correlation Coefficient	.720**	.682**	.592**	1.000	.270	.263	.356*	.710**	-.061
		Sig. (2-tailed)	.000	.000	.000	.	.111	.121	.033	.000	.723
		N	36	36	36	36	36	36	36	36	36
	ROA	Correlation Coefficient	.119	.135	.124	.270	1.000	.882**	.169	.289	-.098
		Sig. (2-tailed)	.490	.432	.469	.111	.	.000	.323	.087	.568
		N	36	36	36	36	36	36	36	36	36
	ROE	Correlation Coefficient	.187	.210	.135	.263	.882**	1.000	.176	.508**	.273
		Sig. (2-tailed)	.275	.219	.432	.121	.000	.	.304	.002	.107
		N	36	36	36	36	36	36	36	36	36
	growth	Correlation Coefficient	.113	.071	.123	.356*	.169	.176	1.000	.244	.214
		Sig. (2-tailed)	.512	.681	.476	.033	.323	.304	.	.152	.211
		N	36	36	36	36	36	36	36	36	36
	size	Correlation Coefficient	.740**	.708**	.640**	.710**	.289	.508**	.244	1.000	.297
		Sig. (2-tailed)	.000	.000	.000	.000	.087	.002	.152	.	.079
		N	36	36	36	36	36	36	36	36	36
	lev	Correlation Coefficient	-.124	-.081	-.200	-.061	-.098	.273	.214	.297	1.000
		Sig. (2-tailed)	.470	.640	.242	.723	.568	.107	.211	.079	.
		N	36	36	36	36	36	36	36	36	36

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 5. Spearman correlations among variables (mining industry)

4. Conclusion

This study uses data from Bloomberg financial company, CSMAR, and Wind database, analyzing whether ESG (environment, social, governance) principle has an impact on Chinese firms' performance. This study select 82 A-share companies from two industry sectors in large or medium size. Firms' performance is represented by three indicators: ROA, ROE, growth rate, while ESG is proxied by ESG scores calculated and published by Bloomberg. It reported that there is a slightly positive correlation between firms' ESG scores and their market performance in technology sector. This is also true within each individual element in ESG. But it shows weak correlation between ESG ratings of firms and their market performance in mining sector. Therefore, this study can conclude that ESG can influent firms' market performance positively in technology sector, but the result differs a lot in mining sector, it shows weak correlation between ESG scores and market performance. Moreover, from the descriptive statics of variables, this study conclude that firms' environmental scores rank last among the three dimensions of ESG. This may be because of the particularity of the industrial nature. The technological companies, however, rarely touches environmental governance. The analysis of ESG and performance indicators from two sectors shows different results. One of the reasons is that there are limited corporations discoursing ESG report in Chinese market. The lack of sample data will reduce the accuracy of the result.

In the investment market, the ESG index also give signs to investors of how the developmental potential of a firm is and attracts more investors. The findings of this paper have profound implication for companies, investment agencies, and investors. Companies need to properly understand the positive impact of ESG on corporate development and improve their ESG levels from multiple perspectives. The overall ESG level of a company, in terms of different evaluation dimensions, is broadly divided into two categories: ratings by professional institutions and evaluations by the public. To obtain better ESG ratings from both information channels, companies need to pay more attention on disclosing relevant information such as ESG reports, publicizing and reporting the company's ESG work. In this case, the market and the public can have more comprehensive understanding of the company's ESG situation. What is more important is doing practical work related to ESG and establishing an appropriate ESG governance framework.

For agencies, ESG product line is an important carrier of sustainable investment strategy. It is an important gateway for investors to access ESG investment. Agencies should actively promote product innovation around customers' ESG demand and form diversified product lines around ESG theme. For instance, a leading North American asset management firm has more than 200 investment products, offering clients a range of different strategies and themes under multi-asset, cash management and so on, among which ETE is the biggest feature. Several popular products have a scale of billions or even billions of dollars. Meanwhile, the agency also regularly carries out ESG product review, constantly renews products according to customers' demand.

Despite of the limited sample volume, there is still some limitation and deficiency of this study and future research. The ESG rating systems differ significantly. Although there are relatively consistent guidelines on ESG investment concept in the world, there are obvious differences in ESG rating system, which are mainly reflected in the regional difference, various rating methods and database etc. Unlike the ESG philosophy tending to the unified, it is believed that the ESG rating system are difficult to be agreed.

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