

Study on ESG and Trade Credit Financing

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Abstract. This paper investigates the effect of Environment, Social, and Governance (ESG) rating on corporations' trade credit financing. Using a sample of 1235 Chinese companies, we find that those with higher ESG ratings perform better in raising trade credit financing. In addition, the positive relationship between ESG rating and trade credit financing is more pronounced in big and non-state-owned firms. The study's central message is that ESG plays an essential role in predicting trade credit financing. Hence, it should not be ignored while considering firms' expenditure, especially for big and non-state-owned firms.

Keywords: ESG; Trade credit financing; Property rights; Firm size.

1. Introduction

Nowadays, investors have taken companies' environment, social, and governance (ESG) practices seriously. Enterprises are undergoing profound changes due to globally adopted standards to combat climate change. Since the Paris Agreement in 2015, plenty of countries has proactively answered the call. China has announced the goal of being emission peak by 2030 and carbon neutrality by 2060 and issued a series of related policies, including making green finance one of the crucial pillars to implement China's energy revolution and ESG a significant concept and practice tool to build a green capital market.

Financing difficulties have always been the bottleneck restricting the development of Chinese enterprises. Many studies have found that the development of the financial system can help enterprises effectively reduce external financing constraints and promote rapid growth. However, China's bank-dominated financial system restricts the financing channels of enterprises to a large extent. Trade credit financing is widely adopted as an essential alternative to bank credit. Some scholars point out that China's trade credit financing is the most common informal financing method for most enterprises constrained by bank credit. Compared with the developed countries in Europe and the United States, China, as a developing country, is going through an economic transformation with relatively severe financial repression and credit discrimination. This unique transformation economic feature significantly impacts on trade credit financing, which is widely used as a surrogate capital source of bank credit when Chinese enterprises are constrained by bank credit and credit rationing.

Therefore, trade credit financing is worth studying its influencing factors as a standard external financing means for enterprises. According to Xia Yingui and Cheng Zhongming, the firm size, sales growth rate, and net profit margin on sales positively relate to trade credit financing. (2009) Wu Sirui and Gong Guangming probe into trade credit financing from the intergenerational inheritance process. (2021) Pan Lin, Zhang Longping et al. investigate the relationship between the controlling shareholder's trade credit financing and equity pledge. (2018) Few studies were conducted on the relationship between ESG and trade credit financing. Yet the ESG reporting has proved to be an important indicator of financial performance, firm value, company investment, et cetera. Gunnar Friedea Timo Busch highlight that the positive ESG impact on CFP appears stable over time. (2015) Xu Guanghua et al. found a significant positive correlation between ESG disclosure and enterprise value. (2022) Gao Jieying et al. point out that good ESG performance of enterprises can effectively reduce agency costs, ease financing constraints, and improve investment efficiency. (2021) The objective of this study is to examine whether the disclosure of ESG-related information helps the company raise more trade credit financing.

We reckon that the influence of ESG disclosure on trade credit financing is also affected by property rights. State-owned enterprises have obtained a relatively high level of social trust and more easily get trade credit financing. Therefore, the disclosure of ESG rating will have a stronger impact on non-state-owned enterprises with comparatively low social confidence according to the expectation theory. Therefore, based on the expectation theory, we assume that the positive relationship between ESG and trade credit financing is more pronounced in non-state-owned enterprises than state-owned ones.

In addition, we predict that big firms are more likely to benefit from the ESG ratings in increasing trade credit financing than small ones. For small and medium-sized enterprises (SME), the ESG can burden the firm's expenditure. And it is reported in the RKS ESG Ratings of 2021 that from the perspective of the average ESG score, SMEs attach more importance to ESG than large enterprises. But among the 800 listed companies, large companies account for nearly 90 percent, making them the mainstream of listed companies. So although the small firms' scores are higher on average, they remain less visible than big firms. Thus, their ESG performance is more easily overlooked. Therefore, It is assumed that the positive association between ESG and trade credit financing is weakened in small firms.

We find evidence supporting all three hypotheses. Our findings contribute to the ESG reporting literature and trade credit financing literature. Prior studies show that trade credit financing is connected to social responsibility. (Wu Beierjiang Aishan, Lou Xiaoting: 2020). Complementing their studies, our study examines whether a comprehensive set of non-financial information, represented by stand-alone ESG reports, is related to trade credit financing. We also extend research on ESG. Recent findings provide evidence that companies highly rated in the ESG report have higher excess returns (Matthew W. Sherwood and Julia L. Pollard: 2017) and lower volatility (N. C. Ashwin Kumara, Camille Smith: 2016) in their stock performances. It is supported by the assumption that ESG factors are considered, by market agents, as a good proxy for firms' financial soundness. Our study extends the ESG by studying its relationship with trade credit financing. In this regard, our findings prove insights for the recent appeal for the company to facilitate its ESG performance to help it raise trade credit financing.

2. Related Research and Hypothesis Development

2.1 ESG and Trade Credit Financing

According to signal theory, the information held by the company and the financing company is different. The former has more information than the latter. Therefore, if the firm can provide ESG reporting, it reduces asymmetric information and information gap, lowering the transaction cost. Thus, the corporations will have a higher possibility of raising finance. Moreover, good ESG reporting will benefit the stakeholders based on stakeholder theory. It builds a reputation for the company, which may increase its social trust and create a positive public image, which is proven to be conducive to trade credit financing. Therefore, we argue that ESG is positively associated with trade credit financing, drawn upon signal theory and stakeholder theory. We state this prediction formally as our first hypothesis.

H1: The publication of ESG reports of listed companies can significantly positively affect the trade credit financing of companies.

2.2 Property Rights and the Relationship between ESG and Trade Credit Financing

According to the expectation theory, the more the disclosure of ESG satisfies the stakeholder, the more optimistic stakeholders are about the future development potential of the enterprise, the easier it is for companies to create a good image and profit from it. State-owned enterprises hold two goals: first, to maintain a positive, stable income; second, to take on significant social responsibility by assisting the government to undertake part of the social governance work. In contrast, the public and investors do not assume private enterprises to undertake social responsibility. So when private

enterprises exceed expectations to have a good ESG performance, the market will predict that they have a tremendous development potential, which improves their possibility to obtain trade credit financing.

Therefore, we predict that the positive correlation between ESG and trade credit financing is more significant if state-owned. We state this prediction formally as our second hypothesis.

H2: *Ceteris paribus*, the positive relationship between ESG disclosure and trade credit financing is stronger in state-owned enterprises than non-state-owned ones.

2.3 Firm Size and the Relationship Between ESG and Trade Credit Financing

It is shown in the report that small and medium-sized firms attach greater importance to the ESG performance but still take up only a tiny portion of the market. Their excellent performances on ESG are offset by their size. By contrast, the big companies' good ESG ratings will be an added advantage to earn higher trade credit financing. They have already enjoyed more resources and partners than their disadvantaged competitors. And the bigger size the company has, the more considerable contribution it can make to society in terms of green development.

Therefore, we assume that the positive correlation between ESG and trade credit financing is more pronounced in big firms. We state this prediction formally as our third hypothesis.

H3: *Ceteris paribus*, the positive relationship between ESG disclosure and trade credit financing is stronger in big firms than small ones.

3. Method

3.1 Data Source and Sample Selection

We obtain our data from the listed firms from the Shenzhen and Shanghai stock exchange between 2010 and 2020 to investigate how ESG ratings' disclosure impacts trade credit financing. We select our sample as follows:

Exclude financial insurance and other listed companies. In China, financial listed companies significantly differ from other listed companies regarding the main business, company size, and information disclosure.

Exclude (*) ST-listed companies because such listed companies have significant differences from other companies concerning financial indicators and information disclosure.

The companies listed in the same year were excluded because they had a shortlisting time and a short duration of historical information, which led to a tremendous difference in information disclosure from other companies.

Eliminate samples without audit charges control variables.

We finally obtained 1235 firm-year observations. To mitigate the impact of extreme values on the result of our empirical study, we use winsor2 to conduct tail reduction at 0.01 and 0.99 levels of continuous variables. ESG rating stems from the Huazheng database and other data from the CSMAR database.

3.2 Measures

3.2.1 Dependent Variable

TC is commonly used as the proxy for trade credit financing for companies. Referring to Lu Zhengfei and Yang Deming's (2011) measurement, we employed TC as our dependent variable, calculated by adopting the bills payable added to accounts payable and accounts received in advance, then divided by total assets.

3.2.2 Independent Variable

We took ESG as our independent variable. Shanghai Huazheng ESG index system sets 26 key indicators by referring to the foreign mainstream ESG evaluation framework abroad and concerning the reality of China's capital market and various listed companies' characteristics. ESG ratings are

conducted on all public companies through an industry-weighted average method every quarter. Our research adopted the total score of ESG published by Sino-Securities Index Information Service (Shanghai) CO.Ltd. ESG rating is divided into nine grades, from low to high, respectively C, CC, CCC, B, BB, BBB, A, AA, AAA. We employ the assignment method to construct the explanatory variable ESG. Nine grades from C to AAA Grades are selected from 1 to 9. In other words, when the rating is C, ESG=1; when the rating equals CC, ESG = 2; When rated CCC, ESG=3, et cetera.

3.2.3 Dummy Variables

State ownership and firm size were selected as dummy variables to explore their influence on the relationship between ESG and trade credit financing in enterprises.

State ownership. Although the reform and opening-up policy have led to partial privatization of some state-owned firms, state ownership is an important figure to characterize economic performance in China. Our research adopted state ownership as a dummy variable to explore whether it has a moderating effect on the relationship between ESG and trade credit financing. We coded it 1 if the ultimate owner of a firm was the Chinese state and agencies; otherwise, we coded it 0.

Firm size. The enterprise scale shows whether the enterprise has the property to collateralize. It can also indicate its information disclosure degree. Big companies, in general, make more transactions and surface in the capital market more often, which decreases its information asymmetry. Our research adopted firm size as a dummy variable to explore whether it affects the relationship between ESG and trade credit financing. We coded it 1 if the company size is greater than the mean of all the firms in the year; otherwise, we coded it 0.

3.2.4 Control Variables

Table 1. Measurement of Main Variables

Variable	Sym bol	Measurement
Dependent Variable		
trade credit financing	TC	the bills payable added to accounts payable and accounts received in advance, then divided by total assets
Independent Variable		
Environment Social governance	ESG	the assignment of ESG score from Shanghai Huazheng ESG ratings
Dummy Variables		
State ownership	SOE	SOE=1 if the firm is state-owned SOE=0 otherwise
SIZE	SIZ E	SIZE=1 if the firm size is greater than the mean SIZE=0 otherwise
Control Variables		
Firm Size	Size	the total asset at the end of the fiscal year, taking the natural logarithm
Debt Asset Ratio	Lev	the total liabilities divided by the total assets
Return on total assets ratio	Roa	net profit divided by the average total asset
Bank Loan	Ban k	short-term loan added to the long-term loan divided by the total asset at the end of fiscal year
Business Growth Force	Gro wth	last year's operating revenue subtracted from the current year's operating income, then divided by last year's operating revenue
Mortgage Ability	Capi tal	fixed assets net value divided by total book assets
Net Cash Flow	Cfo	net cash flow divided by the total asset
year	year	controlled
Industry	Ind	controlled

According to the research of Xia Yingui and Cheng Zhongming, firm size, bank loan, and net cash flow have a specific relationship with trade credit financing. Concerning former scientists' research, we controlled the effect of firm size, debt asset ratio, return on total assets ratio, bank loan, business growth force, mortgage ability, net cash flow, fixed year, and industry. Except when we conducted the group analysis of firm size's effect on the relationship between ESG and trade credit financing, we turned the firm size to a new variable SIZE as defined above. Table 1 presents the measures of all variables.

3.3 Model Estimation

Multiple linear regression was used in our research to explore the effect of ESG on the trade credit financing of the listed Chinese enterprises. All our models were estimated using the STATA 17 statistical package.

$$TC_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 Bank_{i,t} + \beta_3 Capital_{i,t} + \beta_4 Size_{i,t} + \beta_5 Lev_{i,t} + \beta_6 Roa_{i,t} + \beta_7 Growth_{i,t} + \beta_8 Cfo_{i,t} + \beta_9 year + \beta_{10} ind + \epsilon_{i,t} \quad (1)$$

Formula (1) reveals the general proposal of our research. β_1 , defined as the coefficient of the independent variable ESG, was expected to be significantly positive. $Ind_{i,t}$, the subdivision of industry, and year were added to the formula as fixed effects. The remaining variables were control variables, composed of firm size ($Size_{i,t}$), debt asset ratio ($Lev_{i,t}$), return on total assets ratio ($Roa_{i,t}$), bank loan ($Bank_{i,t}$), growth of the company ($Growth_{i,t}$), mortgage ability ($Capital_{i,t}$), net cash flow ($Cfo_{i,t}$).

4. Results

4.1 Descriptive Statistics and Correlation Analysis

Table 2 presents the descriptive statistics for the variables in our study. For the 1235 samples, the average ESG score (Mean = 6.49) for 2010 to 2020 was 6.49, revealing the good performance of listed Chinese enterprises in terms of ESG. A low standard deviation level for ESG (SD = 1.12) showed a relatively steady ESG performance among the firms.

Table 2. Descriptive Statistics and Correlation

Variable	N	Mean	SD	Min	Max	p25	p50	p75
TC	13585	0.1	0.1	-0.08	0.42	0.03	0.08	0.15
ESG	13585	6.78	1.14	1	9	6	7	8
Bank	13585	0.16	0.13	0	0.54	0.04	0.14	0.25
Capital	13585	0.23	0.17	0	0.7	0.09	0.19	0.33
Size	13585	22.59	1.38	19.66	27.16	21.63	22.43	23.42
Lev	13585	0.47	0.2	0.05	0.93	0.32	0.48	0.62
Roa	13585	0.04	0.05	-0.23	0.23	0.01	0.04	0.06
Growth	13585	0.16	0.41	-0.6	2.87	-0.02	0.1	0.24
Cfo	13585	0.05	0.07	-0.18	0.25	0.01	0.05	0.09

4.2 Hypothesis Testing

4.2.1 Main Effect

Table 3 reveals the multiple linear regression models estimating the impact of ESG on trade credit financing. We fixed the effect of year and industry throughout the analysis.

Our baseline regression aimed to explore the main effect of ESG on trade credit financing. Model 1 included all the control and moderating variables. The coefficients of bank loans ($p < 0.01$), firm size ($p < 0.01$), and state of ownership were negative. The coefficients on mortgage ability (capability), debt asset ratio (leverage), business growth force (growth), net cash flow (Cfo) were positive and significant. The results above showed that fewer bank loans, smaller firm size, private enterprises,

higher mortgage ability, higher debt asset ratio, a more affluent abundance of cash flow might be attached to more outstanding trade credit financing.

Model 2 tested the main effect of the critical independent variable, ESG. The coefficient was positive and significant ($p < 0.05$). This finding supported our hypothesis above, stating that ESG predicted trade credit financing. The relationship was consistent in all of the models. ESG ratings would positively affect the trade credit financing of the firm.

4.2.2 Group Analysis

Based on the previous theoretical analysis, the impact of the enterprise ESG information disclosure on the trade credit financing may also be affected by the property rights and firm size. We divided the sample data into two groups, non-state and state ownership, and big and small firms. Big firms have sizes greater than the mean of the firm scale in each specific year, whereas firms with sizes smaller than the average size of the firms in the year are regarded as small firms. Table 4 shows the results of the effect of state ownership and firm size on the relationship between ESG and trade credit financing.

The first and second columns are the group regression results on property rights. The ESG coefficient of state-owned enterprises is 0.00125, whereas non-state-owned firms have a coefficient of 0.00194 ($p < 0.1$). It indicates that the excellent ESG rating of non-state-owned enterprises can better promote the trade credit financing of enterprises. Hypothesis 2 is proved. The third and fourth columns are listed as the firm size group regression results. The coefficient of big firms is 0.00203 and significant ($p < 0.1$), which is greater than that of the firms with the small size (0.00153), which conforms to hypothesis 3.

In conclusion, non-state-owned enterprises earn higher trade credit financing if they endeavor to improve their ESG performance than state-owned ones. In terms of the effect of firm size, companies with bigger sizes will gain trade credit financing more easily than smaller ones on the condition that they devote themselves to their ESG ratings.

Table 3. Empirical Results of Multiple Linear Regression

Variable	Trade Credit Financing (TC)	
	(1)	(2)
ESG		0.00176** (2.23)
Capital	0.0275** (2.05)	0.0271** (2.03)
Size	-0.0108*** (-3.40)	-0.0111*** (-3.48)
Lev	0.259*** (17.52)	0.260*** (17.54)
Roa	0.025 (1.48)	0.0237 (1.40)
Growth	0.00373*** (2.84)	0.00378*** (2.88)
Cfo	0.0336*** (3.00)	0.0339*** (3.26)
SOE	-0.00223 (-0.34)	-0.00233 (-0.36)
_cons	0.233*** (3.40)	0.227*** (3.33)
N	13585	13585
R ²	0.216	0.217

Table 4. Group Analysis of Property Rights and Firm Size

Variable	Trade Credit Financing (TC)			
	SOE	non-SOE	Big Size	Small Size
ESG	0.00125 (-1.06)	0.00194* (1.88)	0.00203* (1.94)	0.00153 (1.59)
Bank	-0.232*** (-9.82)	-0.218*** (-11.58)	-0.201*** (-11.00)	-0.244*** (-11.89)
Capital	-0.00922 (-0.55)	0.0735*** (4.78)	0.016 (0.96)	0.0542*** (3.36)
Lev	0.284*** (13.74)	0.236*** 12.79	0.209*** (11.39)	0.272*** (14.47)
Roa	0.0264 (0.98)	0.0143 (0.68)	0.00719 (0.30)	0.0278 (1.50)
Growth	0.00367** (1.97)	0.00353* (1.90)	0.00400** (2.23)	0.00320* (1.66)
Cfo	0.0365** (2.48)	0.0285* (1.94)	0.0604*** (4.39)	0.0241* (1.77)
Size	-0.0151*** (-2.64)	-0.00978*** (-2.73)		
SOE			0.00532 (0.66)	-0.00219 (-0.25)
_cons	0.320** (2.57)	0.194** (2.56)	-0.00502 (-0.40)	-0.0168* (-1.80)
N	7507	6078	6055	7530
R ²	0.219	0.223	0.186	0.244

5. Discussion

Nowadays, enterprises are necessary to proliferate and develop sustainably in China, which has been broadly accepted. Environment, social, and governance (ESG) are essential for enterprises to achieve long-term survival and the joint sustainable development of the corporation, society, and the environment. It abides by the reasonable expectations of the whole community and improves the competitiveness and reputation of enterprises. However, most studies on ESG are conducted on the relationship between ESG and financial performance, firm value, audit quality, et cetera. Therefore, there is still a limited understanding of prosocial behavior and sustainable development in emerging markets. Our research helps gain insight into the relationship between ESG and trade credit financing and further explores how state ownership and firm size impact this relationship.

This study reckons that ESG affects trade credit financing through stakeholder responses and signal theory mechanisms. For instance, when employees perceive ESG as virtuous, they will identify strongly with the firm, promoting social behavior. Moreover, corporations engaged in ESG practices will likely create an excellent public image. In addition, the disclosure of ESG ratings reduces the information gap between the potential partners. The impact of asymmetric information is offset to some degree and thus enhances the trade credit financing of the beneficiaries.

Using the listed Chinese manufacturing companies on the Shanghai and Shenzhen stock exchanges from 2010 to 2020, our research explored the relationship between ESG and trade credit financing. The empirical results show that ESG could positively affect firm value, *ceteris paribus*. Further, the relationship was stronger for firms with non-state ownership and big firm size. Both of these results were consistent with our expectations. Feeling that the firms with more kindness were bound to receive greater rewards toward their firm value, our research supported this honest thought of scholars.

The public less expects non-state ownership enterprises to respond to the government's call. In contrast, it is taken for granted by most Chinese people that state-owned enterprises carry out the national policy accordingly and proactively. So with regard to the expectation theory, non-state ownership will gain more trade credit financing when they improve their ESG performance. In

addition, their previous disadvantage in business resources and cooperative partners can weaken small and medium-sized firms' endeavors to improve the ESG ratings. Though they have comparatively higher ESG ratings, they are still invisible compared to big companies. In that regard, a big company will gain more trade credit financing when they have an excellent ESG rating than small companies.

In this paper, we focus on the relationship between ESG and trade credit financing based on the role of stakeholder response. This study hopes to become an important stepping stone to understand the relationship between ESG and trade credit financing. It is also an essential supplement to the literature on stakeholder theory. We insist that ESG conforms to Chinese traditional values, generates positive responses from stakeholders, and helps Chinese enterprises answer China's call to pursue green development. At the same time, we further find that the non-state-owned enterprises and big firms strengthen ESG's positive effect on trade credit financing compared to state-owned and small firms. Therefore, managers of non-state-owned enterprises and big firms should take an active part in ESG activities.

We noted several limitations as well. First, we had to shrink the sample size due to the incompleteness of the data. We deleted those enterprises with missing information about annual trade credit financing from the sample set once we found a TC missing for any particular year. We also deleted firms with severe omissions or outliers from that same year. Because of this, our conclusions might not apply to firms with incomplete financial information across the analysis period. Our findings in this research might be overestimated or underestimated but still have some practical implications for organizational operations. In addition, some vital but unobservable variables might be omitted by our studies, which could to some extent affect our conclusions.

Further research could be applied to improve our studies. Generally, the method of estimating the dependent and independent variables could be modified or diversified to enrich our discoveries. Using overall and specific ESG to affect trade credit financing might vary across different enterprises and operational plans. Comparing the similarities or discrepancies among other estimating methods of our key variables might also soon provide some unexpected insights from the managerial aspect. Moreover, the mechanism of ESG's impact on trade credit financing could be further explored, especially in more successfully dealing with the endogeneity problem.

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