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ESG Performance and Capital Investment

Shuna Gao

School of Economics and Management, Tongji University, Shanghai, China
1841084@ tongji.edu.cn

Abstract: With the introduction of the double carbon goal in recent years and the construction of the national sustainable development management system, this paper empirically studies the impact of ESG performance on corporate investment based on 4044 A-share listed companies in China from 2009 to 2020. The results present that there is a significant negative correlation between ESG rating performance and corporate capital expenditure. The better the ESG performance of enterprises, the less capital expenditure of enterprises. Further analysis shows that due to resource constraints, enterprises have a crowding-out effect on investment activities while practicing ESG social responsibility. This study provides empirical evidence for enriching the economic consequences of ESG performance, and has certain implications for decision makers and investors to guide, supervise and improve ESG incentive policies.

Keywords: ESG Performance; Capital Investment; Financing Constraints.

1. Introduction

The concept of ESG was formally proposed by the United Nations Global Compact when it released the 'Who Cares Wins' report in 2004.In 2006, the United Nations Responsible Investment Agency issued the 'Responsible Investment Principles (PRI)' to encourage the inclusion of ESG-related standards into investment management decisions. With the proposal of the double carbon goal in recent years and the increasing attention of the country to green investment, the ESG concept aims to promote enterprises to actively carry out ESG practice from the aspects of environment, social impact and corporate governance, and pursue long-term sustainable development. To carry out ESG evaluation for enterprises is to urge enterprises to promote ESG investment, help enterprises to formulate ESG strategic priorities in corporate decision-making, determine different levels of governance structure, allocate resources more effectively through ESG priority governance, and bring economic benefits to enterprises. Based on the fast-updating and wide-ranging ESG rating scores of China Securities Index, this study takes the data of Chinese A-share listed companies from 2009 to 2020 as a sample, takes ESG rating as a whole to study its impact on capital investment, and empirically tests the relationship between ESG performance and corporate investment. The results show that ESG performance can decrease capital investment.

The main contributions of this paper are: (1) This study enriches the literature on the economic consequences of ESG performance. Existing literature focuses on firm value, enterprise investment efficiency, and financial risk (Fatemi et al.,2018; Gao et al.,2021; Broadstock et al.,2021), while little attention has been paid on the direct consequences of ESG performance. (2) Regarding corporate investment, the existing literature studies the factors affecting capital investment decisions from the perspectives of policy uncertainty, financial reporting and disclosure, and CEO Overconfidence (Gulen and Ion,2016; Roychowdhury et al.,2019; Malmendier and Tate,2005). At present, the literature on the ESG performance and corporate investment is limited. In the relevant study, Roychowdhury et al. (2019) collated a large number of literatures on financial reporting and investment decisions over the past 20 years in the form of a review, summarizing whether and why financial reporting information disclosure affects investment choices, and the study found that financial reporting information disclosure has both positive and negative effects on capital allocation. In contrast, this paper shift attention to ESG performance, we want to empirically study whether the mandatory disclosure of ESG information is likely to increase the company's capital expenditure and promote investment activities in addition to the impact of accounting information disclosure on capital investment. Moreover, different from the general research on the relationship between corporate social responsibility and corporate investment, this paper examines its impact on capital investment from a more comprehensive dimension of ESG, enriching this strand of literature. This study provides implications for policy-makers, listed firms and Investment evaluation agencies.

The remainder of this paper will proceed as follows; Section 2 discusses the literature review and the hypothesis development. Section 3 will present the data and sample, empirical model and variable introduction. Section 4 describes and discusses the empirical and test results. Finally, section 5 concludes and presents the future research directions.

2. Literature Review and Hypotheses Development

(1) Literature review

ESG performance is a concept that considers environmental, social and governance factors in investment decisions. It is an important criterion for measuring whether listed companies have sufficient social responsibility. ESG information disclosure includes the disclosure of the enterprise's own performance in ESG through annual reports, social responsibility reports, etc., to convey the enterprise 's own ESG value to the public. ESG Rating is the classification, quantification and integration of ESG information disclosed by ESG rating agencies through ESG scoring model, so as to score and show the comprehensive strength of enterprises.

In recent years, ESG performance has gradually become one of the important keywords for evaluating the value of corporate investment, and investors' demand for corporate

ESG information disclosure has risen sharply. The existing literature shows that companies with good ESG performance will help to improve the company's ability to continue stable operation, long-term stable development and risk control, improve the company's valuation level and profitability, and reduce the uncertainty risk of investment. For instance, corporate ESG information disclosure reduces the risk of stock price crash by reducing information asymmetry and smoothing investor sentiment (Xi et al., 2022). Raimo et al. (2021) found that there is a negative correlation between ESG information disclosure and the cost of debt capital, that is, higher-transparency corporate ESG information disclosure helps lenders assess borrowers' default risk and helps companies reduce debt financing costs. A high ESG rating helps reduce the financing costs of bond issuers for relatively small businesses; in addition, in terms of evaluating credit quality, ESG makes up for the disadvantage of insufficient information when bond investors evaluate credit quality (Jang et al., 2020). In terms of ESG performance and cost of equity capital, Chen et al. (2022) found that ESG can not only directly and significantly reduce the cost of equity capital of listed companies, but also play an intermediary role to indirectly reduce the cost of equity capital by reducing the market risk of enterprises and increasing their equity diversification. Meng et al. (2022) proved that the disclosure of ESG by Chinese enterprises has a significant positive impact on stock liquidity, which is mainly reflected in the following aspects: good ESG performance first releases the signal that enterprises have potential in green investment to the capital market, and second, it may help reduce systemic risks and special risks by improving cash flow and management, thus improving stock liquidity. Stock liquidity is a key factor in the capital market reaction. The company's stock liquidity level is high, the equity financing ability is also improved, and the cost of equity financing is reduced.

(2) Hypotheses Development

The theory of information asymmetry refers to the fact that in market economic activities, all sorts of staff have different understandings of relevant information; people with sufficient information are often in a more favorable position, while people with poor information are in a relatively unfavorable position. The company follows the environmental, social and governance (ESG) reporting guidelines, which contributes to improve the quantity and credibility of sustainability information when publicly disclosing ESG-related information, thereby further reducing information asymmetry (Darnall et al., 2021). As an important information intermediary in the capital market, increasing the accuracy of analysts' forecasts has a considerable impact on easing information asymmetry. Luo, K. and Wu, S. (2022) found that ESG rating encourages enterprises to pay more attention to continuable development, thereby improving corporate governance, reducing information risk and operational risk, and improving analyst forecast accuracy. However, the higher the degree of ESG controversy, the more difficult it is to accurately predict the company's earnings. Companies can mitigate the uncertainty-increasing effect of ESG disputes by increasing ESG disclosures, helping analysts better assess risks and improving the accuracy of analyst earnings forecasts (Schiemann et al., 2022).

Gulen and Ion (2016), taking US-listed companies as an example, concluded that policy uncertainty inhibits corporate capital investment, and this negative impact is more pronounced when corporate capital is more irreversible and more dependent on government expenditure. Continued good policy is one of the determinants of increasing capital investment. Chinese enterprises ESG started relatively late, ESG rating level in the international community is generally not high, low participation. In recent years, Chinese ESG information disclosure related policies and regulations have continuously strengthened the disclosure requirements and gradually unified the disclosure standards after experiencing the embryonic exploration and development stage. In September 2018, the CSRC issued a revised 'Corporate Governance Guidelines for Listed Companies', establishing the basic framework for environmental, social responsibility and corporate governance (ESG) information disclosure. In July 2020, the third edition of the 'Environmental, Social and Governance Reporting Guidelines' revised by the Hong Kong Stock Exchange officially came into effect, and China has gradually entered the in-depth strengthening stage of ESG information disclosure.

The disclosure of ESG information can reduce the information asymmetry of the capital market, thereby reducing financing costs and constraints. Under the background of ecological civilization construction, environmental and corporate governance factors have a greater effect on corporate financing costs; improving the quality of ESG information disclosure can reduce the adverse impact of negative environmental events on corporate financing costs (Qiu et al., 2019). Improving the level of ESG information disclosure is beneficial for enterprises to reduce financing costs, increase innovation investment and improve profitability, play a guiding role in ESG investment, and promote the expansion of investment scale (Xue et al., 2022). Guariglia, A. (2008) found that the sensitivity of investment to cash flow is positively correlated with the degree of external financing constraints faced by enterprises. With the increase of enterprises' cross-border investment activities, Xie and Lyu (2022) found that good ESG performance of enterprises can significantly reduce debt costs and alleviate financing constraints, obtain better financing channels and promote foreign direct investment. In short, ESG rating results become an important reference for investment decisions. The more complete the information disclosure, the higher the ESG rating, the more competitive the enterprise, the easier it is to obtain the favor of the capital market, and the more financing opportunities. However, the impact of ESG ratings on capital investment decisions depends largely on whether ESG performance can bring economic benefits to enterprises. If companies fulfill their social responsibility to complete ESG information disclosure with limited funds, in order to improve ESG performance, they will increase ' greenwash ' cost expenditure, which will have a crowding-out effect and reduce the scale of capital expenditure. At the same time, if the internal information disclosure is too much, it may lead to information security risks, resulting in competitive disadvantages and increasing the difficulty of financing.

Based on this, this paper hypotheses 1 and 2:

Hypothesis 1: ESG performance will increase capital investment.

Hypothesis 2: ESG performance will decrease capital investment.

3. Research Design

(1) Sample and data

This paper selects Chinese A-share listed companies from 2009 to 2020 as initial sample. ESG rating data comes from

the WIND database, and other corporate financial data and corporate governance data come from CSMAR database. After data processing, this paper first eliminates the samples of the financial industry, and then excludes the samples of ST and * ST companies, because it is clear that the capital investment situation of enterprises in financial distress may be quite different from other enterprise investment mechanisms. After finishing, we finally get 4044 listed companies and 33162 firm-year observations.

Table 1. Variable definitions

Name	Symbol	Definition and measurement
Capital Expenditure	Capex	the proportion of net cash flow generated by investment activities to total assets
ESG Performance	ESG	ESG ratings score is assigned from high to low as 9 ~ 1
Firm Size	Size	the natural logarithm of total assets
Leverage level	Lev	Ratio of total liabilities to total assets
Return on Assets	Roa	Ratio of net profit to total assets
CFO	Cfo	net cash flow from operation activity scaled by total assets
PPE	PPE	the proportion of fixed assets to total assets
Independent Director Ratio	Indep	The ratio of independent directors to the total number of directors
Board Size	Board	The total number of the board of directors takes the natural logarithm

(2) Empirical model

In order to test the impact of ESG rating performance on capital investment (H1), drawing on Xiao Fang et al. (2021), a linear regression model (1) is proposed for empirical testing:

$$CAPEX_{i,t}=\alpha 0+\alpha 1 ESG_{i,t}+\sum \beta Controls_{i,t}+Industry\ FE+Year\ FE+\varepsilon_{i,t} \quad (1)$$

Where α0 is the intercept term, CAPEX i,t is the dependent variable, ESG i,t is the independent variable, α1 is the independent variable coefficient, β is the control variable coefficient, Controls i,t is the control variable, Industry FE is the industry effect, Year FE is the time effect, ε is the random disturbance term. Among these estimators, α1 is the key coefficient, because it means that ESG performance is significantly positive and will significantly increase corporate capital expenditure; conversely, if it is significantly negative, it means the opposite.

(3) Variable definitions

Capital Expenditure is the dependent variable of this paper, referred to as Capex, which represents the capital expenditure of company i in period t. Capital expenditure refers to the company's increased investment in fixed assets, land, machinery and equipment, as well as intangible assets and other long-term assets in order to maintain existing or enhance future competitiveness. Hu et al. (2006) used the ratio of cash to total assets paid for the purchase and construction of fixed assets, intangible assets and other long-term assets as a proxy variable for capital expenditure when studying equity decisions and capital expenditure decisions. On this basis, we mainly look at the data of the cash flow statement and balance sheet of listed companies, and use the proportion of net cash flow generated by investment activities to total assets as a measurement of capital expenditure.

ESG is the independent variable of this paper. This paper uses the rating score of third-party rating agencies as the proxy variable of enterprise ESG performance. Based on previous research (Luo, K. and Wu, S., 2022), we downloaded Hua Zheng index ESG data from the Wind database as a proxy indicator of ESG performance. The ESG rating of the public database is divided into nine grades, from high to low, AAA, AA, A, BBB, BB, B, CCC, CC, and C, respectively. Based on the characteristics of listed companies in China and the market situation, this paper assigns values to each level of data in the order of 9-1 points. For example, when the rating is AAA, ESG = 9; when the rating was AA, ESG = 8; when the rating is A, ESG = 7, and so on.

Controls i,t represents all control variables in this paper. Based on the existing research literature (Raimo et al., 2021), this paper intends to control Firm Size (the natural logarithm of total assets), ROA(Ratio of net profit to total assets), Leverage(Ratio of total liabilities to total assets), PPE(the proportion of fixed assets to total assets), Cfo(net cash flow from operation activity scaled by total assets), Independent Director Ratio(The ratio of independent directors to the total number of directors), Board Size(The total number of the board of directors takes the natural logarithm). This paper mainly controls the fixed effects of industry and year, and the definition and value method of all variables are shown in table 1.

4. Empirical results

(1) Descriptive statistics

Table 2 reports the descriptive statistics of the key dependent, independent and control variables in the linear model. The sample consists of 33162 annual observations during the sample period (2009-2020). The results show that the mean and median values of ESG are 6.454 and 6, respectively, indicating that the average level of ESG is between A and BBB. The minimum value of ESG is 1, the maximum value is 9, and the standard deviation is 1.117, indicating that there is still a significant gap between different sample companies in fulfilling ESG responsibilities. The average capital expenditure is -0.06 and less than the median, and the standard deviation is 0.091, indicating that the capital expenditure of the sample enterprises is generally low. The average size of the company is 22.147, and the median is 21.924, indicating that the size of the sample companies is at a high level. The average asset-liability ratio is 0.439, and the median is 0.428, which means that the financial risk of the sample enterprises is relatively high. The mean and median of HHI are low, indicating that the industrial scale of sample enterprises is similar and the number of samples is sufficient.

(2) Main results

Table 3 reports the results of testing hypotheses H1 and H2 based on Model (1). Among them, the first column is a univariate test without adding control variables. The regression coefficient of ESG on capital expenditure level is − 0.005, the T value is − 7.95, and the coefficient estimate of ESG is significant at the 1 % level. The second column is a

multiple regression result that adds other control variables that may affect corporate investment. The regression coefficient of ESG on capital expenditure level is − 0.003, and the T value is − 4.43. The estimated coefficient of ESG is significant at the 1 % level. The results show that ESG performance has a significant negative impact on the capital expenditure of the enterprise. The regression coefficient of the control variable Size to capital expenditure is-0.023, the T value is-16.66, and it is significant at the 1 % level. The regression results of the remaining control variables are basically consistent with the existing literature (e.g. Raimo et al., 2021; Gao et al., 2021). The regression results show that ESG investment will have a certain crowding out effect on corporate capital expenditure, thus reducing capital investment and supporting Hypothesis 2.

Table 2. Descriptive statistics

Variable	N	Mean	S.D.	Min	25th	Median	75th	Max
Capex	33162	-0.060	0.091	-0.387	-0.099	-0.045	-0.009	0.203
ESG	33162	6.454	1.117	1.000	6.000	6.000	7.000	9.000
Size	33162	22.147	1.439	19.330	21.142	21.924	22.886	27.145
ROAB	33161	0.040	0.070	-0.285	0.013	0.038	0.072	0.228
PPE	33162	0.210	0.165	0.001	0.080	0.175	0.303	0.708
Cfo	33162	0.043	0.074	-0.204	0.005	0.044	0.086	0.249
Lev	33162	0.439	0.222	0.050	0.261	0.428	0.602	0.979
Indep	33162	0.380	0.071	0.250	0.333	0.364	0.429	0.600
Board	33162	2.288	0.258	1.609	2.197	2.303	2.485	2.944
HHI	33162	0.285	0.119	0.202	0.219	0.253	0.298	0.827

Table 3. The effect of ESG performance and capital expenditure

Variable	(1)	(2)
	Capex	Capex
ESG	-0.005*** (-7.95)	-0.003*** (-4.43)
Size		-0.023*** (-16.66)
ROAB		-0.037*** (-3.24)
Cfo		-0.134*** (-14.63)
Lev		0.038*** (6.24)
Indep		0.010 (1.26)
Board		0.011*** (3.93)
HHI		-0.012 (-0.95)
Constant	-0.033*** (-7.20)	0.399*** (13.97)
Year	Yes	Yes
Firm	Yes	Yes
N	33162	33161
R2	0.049	0.079

This table presents the impact of ESG performance on capital expenditure under OLS linear regression model. * * *, * * and * are significant at the 1 %, 5 % and 10 % levels, respectively. The T-values calculated by cluster robust standard error are in the brackets under the regression coefficient.

5. Conclusion

With the double carbon goal and the concept of sustainable development gradually gaining popularity, regulators, investors and companies pay more and more attention to the construction and practice of ESG management system. In this context, this study uses the relevant data of the Hua Zheng index ESG evaluation to empirically test the relationship between ESG performance and corporate capital expenditure of Chinese A-share listed companies with a sample of 4044 listed companies in China from 2009 to 2020. The results show that there is a significant negative correlation between ESG rating performance and corporate capital expenditure, that is, ESG performance will decrease capital investment. The feasible reason behind this result may be that enterprises increase ESG investment under limited funds due to resource constraints, resulting in a certain crowding-out effect on capital expenditure. Therefore, we rationally view the commitments and disclosures in the ESG report. Practicing the ESG development philosophy means that investment is no longer limited to financial considerations, but does not mean that companies sacrifice other company performance in pursuit of sustainability. Regulators, investors and enterprises should grasp the opportunities and challenges brought by ESG, not forget the original intention, strengthen guidance, improve management, promote the sustainable development of enterprises, and promote high-quality economic development.

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