

The Effect of Environmental, Social and Governance (ESG) on Capital Cost: Evidence from Korean KOSPI Firms

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Abstract

This paper examines the empirical association between environmental, social and governance (ESG) and the cost of capital(WACC) on Kospic 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 cost of capital. This study examined the effect of ESG movement on the cost of capital using a large sample of Korean firms. The ESG index announced by the Korea Corporate Governance Service (KCGS) was used as a measurement variable for ESG. The results of this study find that the capital cost borne by companies that actively carry out ESG activities was low. That is, ESG activities have a positive effect on the capital market and have the effect of lowering capital costs. In short, the firms with ESG movement exhibit the negative on the cost of capital.

Keyword: Environmental, Social and Governance (ESG), Capital Cost, ESG(Environment, Social, Governance) index

1. Introduction

Considerable attention about the future of the natural environment, prevailing social conditions, and governance of private and public institutions has come firm's environmental, social and governance(ESG) movement. Scholars and investors have published many empirical studies and several review studies on this relation since the beginning of the 1970s. The largest previous review study analyzes just a fraction of existing primary studies, making findings difficult to generalize. Thus, knowledge on the financial effects of ESG movement remains fragmented. To overcome this shortcoming [1], extract all provided primary and secondary data of previous academic review studies. Through doing this, they combine the findings of about 2,200 individual studies. Hence, they are by far the most exhaustive overview of academic research on this topic and allows for generalizable statements. The results show that the business case for ESG investing is empirically very well-founded. Roughly 90% of studies find a non-negative of ESG and corporate financial performance (CFP) relation. More importantly, the large

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majority of studies reports positive findings. We highlight that the positive ESG impact on CFP appears stable over time. Promising results are obtained when differentiating for portfolio and non-portfolio studies, regions, and young asset classes for ESG investing such as emerging markets, corporate bonds, and green real estate.

Recent studies of ESG movement using survey data from a sample of senior investment professionals from mainstream (i.e. not SRI funds) investment organizations [2], provide insights into why and how investors use reported environmental, social and governance (ESG) information. Relevance to investment performance is the most frequent motivation for use of ESG data followed by client demand and product strategy, bringing change in companies, and then ethical considerations. Important impediments to the use of ESG information are the lack of reporting standards and as a result lack of comparability, reliability, quantifiability and timeliness.

Among the different ESG investment styles, negative screening is perceived as the least investment beneficial while full integration into stock valuation and engagement are considered more beneficial but they are all practiced with equal frequency. Current practices of different ESG styles, especially screening, are driven by product and ethical considerations. In contrast, integration is driven by relevance to investment performance. Future practices of ESG styles are driven by relevance to investment performance, bringing change in companies, and concerns about data reliability.

Prior research examine whether engagement on environmental, social and governance (ESG) issues can benefit shareholders by reducing firms' downside risk, measured using the lower partial moment and value at risk [3]. Using a proprietary database, we provide evidence supporting this hypothesis. They further find that the measured risk effects vary across engagement success and engagement themes. Engagement appears most effective in lowering downside risk when addressing environmental topics (primarily climate change). They find corroborating evidence in that successful engagement reduces the firm's exposure to a downside risk factor.

Based on data from six prominent rating agencies - namely, KLD (MSCI Stats), Sustainalytics, Vigeo Eiris (Moody's), RobecoSAM (SP Global), Asset4 (Refinitiv), and MSCI IVA-, they decompose the divergence into three sources: different scope of categories, different measurement of categories, and different weights of categories. They find that scope and measurement divergence are the main drivers, while weights divergence is less important. In addition, they detect a rater effect where a rater's overall view of a firm influences the assessment of specific categories.

The global trend of emphasizing ESG has also affected the business environment of Korean companies. The ESG index released by the Korea Corporate Governance Service (KCGS) from 2013 to

2018 was used as an ESG measurement variable. This study examined the effect of ESG movement on the cost of capital using a large sample of Korean firms. This study is differentiated from the following perspectives. First, we used a KCGS variable as a proxy of ESG movement. Secondly, the results of this study are robust across different measures of variables and testing methodologies

The remainder of this paper is organized as follows. In the next section, the study review of previous studies, describes the theoretical relevance between ESG and capital cost, and develops research hypotheses. Section 3 includes research designs such as variables, methodologies, and research samples used in the research model. And Section 4 presents the results of empirical analysis. Finally, a summary of the research results and suggestions for future studies.

2. Theoretical Framework and Hypotheses

2.1 Literature Review

Our literature review starts by presenting the state of the research on the ESG. Berg et al.,(2020) find that scope and measurement divergence are the main drivers, while weights divergence is less important. In addition, we detect a rater effect where a rater's overall view of a firm influences the assessment of specific categories.

The coronavirus pandemic caused a sharp market decline while raising heterogeneous responses across companies related to their employees, supply chain, and repurposing of operations to provide needed products and services [4]. They study whether during the 2020 COVID-19 induced market crash, investors differentiated across companies based on their human capital, supply chain, and products and service response. Using data derived from natural language processing applied to news coverage of corporate responses to the coronavirus crisis for 3,023 companies around the world, they find that more positive sentiment around a company's response is associated with less negative returns. This is especially true for companies with more salient responses and in industries that those responses are more likely to represent a more credible commitment to their stakeholders.

Meanwhile, studies related to the definition of ESG have also been reported that propose a theory in which each stock's environmental, social, and governance (ESG) score plays two roles: (1) providing information about firm fundamentals and (2) affecting investor preferences [5]. The solution to the investor's portfolio problem is characterized by an ESG-efficient frontier, showing the highest attainable Sharpe ratio for each ESG level. The corresponding portfolios satisfy four-fund separation. Equilibrium asset prices are determined by an ESG-adjusted capital asset pricing model, showing when ESG

increases or lowers the required return. Combining several large data sets, we compute the empirical ESG-efficient frontier and show the costs and benefits of responsible investing. Finally, we test our theory's predictions using commercial ESG measures, governance, sin stocks, and carbon emissions.

In the last decade, companies have come under pressure to be socially conscious and environmentally responsible, with the pressure coming sometimes from politicians, regulators and interest groups, and sometimes from investors. The argument that corporate managers should replace their singular focus on shareholders with a broader vision, where they also serve other stakeholders, including customers, employees and society, has found a receptive audience with corporate CEOs and institutional investors. The pitch that companies should focus on "doing good" is sweetened with the promise that it will also be good for their bottom line and for shareholders. In this paper, build a framework for value that will allow us to examine how being socially responsible can manifest in the tangible ingredients of value and look at the evidence for whether being socially responsible is creating value for companies and for investors [6].

A study on the relationship between CSR and earnings management has also been reported that examines the empirical association between corporate social responsibility(CSR) and earnings management, using a sample of Kospi and Kosdaq firms over three-year period (2011-2013) [7]. This study used the ESG index published by the Corporate Governance Service as a measure of corporate social responsibility activities. In this paper, find that the CSR reported that it was an incentive to reduce earnings management.

2.2 Hypotheses

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

Hypothesis : The firms with high ESG movement would be a lower in the cost of capital than those with lower ESG movement.

3. Research Design

3.1. Research sample selection

First, the [Table 1] presents a number of sample firms tested this study. It is consisted of a sample

of 1,815 on Korean firms which an index that issued by Korean Corporate Governance Service (KCGS) was used as the measure of ESG movement. To be included in the sample, the company must meet the following criteria: ① each firm had to be ranked in KCGS index over 6-year period (2013-2018); ② sufficient financial data were available to calculate financial performance and other variables in the KIS-VALUE database.

[Table 1] A Number of Sample Firms(Kospi)

Industry	KOSPI	
	frequency	percentage
manufacturing	1,089	60%
construction	37	2%
wholesales and retails	145	8%
service	363	20%
others	181	10%
Total	1,815	100%

3.2 Measurement of Variables

3.2.1 ESG index and Capital Cost

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 index uses three components: environment, society, and governance as different weights. The cost of equity capital is estimated using the three-factor model with the market excess return [8]. We estimate the cost of equity capital for year t+1 in equation (1) with varying factor loadings for each firm using weekly returns:

$$R_i - R_f = a_i + b_i[R_m - R_f] + s_iSMB + h_iHML + e_i \quad (1)$$

The estimated cost of capital measure is equal to the average risk free rate $\overline{R_f}$ plus the estimated slope coefficients \hat{b} , \hat{s} and \hat{h} multiplied respectively with the yearly average returns of $\overline{R_m - R_f}$, \overline{SMB} and \overline{HML} in t+1.

3.2.2 Control Variables

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, were included in the research model as a

variable affecting financial performance.

3.2.3 Regression Model

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

$$WACC_t = a_0 + a_1ESG_t + a_2SIZE_t + a_3DEBT_t + a_4PPE_t + a_5BETA_t + a_6ROA_t + a_7OPI_t + a_8ID_t + a_9YD_t + \varepsilon$$

$$WACC_{t+1} = a_0 + a_1ESG_{t+1} + a_2SIZE_{t+1} + a_3DEBT_{t+1} + a_4PPE_{t+1} + a_5BETA_{t+1} + a_6ROA_{t+1} + a_7OPI_{t+1} + a_8ID_{t+1} + a_9YD_{t+1} + \varepsilon \quad (2)$$

Where,

WACC : The Cost of Equity Capital

ESG : EGS index of Korea Corporate Governance Service(KCGS)

PPE : Total Tangible Assets / Total book value Assets

BETA : Systematic risk of common stock

ROA : Operating Income / Total book value Assets

DEBT : Total Debt / Total Assets

SIZE : Log of Total Assets

OPI : Dummy variable if firm belongs to the sample of auditor's unqualified opinion 1 or 0

$\sum ID$: Industry Dummy

$\sum YD$: Year Dummy

ε : Residual Error

4. Empirical Results

4.1 Descriptive Statistics

Descriptive statistics for ESG, WACC and control variables are reported in [Table 2]. The mean and median of the ESG are 0.3138 and 0.3211, respectively. The st.dev of WACC presents 1.6925, with mean(median) value of 5.5918(5.5465). Furthermore, mean(median) of return on assets (ROA) as measured by financial performance is 0.0176(0.0268), respectively. [Table 2], show that the control variables used in this study are financial leverage(DEBT), SIZE, BETA, and OPI.

[Table 2] Descriptive Statistics of Variables(Kospi)

	KOSPI(N=1,815)				
	mean	median	st.dev	Q1	Q3
ESG	0.3138	0.3211	0.1352	0.2111	0.3711
SIZE	23.2746	23.1154	1.3313	22.3652	23.9798
DEBT	0.4389	0.4428	0.2184	0.2695	0.5847
PPE	0.0934	0.0364	0.1362	0.0072	0.1316
BETA	0.7216	0.6820	0.4051	0.4337	0.9724
ROA	0.0176	0.0268	0.1037	0.0009	0.0539
WACC	5.5918	5.5465	1.6925	4.7052	6.5917
WACCt+1	4.8885	4.8851	1.7293	4.0456	5.8121
OPI	0.8691	1.0000	0.6232	1.0000	1.0000

4.2. Regression Analysis

Results in preceding section are descriptive statistics for ESG, the cost of capital and control variables. [Table 3] presents the Pearson correlation coefficients whit ESG and other variables.. As expected, ESG has significantly positive correlation with SIZE, DEBT, PPE, ROA and OPI. However, the correlations of ESG with WACC and BETA are significantly negative correlation. Also, there are strong positive correlations among ESG measures.

[Table 3] Correlations(Kospi)

	ESG	SIZE	DEBT	PPE	WACC	WACC t+1	ROA	OPI	BETA
ESG	1	0.263**	0.665**	0.241**	-0.034**	-0.102**	0.026**	0.113**	-0.281**
SIZE		1	0.039**	0.121	0.053**	-0.031*	-0.072*	0.121**	0.192**
DEBT			1	0.011	0.062**	-0.152*	-0.045*	-0.058*	0.264**
PPE				1	0.201**	-0.121**	0.281**	-0.014**	0.215**
WACC					1	-0.193**	0.592**	-0.675**	0.180**
WACCt+1						1	0.336*	-0.134	0.191*
ROA							1	0.113**	0.162*
OPI								1	0.071**
BETA									1

** : Significant at $\alpha < 0.01$; * : Significant at $\alpha < 0.05$

The purpose of this paper is to examine whether there is any significant shift in the capital cost on ESG. The hypothesis of this study posits that WACC measured by the cost of equity capital is

negatively related to ESG and ROA. The regression model is estimated to test the relationships between WACC and ESG as presented in [Table 4]. The regression model relates WACC to ESG and it shows that WACC is negatively related to ESG at the 1% significance level. This implies that an increase in firm's ESG activity results in a decrease in firm's WACC. Additionally, firm's WACC is negatively related to ROA at the 1% significance level which indicates that firm's WACC is also increased when ROA is reduced.

[Table 4] presents the models used by the variables of ESG index of KCGS. This study supports the hypothesis which state that firm's WACC is negatively related to ESG. ESG would play a role in mitigating between firms and society, and ESG verified whether there is an effect of reducing the WACC borne by companies through financial transparency and disclosure.

The diagnostic tests appear to be normally distributed and the Durbin-Watson statistic (dw) was close to 2. The results were not significantly different from those of previous studies. Overall, these results directly support the hypothesis even after controlling other factors.

[Table 4] Regression

Variables	WACC		WACCt+1	
	β	t	β	t
Constant	5.4346	2.0208**	7.3637	2.2232**
ESG	-4.8735	-5.6399***	-4.7854	-4.4965***
SIZE	-0.0019	-0.0078	-0.1564	-0.5181
DEBT	0.8152	2.0288**	0.0229	0.0463
PPE	0.6351	0.9381	0.4892	0.5867
BETA	2.7696	16.3452***	1.5887	7.6127***
ROA	-3.7824	-3.9465***	-1.3177	-2.5307**
OPI	0.1244	1.2212	0.0821	1.1142
Σ ID	Included		Included	
Σ YD	Included		Included	
D-W	1.627		1.932	
adj.R [^]	0.490		0.182	
N	437		437	

Where, Refer to the regression model for the definition of variables.

5. Conclusion

The purpose of this study is to test whether there is any systematic relation between environmental, social and governance (ESG) and the cost of capital. 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 cost of capital.

Using this framework, we then derive companies with high ESG hypothesize that WACC is lower and corporate value is higher than those with low ESG. These hypotheses were examined using a sample of 1,815 over four-year period (2013-2018) on Kospi firms. The ESG index released by the Korea Corporate Governance Service (KCGS) was used as an ESG measure. We found that the firms with high ESG movement exhibit lower of the capital cost.

Several related issues are left for future research. First, it has not been fully examined whether ESG and WACC have any causal relationship. For example, financially sound firms may be more active in ESG, which in turn would bring even lower of the capital cost. Second, corporate characteristic variables such as CEO's gender and audit committee can affect the company's ESG system. Hence, investigation into the effects of these factors on ESG and its relationship with WACC will provide further insights into the relation between ESG and WACC.

References

- [1] G. Friede, T. Busch, A. Bassen, "ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies", *Journal of Sustainable Finance & Investment*, vol. 5, iss. 4, December 2015, pp. 210-233, doi: 10.1080/20430795.2015.1118917.
- [2] A. Amel-Zadeh, G. Serafeim, "Why and How Investors Use ESG Information: Evidence from a Global Survey", *Financial Analysts Journal*, vol. 74, December 2018, pp. 87-103, doi: 10.2469/faj.v74.n3.2.
- [3] A. G. F. Hoepner, I. Oikonomou, Z. Sautner, L. T. Starks, X. Zhou, "ESG Shareholder Engagement and Downside Risk", *SSRN Electronic Journal*, November 2016, pp.1-49, doi: 10.2139/ssrn.2874252.
- [4] A. Cheema-Fox, B. R. Laperla, H. Wang, G. Serafeim, "Corporate Resilience and Response During COVID-19", *Journal of Applied Corporate Finance*, vol. 33, iss. 2, September 2021, pp. 24-40, doi: 10.1111/jacf.12457.
- [5] L. H. Pederson, S. Fitzgibbons, L. Pomorski, "Responsible Investing: The ESG-Efficient Frontier", *Journal of Financial Economics*, vol. 142, iss. 2, November 2021, pp. 572-597, doi: 10.1016/j.jfineco.2020.11.001.
- [6] B. Cornell, A. Damodaran, "Valuing ESG: Doing Good or Sounding Good?", *The Journal of Impact and ESG Investing*, vol. 1, no. 1, September 2020, pp. 76-93, doi: 10.3905/jesg.2020.1.1.076.
- [7] J. R. Park, Y. H. Kim, "The Empirical Study of Earnings Management on Corporate Social Responsibility -The Comparative of Kospi and Kosdaq Firms-", *Korea International Accounting Review*, no. 72, April 2017, pp. 187-205, doi: 10.21073/kiar.2017..72.008.
- [8] E. F. Fama, K. R. French, "Common risk factors in the returns on stocks and bonds", *Journal of Financial Economics*, vol. 33, iss. 1, February 1993, pp. 3-56, doi: 10.1016/0304-405X(93)90023-5.