The Effect of Environmental, Social and Governance (ESG) on Credit Ratings: Evidence from Kosdaq Firms*

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Abstract

This paper examines the empirical association between environmental, social and governance (ESG) and the credit ratings on Kosdaq firms. Based on the argument that ESG movement would benefit shareholders by reducing firms' downside risk, measured using the lower partial moment and value at risk, this study hypothesized that ESG movement would affect the credit ratings. This study examined the effect of ESG movement on the credit ratings using a large sample of Korean Kosdaq firms over 5-year period (2012-2016). An ESG(Environment, Social, Governance) index published by Korean Corporate Governance Service (KCGS) was used as the measure of ESG movement. The results of this study find that the firms with ESG movement exhibit the positive on the credit ratings. These results are robust across different measures of variables and testing methodologies.

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1. INTRODUCTION

Environmental, social, and governance (ESG) efforts of corporations have been the subject of much interest of late among many of their stakeholders. ESG features are commonly investigated in equities research (e.g., Fan and Michalski, 2020), however, the presence within corporate credit research is limited (Attig et al., 2013). Hachenberg and Schiereck (2018) investigate whether green bonds are priced differently from conventional bonds, and illustrate there is no real marginal difference. Tang and Zhang (2020) demonstrate that the main advantage of green bonds is not cheaper debt financing, rather increased institutional ownership and improved stock liquidity after issuance. Moreover, Kiesel and Lucke (2019) find that ESG consideration is a significant determinant in the stock return and credit default swap (CDS) spread around the rating announcement, with corporate governance playing the most important role.

In Hoepner et al., (2018), firms that address their ESG problems on the advice of a large investor appear to reduce their downside risk. In a wider sample of firms, Amiraslani et al.,(2017) discover that rms with better corporate social responsibility enjoyed lower credit spreads and higher credit ratings during the two years of the financial crisis. Hong and Liskovich (2015) find that socially responsible firms receive lower fines for foreign bribery. While these results give reason to be optimistic, it remains to be seen if ESG is salient to firm risk on a more general basis. Their results suggest that the actual contribution of ESG issues on the whole in the analysis of credit risk is most likely limited.

In Yang(2020), articles between December 2019 and November 2020 in The Economist highlight the importance of diversity inclusion, carbon emissions, resource reduction, and employee training for firms. Consequently, to bring clarity to the ESG debate, this paper introduces ESG features into United States (US) and global firm samples with traditional features exhibited in the literature for corporate credit rating prediction. Identifying key ESG features can provide insight into which areas firms should actively seek on improving, particularly those with issued or looking at issuing corporate bonds.

Barth et al.,(2021) examine the implications of environmental, social and

governance (ESG) practices of firms for the pricing of credit default swaps (CDS). Their findings emphasize that firms' ESG practices seem to be connected to CDS spreads, and thus to credit risk. As a result, the ESG performance of firms can potentially be considered as an additional determinant of their CDS spreads. Overall, the results on ESG and credit spreads should have three main implications for investors. First, credit analysts can improve their credit risk models when incorporating ESG ratings. Second, fixed-income portfolio managers can improve risk management and performance measurement when considering ESG ratings of their portfolio constituents. Third, potential time-variability of credit risk components related to ESG might be relevant for factor-based investment strategies in credit markets.

This global trend toward emphasizing on ESG has also affected the business environment for the firms in Korea. An ESG(Environment, Social, Governance) index published by Korean Corporate Governance Service (KCGS) from 2012 to 2016 was used as the measure of ESG movement. This study examined the effect of ESG movement on the credit ratings using a large sample of Korean Kosdaq firms. This paper contributes to the body of finance literature that studies the evolution of the credit ratings market and the results of this study are robust across different measures of variables and testing methodologies.

The rest of this paper proceeds as follows. Section 2 introduces the data on credit ratings and the news archive about ESG issues. The theoretical relation between ESG and credit ratings and the research hypotheses are briefly explained. Section three contains the research design including the sample selection and measurements of variables and methodology. The empirical results are presented in section four. A summary of the results and some suggestions for future research will appear in the last section.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

2.1 Literature Review

Corporate credit ratings serve a vital function in debt markets by providing signals to investor information for the quality and marketability of issued or issuing bonds (Pinches and Singleton, 1978; Pogue and Soldofsky, 1969). The determinants of corporate credit ratings are investigated extensively, however most studies differentiate with the features and models utilized. Financial, macroeconomic, and governance factors are highlighted as the main determinants (traditional features) of corporate credit ratings using conventional tools (Ashbaugh-Skaife et al., 2006; Blume et al., 1998; Ederington, 1985), with logistic regression (LR) primarily used for class prediction (Hajek and Michalak, 2013; Kamstra et al., 2001).

Hachenberg and Schiereck (2018) investigate whether green bonds are priced differently from conventional bonds, and illustrate there is no real marginal difference. Tang and Zhang (2020) demonstrate that the main advantage of green bonds is not cheaper debt financing, rather increased institutional ownership and improved stock liquidity after issuance. Moreover, Kiesel and Lücke (2019) and that ESG consideration is a significant determinant in the stock return and credit default swap (CDS) spread around the rating announcement, with corporate governance playing the most important role.

In Yang(2020), environmental, social, and governance (ESG) issues of corporations have been the subject of much interest of late among many of their investors. Increasingly, these issues are being examined with a view towards managing financial risks. This paper studies the implications of this development for the credit ratings business and finds that a recent move by Standard & Poor's and Moody's towards incorporating ESG issues into their credit analysis was perceived by the market to have improved the quality of their ratings. However, despite this new recognition of ESG in the market for credit ratings, news about problems related to ESG appears to generally matter

very little for these ratings.

Hübel(2020) investigates the role of countries' environmental, social and governance (ESG) performance in sovereign credit default swap (CDS) markets. Based on data for 60 countries from 2007 to 2017, we find that countries with superior ESG performance do not only show lower CDS spreads, they also exhibit flatter CDS implied credit curves. This implies a risk mitigation effect of ESG which is even more pronounced in the long term than in the short term. These results remain robust with regard to various economic and financial control variables as well as credit ratings, implying that CDS markets incorporate ESG information differently than credit rating agencies. From an investor's perspective, this paper finds that considering ESG does not involve sacrificing returns. Indeed, investors can potentially benefit from ESG differences between countries with similar credit ratings.

2.2 Hypotheses

As suggested by previous section, ESG efforts make contributions to reducing conflicts between firms and society. The excessive expense of ESG efforts can affect the credit ratings of the firms. These impacts of ESG efforts on the firms' credit ratings are elaborated below and ESG movement can affect the firms' credit ratings in the following ways.

Hypothesis : The firms with high ESG efforts would be a higher in the credit ratings than those with low ESG efforts.

3. RESEARCH DESIGN

3.1 Sample Selection

<Table 1> presents a number of sample firms tested this study. It is consisted of a sample of 437 on Korean Kosdaq firms which an ESG(Environment, Social,

Governance) index published by Korean Corporate Governance Service (KCGS) was used as the measure of ESG movement. To be included in the sample, the firm must satisfy the following criteria: (1) each firm had to be ranked in KCGS index over 5-year period (2012-2016); (2) sufficient financial data was available in KIS-VALUE database to calculate financial performances and other variables.

<Table 1> A Number of Sample Firms(Kosdaq)

Industry	KOSDAQ	
	frequency	percentage
manufacturing	258	59%
construction	4	1%
wholesales and retails	26	6%
service	131	30%
others	18	4%
Total	437	100%

3.2 Measurement of Variables

ESG variable was measured as SCORE index published by Korean Corporate Governance Service (KCGS). SCORE index is a score based on the evaluation of a firm's ESG system using three components- the Environment, Social, Governance- with different weights. RANK variable is measured as credit rating of NICE.

In an attempt to investigate this "correlated omitted variables" problem, we repeat the analysis with the inclusion of firm size (SIZE), systematic risk of common stock(BETA), DEBT(Book Value of Debt/Book Value of Assets). The variables, SIZE and DEBT, have been shown to affect financial performance(e.g., Easton and Zmijewski (1989) and Collins and Kothari (1989)).

3.3 Regression Model

As an attempt to investigate whether the firm's ESG movement affects its credit ratings, we estimate the following regression model:

$$RANK_t = a_0 + a_1ESG + a_2SIZE_t + a_3DEBT_t + a_4PPE_t + a_5BETA_t + a_6ROA_t$$
$$+ a_7OPI_t + a_8ID_t + a_9YD_t + \epsilon$$
$$RANK_{t+1} = a_0 + a_1ESG + a_2SIZE_t + a_3DEBT_t + a_4PPE_t + a_5BETA_t + a_6ROA_t$$
$$+ a_7OPI_t + a_8ID_t + a_9YD_t + \epsilon$$

$Where,$
$\quad RANK : Credit\,Rankings\,of\,NICE$
$\quad ESG : ESG\,Index\,of\,Korea\,Corporate\,Governance\,Service\,(KCGS)$
$\quad SIZE : Natural\,Log\,of\,Total\,Book\,Value\,Assets$
$\quad DEBT : Book\,Value\,of\,Debt\,/\,Book\,Value\,of\,Assets$
$\quad PPE : Tangible\,Assets\,/\,Total\,Assets$
$\quad BETA : Systematic\,Risk\,of\,Common\,Stock$
$\quad ROA : Operating\,Income\,/\,Total\,Assets$
$\quad OPI : Dummy\,variable\,which\,takes\,a\,value\,of\,\text{if}\,firm\,belongs\,to\,the$
$\qquad sample\,of\,auditor's\,unqualified\,opinion,\,\text{and}\,0\,otherwise$
$\quad \sum ID : Industry\,Dummy$
$\quad \sum YD : Year\,Dummy$
$\quad \epsilon : Residual\,Error$

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

Descriptive statistics for ESG, RANK and control variables are reported in ⟨Table 2⟩. The mean and median of the ESG are 0.2694 and 0.2578, respectively. The st.dev of RANK presents 1.9626, with mean (median) value of 4.8764(5.0000). Furthermore, mean and median of return on assets (ROA) as measured by financial performance is 0.0208 and 0.0324, respectively. As reported in ⟨Table 2⟩, the control variables used in this study are financial leverage(DEBT), SIZE, BETA, and OPI.

<Table 2> Descriptive Statistics of Variables(Kosdaq)

	mean	median	st.dev	Q1	Q3
	KOSDAQ(N=437)				
ESG	0.2694	0.2578	0.0845	0.1967	0.3374
SIZE	25.7521	22.6922	0.6597	22.2908	23.2083
DEBT	0.3695	0.3533	0.2110	0.1941	0.5326
PPE	0.0827	0.0351	0.1106	0.0114	0.1175
BETA	1.0673	1.0896	0.4195	0.8094	1.3629
ROA	0.0208	0.0324	0.1887	0.0013	0.0828
RANK	4.8764	5.0000	1.9626	3.0000	6.0000
RANKt+1	4.9176	5.0000	2.0268	3.0000	6.0000
OPI	0.6900	1.0000	0.6211	0.0000	1.0000

4.2 Regression Analysis

Results in preceding section are descriptive statistics for ESG, RANK(credit ratings) and control variables. <Table 3> presents the Pearson correlation coefficients among selected variables, which present potential effects of other variables on ESG as well as RANK. The rationale for selecting and comparing these particular variables is their association with ESG. As expected, ESG has significantly positive correlation with RANK, SIZE and PPE. However, the correlations of ESG with BETA are significantly negative correlation. Also, there are strong positive correlations among ESG measures.

\<Table 3\>Correlations(Kosdaq)

	ESG	SIZE	DEBT	PPE	RANK	RANK t+1	ROA	OPI	BETA	
ESG	1	0.263 **	0.076	0.115 *	0.629 *	1.027 **	0.005	0.030	-0.164 **	
SIZE		1	0.316 **	0.234 **	0.017	0.032	0.074	0.087	-0.097 *	
DEBT			1	-0.159 **	0.782 **	0.738 **	-0.425 **	-0.439 **	-0.034	
PPE				1	-0.298 **	-0.275 **	0.212 **	0271. **	-0.119 *	
RANK					1	0.885 **	-0.475 **	-0.522 **	0.038	
RANK t+1						1	-0.384 **	-0.135	-0.434 **	
ROA							1	0.985 **	-0.042	
OPI								1	-0.041	***:
BETA									1	

Siginificant at α <0.01;**: Siginificant at α <0.05; *: Siginificant at α <0.1

The purpose of this paper is to examine whether there is any significant shift in the credit ratings on ESG. The hypothesis of this study posits that the credit ratings measured by NICE is positively related to ESG and ROA. The regression model is estimated to test the relationships between RANK and ESG as presented in Table 4. It shows that RANK is positively related to ESG at the 5% significance level. This implies that an increase in firm's ESG activity results in a increase in firm's RANK. Additionally, firm's firm's RANK is positively related to ROA at the 1% significance level which indicates that firm's RANK is also decreased when ROA is reduced.

\<Table 4\> presents the models used by the variables of environment index, social index and governance index of KCGS. This study supports the hypothesis which state that firm's RANK is positively related to ESG. ESG would play the role of reducing conflicts between firms and society, and it also increase financial transparency and disclosure, thereby highering firms' RANK.

The residuals of the diagnostic tests appear to be approximately normally

distributed and the Durbin-Watson statistic (dw) was close to 2. Outliers were examined by eliminating observations containing value of DEBT and BETA greater in absolute value of the 10 percent. The results were not significantly different from those reported. The Hausman and RESET tests for general mis-specification seemed again to indicate the existence of possible underlying weaknesses in the model. The RESET test produced a coefficient on the proxy variable that was significantly different from zero at the one significance level. In the Hausman test, the relevant F-value of 7.234 on the unrestricted equation exceeded the critical F-value (2.561). Overall, these results provide a direct support to the hypothesis, even after controlling for other factors.

<Table 4> RANKt = a0 + a1ESG+ a2SIZEt +a3DEBTt + a4PPEt + a5BETAt + a6ROAt + a7OPIt + a8IDt + a9YDt + ε

Variables	RANK		RANKt+1	
	β	t	β	t
Constant	5.1622	2.8547***	9.0189	4.1173**
ESG	0.5590	2.0509**	1.1067	2.4065**
SIZE	−0.2082	−1.2593	−0.5613	−2.8034***
DEBT	6.4998	23.2445***	6.5087	19.2151***
PPE	0.7855	0.8912	0.6812	0.7137
BETA	−2.5687	−15.5812***	−2.8791	−16.5431***
ROA	3.7824	4.0251***	3.3156	2.5457**
OPI	0.2144	1.1254	0.1945	1.1781
Σ ID	Included		Included	
Σ YD	Included		Included	
D−W	1.723		1.945	
adj.R^	0.350		0.253	
N	437		437	

Where,
  RANK : Credit Rankings of NICE
  ESG : ESG Index of Korea Corporate Governance Service (KCGS)
  SIZE : Natural Log of Total Book Value Assets
  DEBT : Book Value of Debt / Book Value of Assets
  PPE : Tangible Assets / Total Assets
  BETA : Systematic Risk of Common Stock
  ROA : Operating Income / Total Assets
  OPI : Dummy variable which takes a value of if firm belongs to the
    sample of auditor's unqualified opinion, and 0 otherwise
  Σ ID : Industry Dummy
  Σ YD : Year Dummy
  ϵ : Residual Error
  ***: Siginificant at α < 0.01 ; **: Siginificant at α < 0.05;
  *: Siginificant at α < 0.1

5. CONCLUSION

The purpose of this study is to test whether there is any systematic relation between environmental, social and governance (ESG) and firms' credit ratings. Based on the argument that ESG movement would benefit shareholders by reducing firms' downside risk, measured using the lower partial moment and value at risk, this study hypothesized that ESG movement would affect the credit ratings.

Using this framework, we then derive the hypotheses that firms with higher ESG would have higher credit ratings and higher firm values than those with lower ESG. These hypotheses were examined using a sample of 437 over five-year period (2012-2016) on Kosdaq firms. An ESG(Environment, Social, Governance) index published by Korean Corporate Governance Service (KCGS) was used as the measure of ESG movement. We found that the firms with high ESG movement exhibit higher of the credit ratings.

Several related issues are left for future research. First, although SCORE index appears to be most reliable data source, its reliability as a proxy for ESG is an open question. Therefore, it is necessary to conduct more research on the development of a comprehensive ESG measure or the comparison of existing ESG measures. Second, firm characteristics variables such as CEO's management philosophy and degree of foreign exposure may affect the firm's ESG system. Hence, investigation into the effects of these factors on ESG and its relationship with credit ratings will provide further insights into the relation between ESG and credit ratings.

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신용등급에 관한 ESG의 영향-Kosdaq 기업에 관한 증거*

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요약

본 연구는 환경, 사회, 지배구조(ESG)와 신용등급이 유의적인 관계가 있는지를 Kosdaq시장을 통해 검증한다. 기업의 ESG활동이 기업과 사회의 갈등을 줄이는 역할에 관한 논쟁에 대해 본 연구는 기업의 ESG활동과 신용등급을 사용하여 관계를 검증하였다. ESG 활동을 많이 하는 기업과 신용등급과의 관계를 예측하였다. 이 가설을 검정하기 위해 한국지배구조원에서 발표하는 지수를 참고하여 2012년부터 2016년까지 437개 코스닥기업의 표본을 대상으로 실증분석을 하였다. 연구결과 기업의 ESG를 활동적으로 하는 기업일수록 신용등급과 유의한 결과를 나타냈다. 따라서 기업이 ESG 활동을 할 수록 보다 신용등급을 제고할 수 있다는 결론을 제시한다.

핵심용어: 환경,사회,지배구조(ESG), 신용등급, ESG 지수