

Impact of ESG ratings on the borrowing cost, Evidence from
Asia-Pacific Region

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ผลกระทบของ ESG ratings ต่อต้นทุนในการกู้ยืมเงิน ผลการศึกษาในภูมิภาคเอเชียแปซิฟิก



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This paper studies the impact of ESG ratings, in conjunction with the particular dimension, on the companies' borrowing cost. Also, this is the first paper that study the impact of level of ESG disclosure, voluntary and mandatory disclosure, on the borrowing cost of the firms.

The findings show that only ESG disclosure score has significantly lower the borrowing cost of the companies through the environmental and corporate governance dimensions. It can be concluded that lending institutions do take into account the ESG disclosure score, which integrated risk management framework of firm, as an additional explanation factor over the financial factors. Besides, they concentrate on the dimensions that have ability to mitigate reputation risk of the firms in evaluating cost of borrowing process.

Nevertheless, the mandatory level of ESG disclosure does not lessen the borrowing cost. Mandatory disclosure force firms to reveal the actual information of their ESG activities in all aspects. Therefore, the true quality of the firms is observable, and thus reducing asymmetric information among lenders and borrowers. However, it does not mean that the borrowing cost will be decreased as a result.

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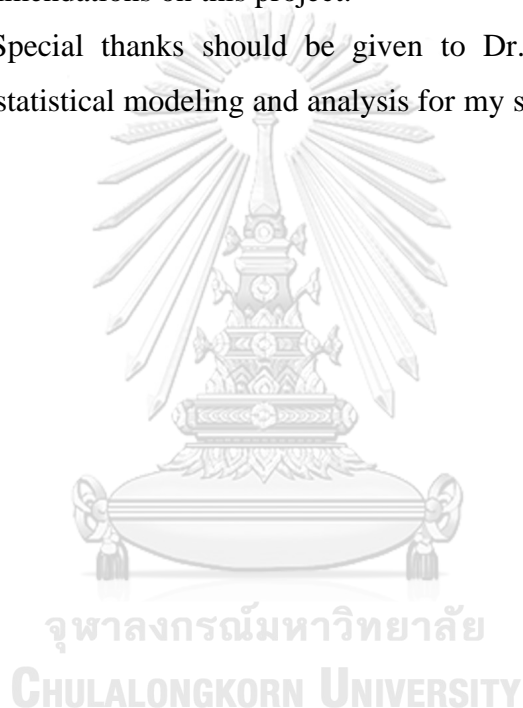
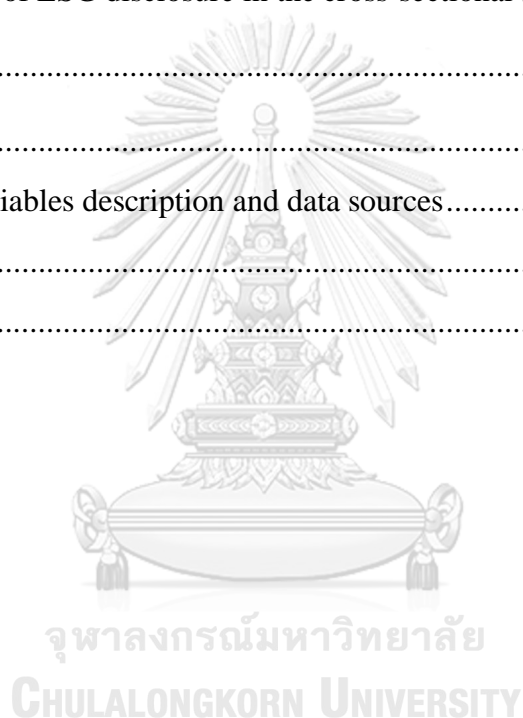


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ABSTRACT

This paper studies the impact of ESG ratings, in conjunction with the particular dimension, on the companies' borrowing cost. Also, this is the first paper that study the impact of level of ESG disclosure, voluntary and mandatory disclosure, on the borrowing cost of the firms

The findings show that only ESG disclosure score has significantly lower the borrowing cost of the companies through the environmental and corporate governance dimensions. It can be concluded that lending institutions do take into account the ESG disclosure score, which integrated risk management framework of firm, as an additional explanation factor over the financial factors. Besides, they concentrate on the dimensions that have ability to mitigate reputation risk of the firms in evaluating cost of borrowing process.

Nevertheless, the mandatory level of ESG disclosure does not lessen the borrowing cost. Mandatory disclosure force firms to reveal the actual information of their ESG activities in all aspects. Therefore, the true quality of the firms is observable, and thus reducing asymmetric information among lenders and borrowers. However, it does not mean that the borrowing cost will be decreased as a result.

1. INTRODUCTION

In the world of asymmetric information, the party who possesses greater material knowledge tend to gain from an economic transaction than the other party. Both Academics and Practitioners are seeking for new additional data to decrease the gap among two market participants, the borrowing companies, and lending institutions. There are arising of the ESG ratings leading the new tools for the lending institution to intensify an ability to prove the true quality of the potential borrower. ESG-driven risk allocation decisions from banks and investors are affecting the ability of corporates to refinance, in at least one instance even driving credit rating downgrades. Survey evidence indicates a significant number of banks have now included ESG considerations in their risk management frameworks (Tang & Steel, 2019).

There are shreds of evidence at a global level that showed the ESG ratings are essential and set to be a critical criterion for loan approval. Lending institutions require ESG data issued by independent rating agencies to examine the transparency of such borrowing firms due to the expanding issuance of sustainability-linked loans. According to Refinitiv LPC., the Sustainability-Linked Loan Principles launched in March 2019 by the Loan Syndications and Trading Association, Loan Market Association and Asia Pacific Loan Market Association. The ESG-linked credit facilities could be the new scheme for the borrowing firms to become value-added and shine brighter in the financial market by linking firms' sustainable commitment with their financial instruments. The cost of borrowing is tied to the ESG risk and performance, those firms that improve ESG ratings could reduce the margin on

interest rate on the loan. In 2019, Global green and ESG-linked loans total US\$92 billion, sustainability-linked loans total US\$71.3 billion at the end of the third quarter of 2019 and have increased two times from US\$32 billion at the end of the third quarter of 2018. Europe is the leader with 74% of green and ESG volume for the year to date, followed by Asia (14%) Americas (11%) and Japan (1%) (Guzman, 2019; Henze, 2020).

In addition, there is evidence from one of the emerging markets that has fast progress in ESG development, Thailand. Bank of Thailand will be launched the ESG criteria for responsible lending and regulated Thai banks to comply with the scheme by the end of 2020. The criteria cover four dimensions, namely leadership and responsible lending commitment, stakeholder engagement, internal implementation mechanisms, and transparency. This procedure will guide the financial institutions to value the borrowing firms not only corporate governance of the firms but also the ESG combination by assessing the reputation risk exposed to the businesses. The awareness and responsibility of lending institutions towards responsible lending will not only protect corporate stakeholders, but also stabilize sustainable economic well-being in long term.

The objectives of this paper are to analyze the impact of the ESG ratings from two data providers namely, Bloomberg and Thomson Reuters on the borrowing cost of the companies. Also, this paper is also evaluated the impact of each aspect of ESG ratings by decomposed into Environmental (E), Social, (S) and Governance (G) aspects on the borrowing cost. In addition, in term of level of ESG disclosure, this is

the first paper that study the effect level of ESG disclosure, which are voluntary disclosure and mandatory disclosure, on the borrowing cost.

According to the objectives mentioned above, the hypotheses of this paper are, First, the higher ESG scores will have significant decrease the borrowing cost of the borrowing firms. Lending institutions do integrate the sustainability factor to make their credit decisions (Hoepner, Oikonomou, Scholtens, & Schröder, 2016; Malik, 2015; Scholtens, 2006, 2009; Zeidan, Boechat, & Fleury, 2015). Therefore, firms with have ESG score will have less reputational risk and will be granted from the lending institution by lowering corporates' borrowing cost.

Second, Particular dimension of ESG score will have significant different impact to the borrowing cost of the borrowers, due to the view of lending institution that assign the different weight of each dimension. The previous researches (Jung, Herbohn, & Clarkson, 2018; Nandy & Lodh, 2012) suggest that firm with high Environment dimension score will get a more favorable loan contract and lower cost of borrowing.

Third, the higher level of ESG disclosure will have significant impact by decreasing the borrowing cost of the borrowing firms. A stricter level of ESG disclosure, mandatory disclosure, could reduce asymmetric information among lenders and borrowers. The lenders will be able to observe the true quality of the firms and avoid the adverse selection problem as a consequence (George, 1970).

This paper will shed light on the Asia pacific region, which has been growing the awareness of the value of ESG integration in their investment decision making and management processes (Zembrowski & Leung, 2019), regarding the observation

by Global Sustainable Investment Alliance. While previous papers mainly focused on European and North American regions. Besides, the results among ESG rating and the borrowing cost have remained a controversial issue. Hence, this paper will be added a limited number to the result by using an accounting-based measurement as a proxy for the borrowing cost.

The findings show that only ESG disclosure score has significantly decrease the cost of borrowing of the firms through the environmental and corporate governance dimensions. It can be concluded that lending institutions do take into account the ESG disclosure score, which integrated risk management framework of firm, as an additional explanation factor over the financial factors. Besides, they concentrate on the dimensions that have ability to mitigate reputation risk of the firms in evaluating cost of borrowing process.

Nevertheless, the mandatory level of ESG disclosure does not lessen the borrowing cost. Mandatory disclosure is force firm to reveal the actual information of their ESG activities in all aspects. Therefore, the true quality of the firm is observable, and thus reducing asymmetric information among lenders and borrowers but does not mean that the borrowing cost will be reduce as a result.

2. LITERATURE REVIEW

In the notion of risk management, Environment, Social and Governance rating is a new factor introduced to use as a risk mitigation factor. However, academics are still having controversy regarding the effect of ESG factors on a firm's financial performance. Some studies observed that the ESG-CSR score is just only a “feel-good” factor. Consequently, the negatively correlation among ESG and financial performance is observable, traced back to 1958, firms mentioned that “welfare and society are not the corporation's business. Business is making money, not sweet music”. The purpose of the lending institutions is to evaluate the ability to repay the loan. Therefore, Banks are interested in explicit financial information through financial statements of the borrowing firms (Levitt, 1958). The possible explanation is that the benefits of ESG activities do not exceed their costs (Kim & Lyon, 2015). In addition, in the notion of abnormal return, some recent studies show that companies generated negative abnormal returns when participated in environmentally friendly activities or winning green awards experience (Fisher-Vanden & Thorburn, 2011; Jacobs, Singhal, & Subramanian, 2010; Lyon, Lu, Shi, & Yin, 2013). Thus, when investors perceive that firm engaged in costly investments, they will penalize such firms as a result. Besides, the incentive to engage in CSR practices is “greenwashing” to conceal corporate misbehavior (Hemingway & Maclagan, 2004). This, consequently, leads to a higher borrowing cost of such firms (Jensen & Smith, 2000).

Notwithstanding, the empirical researches have developed recently to defense that ESG ratings and profitability firm is positively correlated. Firms' profitability is insufficient to make a lending decision by the financial institutions (Hoepner et al.,

2016; Malik, 2015; Scholtens, 2006, 2009; Zeidan et al., 2015). In the stakeholder theory framework (Freeman, 2010), firms which take actions to fulfill the needs of different groups of stakeholder, such as lenders, employees, customers, and regulators, will be granted by efficient contracting (Jones, 1995) and created opportunity to for potential growth and risk mitigation (Fatemi, Fooladi, & Tehranian, 2015).

The various methodologies, observation data and time series are used to gauge the effect of ESG ratings on the creditworthiness of the borrowing companies in many dimensions. Credit rating, credit risk, borrowing cost, bond yields, bond yield spreads, and credit default swap are employed to gauge the performance of the firm through creditworthiness (El Ghouli, Guedhami, Kwok, & Mishra, 2011; Ge & Liu, 2015; Goss & Roberts, 2011; Menz, 2010; Stellner, Klein, & Zwergel, 2015). Nonetheless, the findings are varied. Pieces of evidence from the US determining that environmental ratings are reducing cost of borrowing of the firm (Bauer & Hann, 2010). In line with CSR performance transmit the importance of non-financial information to lower financing costs, thus contribute to higher credit ratings in the US (Attig, El Ghouli, Guedhami, & Suh, 2013). The same result in EU countries suggested that ESG ratings, especially in social and governance metrics, meaningfully affects credit ratings (Devalle, 2017). Consistently with the usage of accounting methods as a proxy for the borrowing cost, ESG performance and disclosure are negatively related to the borrowing cost (Eliwa, Aboud, & Saleh, 2019). However, the dissimilar result occurred regarding the evidence in the EU market with high ESG-CSR commitment face higher corporate bond spread (Menz, 2010). Whereas in Asia, ESG scores in social and governance pillar from Bloomberg lead to a smaller odd of

having a higher credit rating score. But the result is different from the ESG score from Reuters, which lead to negatively affect credit rating (Jamprasert, Kuwalairat, Srivisal, & Sthienchoak, 2020).

Regarding to the studies about the level of ESG disclosure, firms complied with voluntary level of disclosure have a choice to report ESG activities extensively when firms have a positive ESG activities, and report modestly when they have a negative ESG activities (Dye, 1985; Verrecchia, 1983). Regarding the adverse selection problem (George, 1970), good firms will separate themselves from bad firms by signaling through the ESG ratings. The additional research finds that good ESG ratings firm decrease their cost of capital and increase firm value when they get a favorable media coverage (Cahan, Chen, Chen, & Nguyen, 2015). Moreover, according to the 2016 PRI study (Heath, Paty, & Martindale, 2016), there is evidence demonstrates that a stricter level of ESG disclosure regulations is more impactful than voluntary guidelines by improving corporate risk management.

3. RESEARCH METHODS

3.1 Data Sample

The data sample comprises non-financial companies listed on 6 countries in Asia Pacific stock exchanges including, the Australian Securities Exchange, Hong Kong Stock Exchange, Tokyo Stock Exchange, Singapore Exchange, Shenzhen Stock Exchange, and Stock Exchange of Thailand. This paper employed the filtering process to carve out the observations that do not contain the ESG score or the borrowing cost in a particular year. The final sample consists of 1,771 firms, covering the period from 2008 to 2018. The dependent variable in this study is the borrowing cost, collected from the company's financial statement on annually basis. The independent variables are ESG performance and ESG disclosure, while ESG performance is collected from Reuter, ESG disclosure is collected from Bloomberg. I used data from both data providers to test whether the differences in the ESG scoring method for each data provider give the same result or not. In addition, sets of control variables being used to control the credit risk of the company namely Firm size, Leverage, Return on Assets, and Interest Coverage Ratio. These data are collected from the company financial statement from Bloomberg.

3.2 Independent Variables

The independent variables are the ESG disclosure score and ESG performance score gathered from the two data providers, Bloomberg, and Reuters, respectively. Both have different methodologies to evaluate and assign the ESG scoring for a particular firm. Both data providers illustrate the ESG score in the same term ranked from 0 to 100.

The observations are processed through the following procedures. First, I excluded the firms from the financial industry, due to the differences in default risk profile arising from the nature of the business which has a significant amount of interest expenses than other industries. Second, the firms which lacked ESG score and borrowing cost ratio are also removed from the data sets. In addition, I selected only the firms which have completed ESG score consecutively in the observation period to make a balanced panel data. Third, I chose the firms which have both ESG disclosure and performance for the results to be comparable. Therefore, in *Table 1* describes the total observations grouped by industry sector and country. The total samples comprise 1,771 firm-year observations. Section A in *Table 1* reports the industry sectors of the observations are mainly concentrated in Industrial (35.4%), Consumer, Cyclical (18.6%), Basic Materials (15.5%), Consumer, Non-cyclical (8.1%), and Communications (6.8%). Moreover, Section B in *Table 1* describes the total observations grouped by each country. Japan, Australia, and Hong Kong are the top three countries which have cover 91.3% of the total number of the observation firms.

Table 1**The total observations grouped by industry sector and country.**

Section A: Total observations grouped by industry sector.

Industry sector	Total	Percentage
Basic Materials	275	15.5%
Communications	121	6.8%
Consumer, Cyclical	330	18.6%
Consumer, Non-cyclical	143	8.1%
Diversified	22	1.2%
Energy	99	5.6%
Industrial	627	35.4%
Technology	55	3.1%
Utilities	99	5.6%
Total	1,771	100.0%

Section B: Total observations grouped by country.

Country	Total	Percentage
Australia	264	14.9%
China	66	3.7%
Hong Kong	242	13.7%
Japan	1111	62.7%
Singapore	66	3.7%
Thailand	22	1.2%
Total	1,771	100.0%

ESG performance score is measured by Thomson Reuter. The aggregated score can be split into each pillar, environmental, social, and governance pillar score. Moreover, each pillar is drilled down to cover 10 main categories based on reported data in the public domain which are annual reports, company websites, NGO websites, Stock exchange filings, CSR Reports, and news. The collected data are prioritized in weight within each category as in *Table 2*.

Table 2
Thomson Reuters weight of each pillar.

Pillar	Category	Indicators in rating	Weights	Pillar weights
Environmental	Resource use	19	11.0%	34.0%
	Emissions	22	12.0%	
	Innovation	20	11.0%	
Social	Workforce	29	16.0%	35.5%
	Human rights	8	4.5%	
	Community	14	8.0%	
	Product responsibility	12	7.0%	
Governance	Management	34	19.0%	30.5%
	Shareholders	12	7.0%	
	CSR strategy	8	4.5%	

Whereas ESG disclosure score is measured by Bloomberg. The score covered 120 ESG indicators from carbon emissions to shareholder rights. Data sources are gathered from annual reports, sustainability reports, press releases, third-party research, and risk management framework of the companies. The ESG score reflect the transparency of the company, this means that the more information disclosed, the higher the disclosure score of the firm. In the Asia Pacific, the level of ESG disclosure is vary across countries. Whereas Hong Kong and Singapore have using mandatory level of ESG disclosure, the rest of the countries in the observations have applied voluntary level of ESG disclosure in *Table 3*.

Table 3
Level of ESG disclosure in observation country.

Country	Level of ESG disclosure	Remark
Australia	Voluntary	
China	Voluntary	going to migrate to mandatory disclosure in 2020
Hong Kong	Mandatory	migrated to mandatory disclosure in 2017
Japan	Voluntary	
Singapore	Mandatory	migrated to mandatory disclosure in 2016
Thailand	Voluntary	

3.3 Dependent Variable

In the study, the dependent variable is the borrowing cost of the borrowing firms calculated as the interest expense divided by average total interest-bearing liability. The ratio employed to measure the interest rate that the company is paying on company's total interest-bearing liability by combined both short-term and long-term liability. Therefore, the variable can be a proxy for current and long-term prospects as the companies' borrowing cost. The data are gathered from Bloomberg on annually basis.

Table 4 reports the descriptive statistics. The average ESG performance score is 59.0523 and higher than ESG disclosure score at 37.9946 out of 100. Governance score is the highest score over the other components in both ESG performance and ESG disclosure score at 64.0367 and 52.2203, respectively. The average of borrowing cost is 3.02% per year. The mean of Firm size is 12.87586. The mean of Leverage ratio is 27.99% per year. The mean of Return on Asset is 3.6395% per year. The mean of Interest coverage ratio is 14.7425 times per year.

Table 4
Descriptive statistics.

Variable	Obs	Mean	S.D.	25%	Median	75%
Borrowing cost (CoD)	1,771	0.0302	0.0300	0.0129	0.0191	0.0400
ESG-disclose	1,771	37.9946	10.1123	30.1653	38.8430	45.0413
ESG-perform	1,771	59.0524	16.3936	49.8868	61.2313	70.8623
Environmental-disclose	1,771	33.6388	14.5574	21.7054	34.8837	44.1861
Social-disclose	1,771	33.7348	11.4794	28.0702	33.3333	38.5965
Governance-disclose	1,771	52.2203	8.0289	46.4286	51.7857	57.1429
Environmental-perform	1,771	56.4516	21.2666	41.7968	59.3103	73.2464
Social-perform	1,771	54.1276	97.6975	40.6130	58.7594	72.4792
Governance-perform	1,771	64.0367	20.4762	51.9836	67.6908	79.9099
Size (log of total assets)	1,771	12.8759	1.2776	12.0031	12.8492	13.5895
Lev	1,771	0.2799	0.1369	0.1770	0.2682	0.3752
ROA	1,771	0.0364	0.0469	0.0163	0.0324	0.0570
Intcov	1,771	14.7425	20.9911	3.2633	8.1297	17.6305

Table 5 reports the correlations among the independent, dependent, and control variables. According to the table, the borrowing cost has an inverse correlation with the ESG disclosure score, but not ESG performance score. Additionally, the borrowing cost is also negative related with firm size and Interest coverage ratio, which is in line with the prior researches (Erragragui, 2018; Francis, LaFond, Olsson, & Schipper, 2005; Gray, Koh, & Tong, 2009; Hoepner et al., 2016) (Eliwa, Haslam, & Abraham, 2016; Hasan, Hoi, Wu, & Zhang, 2017). Besides, the ESG performance score and ESG disclosure score is in positive association, firm size, interest coverage ratio and return on asset in the same line with previous studies from (Arena, 2018; Eliwa et al., 2019; Erragragui, 2018; Francis et al., 2005; Goh, Lee, Lim, & Shevlin, 2016; Gray et al., 2009).

Table 5**Correlations among the independent, dependent, and control variables.**

	CoD	ESG -disclose	ESG -perform	Size	Lev	ROA	IntCov
CoD	1						
ESG-disclose	-0.1157 <0.0000	1					
ESG-perform	0.0311 <0.1905	0.5319 <0.0000	1				
Size	-0.1294 <0.0000	0.325 <0.0000	0.3259 <0.0000	1			
Lev	-0.1909 <0.0000	-0.1805 <0.0000	-0.2068 <0.0000	0.0403 <0.0902	1		
ROA	0.1946 <0.0000	-0.0015 <0.9496	0.0464 <0.0508	0.0109 <0.6469	-0.2918 <0.0000	1	
Intcov	-0.2182 <0.0000	0.1511 <0.0000	0.0854 <0.0003	-0.0176 <0.4587	-0.4407 <0.0000	0.3232 <0.0000	1

It is noted that the correlation between ESG scores from both data providers is positively correlated (0.5319) but the magnitude is certainly far from perfect as a result of the differences in methodology and attribution for the scoring process of each data provider. The possible explanation of the relationship between the two ESG ratings are adversely associated or not associated for some firm. Hence, the determination about the effect of ESG ratings on the borrowing cost will be much more in a clearer picture when comparing between the use of both attributions.

4. METHODOLOGY

Panel regression and probit regression are applied in this research to test the relationship in two dimensions, cross-sectional and longitudinal. The data are collected from 6 Asia Pacific stock exchanges namely, Australian Securities Exchange, Hong Kong Stock Exchange, Tokyo Stock Exchange, Singapore Exchange, Shenzhen Stock Exchange, and Stock Exchange of Thailand from 2008 to 2018, This contributes to the 1,771 firm-year observations in this study. According to Hausman test, the fixed-effects model is determined to be more appropriate than the random-effects model. Assumptions about an error term for the model are assumed to vary non-stochastically over firms or time making the fixed effects model analogous to a dummy variable model in one dimension. The group means, which are group-specific fixed quantity, are fixed. Therefore, the fixed effects estimator is used to refer to an estimator for the coefficients in the equation comprises year, industry, and country fixed effects regarding the time-invariant intercept for each subject.

4.1 Impact of ESG ratings on the borrowing cost

In the present section, I projected that ESG ratings are adversely affecting the company's borrowing cost. I employ the subsequent regression equation among the ESG ratings, the company's borrowing cost and the set of control variables.

I regress ESG performance score and ESG disclosure score separately to the companies' borrowing cost in Equation (1)

$$\begin{aligned}
CoD_{i,t} = & \beta_0 + \beta_1 ESG_{i,t}^k + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \beta_5 IntCov_{i,t} + \\
& \beta_6 IndustryFixedeffect_i + \beta_7 YearFixedeffect_t + \beta_8 CountryFixedeffect_i + \\
& \varepsilon_{i,t}
\end{aligned} \tag{1}$$

Firstly, I collect the Borrowing cost (*CoD*) from the company's financial report based on a yearly basis, which is an interest expense divided by an average total interest-bearing debt of a company. The rationale behind the use of *CoD* is according to a meta-analysis studied by (Orlitzky, Schmidt, & Rynes, 2003) find that ESG rating is more correspond with the accounting-based measurement from the company's financial statement, than to market-based measurement in terms of company's credit rating. I use Bloomberg as the source of the data. The reason for using annually data is to comply with the ESG score which was also announced based on annually basis. Secondly, I employ ESG ratings (ESG^k), k denotes either ESG performance or ESG disclosure score from two sources of data provider, Bloomberg ESG disclosure and Thomson Reuter DataStream ASSET4 ESG performance.

ESG performance score is a wide-ranging assessment of the sustainability impact on the firms. ESG performance is collected and scored from the reported data of the companies in the public domain by Thomson Reuters. It used to measure a relationship between ESG performance, commitment, and effectiveness of the company across three core pillars which covered 10 categories. These pillars are comprised of, first, Environmental pillar (E), which covered the resource use, emissions, and innovation of the firm. Second, Social pillar (S), covered workforce, human rights, community, and product responsibility. Third, Governance pillar (G), it covered the management, shareholders, and CSR strategy. Furthermore, ESG

disclosure score is collected and scored by Bloomberg. They collected the data from the information available in various sources in annual reports, corporate social responsibility reports of the firms and companies' websites. The data provider assigns scores of the firms based on annually basis by take risk management framework of the firms into account. ESG disclosure score comprises 120 ESG indicators. For example, carbon emissions, climate change effect, pollution, renewable energy, political contributions, discrimination, diversity, community relations, and human rights.

In the meantime, the set of control variables comprise of firm size (Size) is a natural logarithm of total assets in year t . Size and borrowing cost are negatively correlated. Moreover, large size firms are projected to have a lower cost than small size firm due to the ability to utilize their resources for acquiring external funding. (Eliwa et al., 2016; Erragragui, 2018; Hasan et al., 2017). Leverage (Lev) is a total interest-bearing liability divided by total assets ratio in year t . I expected that leverage is positive correlated to the borrowing cost. A lower leverage companies are expected to have a smaller borrowing cost due to the better solvency than firms with a higher leverage firms (Erragragui, 2018; Goh et al., 2016; Jung et al., 2018; Tran, 2014). Return on Asset (ROA) is a net income before extraordinary items divided by total assets ratio. I expected to realize the negative association between ROA and the borrowing cost. A better financial position of the firms should be higher for firms with higher ROA able to acquire funding with lower cost of borrowing (Aman & Nguyen, 2013; Arena, 2018; Ge & Liu, 2015). Finally, Interest coverage ratio (IntCov) is a total operating income to total interest expense ratio. Borrowing firms with the higher interest coverage ratio implied the higher capabilities to repay their interest than those with lower interest coverage ratio. Therefore, higher interest

coverage ratio of the firms will lessen the borrowing cost (Erragragui, 2018; Francis et al., 2005; Gray et al., 2009; Hoepner et al., 2016). These control variables are employed in the equation for controlling the creditworthiness of the companies. The data are gathered from the annual financial statement of firms as disclosed in Bloomberg.

According to the assumption about the error term for the model is assumed to vary non-stochastically over firms or time, I exploit the set of fixed effect estimators which are year, industry, and country-fixed effects. These variables are persistent across particulars, do not change or change at a constant rate over time. Any effects from being in the year, industry or country will not change over time.

Besides, I also regress the particular dimensions of ESG score, Environmental score (E), Social score (S), and Governance score (G) to the companies' borrowing cost in Equation (2)

$$\begin{aligned}
 CoD_{i,t} = & \beta_0 + \beta_1 E_{i,t}^k + \beta_2 S_{i,t}^k + \beta_3 G_{i,t}^k + \beta_4 Size_{i,t} + \beta_5 Lev_{i,t} + \beta_6 ROA_{i,t} + \\
 & \beta_7 IntCov_{i,t} + \beta_8 IndustryFixedeffect_i + \beta_9 YearFixedeffect_t + \\
 & \beta_{10} CountryFixedeffect_i + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

The Environment, Social and Governance score (E^k , S^k , G^k) are collected annually from both service providers, Thomson Reuters and Bloomberg and used in Model (2), while k denotes ESG performance score or ESG disclosure score. The same set of control variables and fixed effects as mention above are utilized to control for credit risk.

4.2 Impact of the level of ESG disclosure on the borrowing cost

In the present section, I investigate the impact of the level of ESG disclosure that gathered from Bloomberg on the borrowing cost of the company. At the individual market level, they differ in the level of disclosure, ranging from voluntary to mandatory disclosure. Besides, our selected observation markets in the Asia Pacific are migrated from voluntary to mandatory level of disclosure as governed by their stock exchange authorities. This action sheds light on the importance of the level of ESG disclosure whether the higher level of ESG disclosure pressured by the regulators will contribute the firms to improve their quality of disclosure. Consequently, the borrowing cost of the firms will be lessened by the reduction of asymmetry information between firms and their stakeholders, especially from the lending institution.

The probit regression models are utilized to measure the effect on the borrowing cost after deployed the mandatory level of ESG disclosure. The purpose of this model is to evaluate the probability that observation with particular characteristics will fall into a specific one of the categories. Moreover, classifying observations based on their predicted probabilities is a type of binary classification model. Since the underlying latent variable propensity that the dependent variable is equal to one is unobserved, the assumption about the distribution of errors is normal distribution to use the maximum likelihood estimation. In this paper, I applied to the probit model in two dimensions, across observations and across time.

4.2.1 Level of ESG disclosure in the longitudinal study

To empirical test this section, the data sets are used two years before and after the transition level of ESG disclosure in observation firms listed in Singapore and Hong Kong stock exchange. The division groups are allocated into two groups, the first group is the observation-year before the transition year, which from 2014 to 2015 for Singapore, and from 2015 to 2016 for Hong Kong. The second group is the observation year from 2016 to 2017 for Singapore and in 2017 to 2018 for Hong Kong. Then I regress the ESG disclosure on the borrowing cost after the change in the level of disclosure whether the stricter level leads to reduce in borrowing cost in Equation (3).

$$\begin{aligned}
 Prob(CoD_{i,t} = 1) = & \beta_0 + \beta_1 Level_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \\
 & \beta_5 IntCov_{i,t} + \beta_6 IndustryFixedeffect_i + \beta_7 YearFixedeffect_t + \\
 & \beta_8 CountryFixedeffect_i + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

Equation (3) is used for the empirical test, where *CoD* is a variable which equals one if a company has a lower borrowing cost than the previous year and zero otherwise. *Level* is a factor that equals one for the firms in the year which uses mandatory disclosure, which is a higher disclosure level and zero otherwise. The same set of control variables in the prior section are employed to control the firm characteristics which may affect the companies' borrowing cost.

4.2.2 Level of ESG disclosure in the cross-sectional study

In the present section, I scope the observation period to be only in 2018 by divided observation into two groups, whereas the first group is the companies listed in countries which deployed voluntary basis, consist of Australia, Japan, China, and Thailand, the second group is the companies listed in countries which governed by mandatory basis, comprised of Hong Kong and Singapore in Equation (4).

$$Prob(CoD_i = 1) = \beta_0 + \beta_1 Level_i + \beta_2 Size_i + \beta_3 Lev_i + \beta_4 ROA_i + \beta_5 IntCov_i + \beta_6 IndustryFixedeffect_i + \beta_7 CountryFixedeffect_i + \varepsilon_{i,t} \quad (4)$$

Equation (4) is used for the empirical test, where *CoD* is a variable which equals one if a company has a lower borrowing cost than the prior year and zero otherwise. *Level* is a factor that equals one for firms listed in the countries that used mandatory disclosure and zero otherwise. The same set of control variables in the prior section are employed to control the firm characteristics which may affect the companies' borrowing cost. Except for the *YearFixedEffect* which will be carved out from the model because of the cross-section characteristic of the model

5. EMPIRICAL RESULTS AND DISCUSSION

In the present section, I demonstrate three topics of experiments to evaluate the relevance regarding ESG ratings and the borrowing cost. First, I evaluate the impact of ESG ratings on the borrowing cost. Second, I evaluate the impact of particular dimensions of ESG ratings, Environmental, Social, and Governance on the borrowing cost. Finally, I evaluate the impact of level of ESG disclosure on the borrowing cost.

5.1 Impact of ESG ratings on the borrowing cost

I expected that the ESG ratings are adversely related with the borrowing cost. I evaluate the subsequent regression equation between ESG disclosure or performance score, a set of control variables, firm size, Return on Asset and Interest Coverage ratio are also negatively associated with the borrowing cost, except for leverage, which is positively associated to the borrowing cost.

5.1.1 ESG disclosure score on the borrowing cost

Table 6 shows the results of Equation 1 using ESG disclosure score from Bloomberg as an independent variable. The outcomes demonstrate a significant negatively correlation among ESG disclosure score and the borrowing cost without employed a set of control variables in Model (1). The estimated coefficient of ESG disclosure without control variable is -0.000144 and is statistically significant at 5% level. In addition, Model (2) in *Table 6* shows the impact of ESG disclosure score with a set of control variables, the estimated coefficient of ESG disclosure with

control variable is -0.000189 and is statistically significant at 5% level. It can be summarized that the ESG disclosure score has an additional explanatory power over the financial factors that indicated the creditworthiness of potential borrowers.

Table 6

Panel regressions of ESG disclosure score on the borrowing cost.

The table present panel regressions of Borrowing cost as a function of ESG disclosure score by using Equation 1:

$$CoD_{i,t} = \beta_0 + \beta_1 ESG_{i,t}^k + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \beta_5 IntCov_{i,t} + \beta_6 IndustryFixedeffect_i + \beta_7 YearFixedeffect_t + \beta_8 CountryFixedeffect_i + \varepsilon_{i,t}$$

Where, CoD denote a borrowing cost which calculated as the interest expense divided by the interest-bearing liability ratio of the firm in particular year. ESG^k denote ESG score is range from 0 to 100 measured by Bloomberg indicator. The set of control variable are employed, where Size denoted firm size, Lev denoted leverage ratio, ROA denoted return on asset ratio and IntCov denote interest coverage ratio of the firm. The sample covers the period 2008 to 2018. Variable descriptions and sources are defined in Appendix. T-statistics in parentheses. ***, **, * denote significance in the difference in means at the 1%, 5%, and 10% level, respectively.

	(1)	(2)
	CoD	CoD
_cons	0.0881*** (18.12)	0.109*** (9.55)
ESG-disclose	-0.000144** (-2.25)	-0.000189** (-2.73)
Size		-0.000826 (-1.54)
Lev		-0.0376*** (-4.85)
ROA		0.00555 (0.26)
IntCov		-0.000183*** (-4.23)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Country fixed effect	Yes	Yes
N	1,771	1,771

Corresponding with the projection, the results demonstrate that firms with higher ESG disclosure score have the lower borrowing cost. The implication of the result is that it can be utilized as a signal from the lending institutions when the ESG disclosure score increases, the lending institutions are willing to reduce the amount of interest for a dollar of debt for such companies. This means that lenders do combine the ESG disclosure data of the borrowing firms when assessing the risk profile of such firms in the credit evaluation process (Hoepner et al., 2016; Malik, 2015; Scholtens, 2006, 2009; Zeidan et al., 2015). The result is consistent with previous study that find a negative correlation between ESG disclosure score and the borrowing cost in EU countries (Eliwa et al., 2019). Besides, there is a negative correlation between corporate social responsibility disclosure and the borrowing cost (Gao, Dong, Ni, & Fu, 2016). The result of this study can be added into the limited number of researches in the notion of ESG disclosure that have an impact on a firm's ability acquire the lower cost of external funding.

Moving to control variables, it can be found that the estimated coefficient of Interest Coverage ratio is -0.000183 and is statistically significant at 1% level, corresponding with the preceding research (Eliwa et al., 2019; Erragragui, 2018; Francis et al., 2005; Gray et al., 2009; Hoepner et al., 2016). This means that firms with high Interest coverage ratio will have a lower borrowing cost regarding the higher capabilities to pay their interest. Nevertheless, the leverage is -0.0376 and statistically significant at 1% level. The negative relationship among leverage and borrowing cost is different from the previous studies (Eliwa et al., 2019; Erragragui, 2018; Goh et al., 2016; Jung et al., 2018; Tran, 2014). This means that when firms

have higher leverage, the borrowing cost is decreased. The explanation to the difference to the prior studies is that even the solvency is affected by increasing in leverage ratio, which make high indebtedness company expose to bankruptcy throughout a business downturn. However, if the firms use proceed from lenders to acquire an asset that generate a higher return than cost of borrowing. A company then creates value. In addition, the lending institution with high leverage tend to charge lower interest rates than banks with low leverage which will allow bank's ability to deduct more interest expenses (Dzhamalova, 2016).

5.1.2 ESG performance score on the borrowing cost

Regarding ESG performance score from Thomsom Reuters, *Table 7 Model (1)* shows the impact of ESG performance without employed a set of control variables. The outcomes show that there is no significant between ESG performance score and the borrowing cost. Besides, after adding the set of control variables in Model (2), the result is still no significant. The results are correspond to the previous studies (Erragragui, 2018; Hoepner et al., 2016; Jamprasert et al., 2020; Stellner et al., 2015) which realize a positive association or an insignificant among ESG performance score and the borrowing cost.

However, the outcomes are not in line with the projection and prior researches from (Aman & Nguyen, 2013; Eliwa et al., 2019; Ge & Liu, 2015; Goss & Roberts, 2011; Hasan et al., 2017). The contradiction between the result of this paper and previous papers studied in EU countries and United States, which known for the ESG leaders since 2002, is due to the ESG laggard in the Asia-Pacific region. The APAC has established the framework in almost a decade later. The ESG laggard implied that

the relative ESG performance in APAC has a lower degree of transparency in reporting material ESG data publicly than in EU countries and United States. In addition, the risk mitigation effect of ESG is more explicit in regions with high country-level ESG, high investor protection and higher transaction costs (Breuer, Müller, Rosenbach, & Salzmann, 2018; El Ghouli et al., 2011; Stellner et al., 2015). The evidence leads to the divergence effect of ESG performance on the cost of borrowing across the regions.

Unlike ESG disclosure, it can be concluded that the ESG performance does not create the additional explanatory power over the financial factors that indicated the creditworthiness of potential borrowers. Regarding the ESG uptake by the financial institutions has been increasing year over year. There are still gaps in the different scope and measurement of categories across data providers by capturing different attributes of ESG score (Berg, Koelbel, & Rigobon, 2020). Which leads to the different results to cost of borrowing when using the ESG ratings from different data providers. ESG disclosure score provides additional information regarding risk management framework that expresses firms' responsiveness of their ESG difficulties and plans to mitigate the negative impacts. This makes ESG disclosure score more robust than ESG performance score. The supported evidence demonstrate that lenders integrate corporate ESG risk exposure into credit evaluation. The effect of the environmental risk on the borrowing cost is lessened only if the borrowing firm has responsiveness of the risk and willingness to mitigate the risk by using the green technology scheme (Jung et al., 2018).

Table 7**Pooled regressions of ESG performance score on the borrowing cost (the interest rate proxy).**

The table present panel regressions of Borrowing cost as a function of ESG performance score by using *Equation1*:

$$CoD_{i,t} = \beta_0 + \beta_1 ESG_{i,t}^k + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \beta_5 IntCov_{i,t} + \beta_6 IndustryFixedeffect_i + \beta_7 YearFixedeffect_t + \beta_8 CountryFixedeffect_i + \varepsilon_{i,t}$$

Where, denote a borrowing cost which calculated as the interest expense divided by the interest-bearing liability ratio of the firm in particular year. ESG^k denote ESG score is range from 0 to 100 measured by Thomson Reuter indicator. The set of control variable are employed, where Size denoted firm size, Lev denoted leverage ratio, ROA denoted return on asset ratio and IntCov denote interest coverage ratio of the firm. The sample covers the period 2008 to 2018. Variable descriptions and sources are defined in Appendix. T-statistics in parentheses. ***, **, * denote significance in the difference in means at the 1%, 5%, and 10% level, respectively.

	(1)	(2)
	CoD	CoD
_cons	0.0835*** (19.15)	0.108*** (9.57)
ESG-perform	-0.00000128 (-0.05)	-0.0000173 (-0.57)
Size		-0.00117** (-1.97)
Lev		-0.0355*** (-4.72)
ROA		0.00719 (0.33)
IntCov		-0.000186*** (-4.23)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Country fixed effect	Yes	Yes
N	1,771	1,771

Moving to the control variables, it can be found that the estimated coefficient of Firm size is -0.00117 and is statistically significant at 10% level, consistent with results in the preceding studies (Eliwa et al., 2019; Eliwa et al., 2016; Erragragui, 2018; Hasan et al., 2017). This means that large size firms have a lower borrowing cost than small size firms due to the ability to utilize their resources for acquiring external funding. Furthermore, the estimated coefficient of Interest Coverage ratio is -0.000186 and is statistically significant at 1 % level, consistent with findings in the preceding studies (Eliwa et al., 2019; Erragragui, 2018; Francis et al., 2005; Gray et al., 2009; Hoepner et al., 2016). This means that firms with high Interest Coverage ratio have a smaller borrowing cost regarding the higher capabilities to repay their interest. Nevertheless, the leverage is -0.0355 and is statistically significant at 1 % level which different from the previous studies (Eliwa et al., 2019; Erragragui, 2018; Goh et al., 2016; Jung et al., 2018; Tran, 2014). This means that when firms have higher leverage, the borrowing cost is. The implication is as explained in previous section 5.1.1.

5.2 Impact of particular dimension of ESG ratings on the borrowing cost

I expected that the particular dimension of ESG ratings are adversely related with the borrowing cost. I evaluate the subsequent regression equation between Environmental, Social, and Governance disclosure or performance score, a set of control variables, firm size, Return on Asset and Interest Coverage ratio are also

negatively correlated with the borrowing cost, except for leverage, which is positively correlated to the borrowing cost.

5.2.1 Particular dimension of ESG disclosure score on the borrowing cost

The ESG disclosure score is divided into the particular dimensions. Corresponding with the projections, results in *Table 8* demonstrate that the environmental and governance dimensions have negative relationships with the borrowing cost. Model (3) reports that corporate governance dimension of ESG disclosure is statistically significant at 1% level and has the highest effect on the borrowing cost with the estimated coefficient of -0.000369 without control variables. In the same way, Model (6) reports that corporate governance dimension of ESG disclosure is statistically significant at 1% level with the estimated coefficient of -0.000355 when deployed the set of control variables.

Followed by the environmental dimension, Model (1) reports that environmental dimension of ESG disclosure is statistically significant at 10% level with the estimated coefficient of -0.0000761 without control variables. Additionally, after adding a set of control variables in Model (3), environmental dimension of ESG disclosure is still statistically significant at 1% level with the estimated coefficient of -0.000116. In relation with the results, it can be summarized that the lending institutions assign different weight of the particular ESG dimension according to the risk exposure by borrowing firms. The environmental and corporate governance are the main dimensions that has an additional explanatory power over the financial factors that indicated the creditworthiness and reputation of potential borrowers.

The negative association among the environmental and governance aspects of ESG disclosure score and the borrowing cost is in line with preceding studies that

lenders combined the environmental and governance dimension in the lending decision process (Eliwa et al., 2019). The effect of environmental dimension in high carbon emissions leads to an increasing in borrowing cost and the eco-friendlier firm gets a more favorable loan contract than the firms with a lower environment score (Jung et al., 2018; Nandy & Lodh, 2012). Also, the preceding literature emphasized the effect of corporate governance dimension in terms of management quality on the borrowing cost, and the logic of lenders when considering good or poor management practices. Result can be added to the limited number of the study in ESG (Rahaman & Al Zaman, 2013).



5.2.2 Particular dimension of ESG performance score on the borrowing cost

ESG performance score is divided into the particular dimensions. *Table 9* describes the outcomes of equation (2), I only find that only environmental dimension is statistically significant at 1 0% level and estimated coefficient is -0.0000355 in Model (1) without control variables.

When employ a set of control variables in Model (4), the result is consistent with Model (1) that only environmental factor has impact on the borrowing cost. The coefficient of environmental dimension is -0.0000440 and is statistically significant at 5% level. The implication in of higher environmental score results in a decreasing borrowing cost is correspond to preceding literatures that the effect of high carbon emissions in environmental dimension contributes to an increasing in borrowing cost and the eco-friendlier firm gets a more favorable loan contract than the firms with a smaller environment score (Jung et al., 2018; Nandy & Lodh, 2012).

I argue that the significant impact of the environmental factor on the borrowing cost may be vanished by the insignificant impact of the social dimension and corporate governance dimension factor, as we can see the irrelevant impact of the combine ESG performance score on the borrowing cost. I believe that the lending institutions assign different weight to each component of ESG score to gauge the creditability of the firms in the lending decision process.

According to the stakeholder theory, good firms sent a strong signal to differentiate themselves from bad firms by allocating part of their proceeds to fulfill demands of various stakeholder groups and still maintaining firm performance at the same time. Furthermore, firms complied with ESG ratings could decrease asymmetric information between themselves and lending institutions by signaling that they are not involve in business activities that deteriorate the environment or the broader society, which helps lending institutions evaluate the true quality of the firms regarding the reputational risk in the lending process.

5.3 Impact of Level of ESG disclosure on the borrowing cost

I expected that the higher level of ESG disclosure are adversely related with the borrowing cost by evaluating the subsequent probit regression. A set of control variables, firm size, Return on Asset, and Interest Coverage ratio are also negatively correlated with the borrowing cost, except for leverage, which is positively correlated to the borrowing cost.

5.3.1 Level of ESG disclosure in the longitudinal study in Hong Kong and Singapore

Apart from the projection, the result from the Model (1) *Table 10* demonstrate that there is no statistically significant impact of Level of ESG disclosure in Hong Kong and Singapore on the borrowing cost. At the same time, when deployed a set of control variables in Model (2) *Table 11*, the result is as the same with model (1). This means that the borrowing cost of firms using mandatory disclosure and voluntary disclosure is indifferent.

The finding shows that after changing to mandatory disclosure, it does not mean that lending institution will offer the lower borrowing cost to the firm. However, when traced back to the study of the disclosure level in term of corporate social responsibility in Amsterdam Stock Exchange. The findings show that there is a positive relationship between level of corporate social responsibility disclosure and the corporate social responsibility score (Gao et al., 2016). But my study extended the research area to the direct relationship between the level of disclosure and borrowing cost. The possible explanation is that, regarding the evidence from (Dye, 1985; Verrecchia, 1983) firms have a choice to report their ESG engagement, A positive

ESG ratings companies would choose to report extensively on their ESG activities, and those with a negative ESG ratings would choose to report modestly.

Table 10

Probit regressions of level of ESG disclosure in Hong Kong and Singapore on the borrowing cost.

The table present probit regression of Borrowing cost as a function of level of ESG disclosure for observation firms listed in Singapore and Hong Kong stock exchange by using Equation (3),

$$Prob(CoD_{i,t} = 1) = \beta_0 + \beta_1 Level_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \beta_5 IntCov_{i,t} + \beta_6 IndustryFixedeffect_i + \beta_7 YearFixedeffect_t + \beta_8 CountryFixedeffect_i + \varepsilon_{i,t}$$

Where CoD denote Borrowing cost and equal to one if a firm has a lower borrowing cost than the previous year and zero otherwise. Level denote level of ESG disclosure gathered from Bloomberg ESG disclosure score and equal to one for the firms in the year which uses a comply-or-explain basis, which is a higher disclosure level and zero otherwise. The set of control variables are employed, where Size denoted firm size, Lev denoted leverage ratio, ROA denoted return on asset ratio and IntCov denote interest coverage ratio of the firm. The sample covers the period 2014 to 2017 for Singapore and 2016 to 2018 for Hong Kong, which is two years before and after the transition year to higher level of ESG disclosure. Variable descriptions and sources are defined in Appendix. T-statistics in parentheses. ***, **, * denote significance in the difference in means at the 1%, 5%, and 10% level, respectively.

	(1)	(2)
	CoD	CoD
_cons	1.230**	0.711
	-2.26	-0.93
Level	-0.0909	-0.0858
	(-0.18)	(-0.17)
Size		0.0223
		-0.52
Lev		0.618*
		-1.67
ROA		-0.434
		(-0.34)
IntCov		0.00669*
		-1.82
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Country fixed effect	Yes	Yes
N	616	616

Regarding to the adverse selection problem (George, 1970), good firms will separate themselves from bad firms by signaling through the ESG ratings. Besides, according to the 2016 PRI study, there is evidence demonstrates that a stricter level of ESG disclosure regulations is more impactful than voluntary guidelines by improving corporate risk management. Therefore, it can be concluded that lending institutions have attention to ESG activities of the firm and level of disclosure act as the compliment factor that force firm to disclose actual information of their ESG activities in all aspects, not only the positive ESG activities, but also ESG risks simultaneously. Thus, the lender can assign the precisely borrowing cost to the firm but does not mean it will be lower as a result.

5.3.2 Level of ESG disclosure in the cross-sectional study in year 2018

In a similar vein in section 5.3.2, there is insignificant association between the level of ESG disclosure across the Asia Pacific region in year 2018 and the borrowing cost. The results shown in Model (1) *Table 11*, without control variables, that the countries which use mandatory disclosure does not have lower borrowing cost than the countries which use voluntary disclosure. Moreover, when apply a set of control variables in Model (2), the result is indifferent with Model (1).

A higher level of ESG disclosure could reduce asymmetric information among lenders and borrowers by avoiding that some firm which choose to report extensively on the activities that contribute the higher ESG score and not to report some activities that the lower ESG score.

Table 12**Probit regressions of level of ESG disclosure in 2018 on the borrowing cost.**

The table present probit regression of Borrowing cost as a function of level of ESG disclosure for observation firms listed in Asia pacific stock by using Equation (4),

$$Prob(CoD_{i,t} = 1) = \beta_0 + \beta_1 Level_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \beta_5 IntCov_{i,t} + \beta_6 IndustryFixedeffect_i + \beta_7 YearFixedeffect_t + \beta_8 CountryFixedeffect_i + \varepsilon_{i,t}$$

Where CoD denote Borrowing cost and equal to one if a firm has a lower borrowing cost than the previous year and zero otherwise. Level denote level of ESG disclosure gathered from Bloomberg ESG disclosure score and equal to one for the firms which uses a comply-or-explain basis, which is a higher disclosure level and zero otherwise. The set of control variables are employed, where size denoted firm size, lev denoted leverage ratio, ROA denoted return on asset ratio and Intcov denote interest coverage ratio of the firm. The sample covers only year 2018 across firm, which is two years before and after the transition year to higher level of ESG disclosure. Variable descriptions and sources are given in Appendix. T-statistics in parentheses. ***, **, * denote significance in the difference in means at the 1%, 5%, and 10% level, respectively.

	(1)	(2)
	CoD	CoD
_cons	-0.14 (-0.87)	-0.163 (-0.35)
Level	-0.61 (-1.54)	-0.583 (-1.44)
Size		-0.0138 (-0.35)
Lev		0.421 -1.23
ROA		0.446 -0.62
Intcov		0.002 -1.06
Industry fixed effect	Yes	Yes
Year fixed effect	No	No
Country fixed effect	Yes	Yes
N	809	809

According to the prior researches, the debt contract is more saleable when the information of the borrowing firm is more transparent (Dennis & Mullineaux, 2000). Furthermore, the higher level of disclosure can reduce asymmetric information and agency conflicts between debtholders and shareholders (Aman & Nguyen, 2013). The higher level of ESG disclosure is drive firms to disclose not only the positive ESG activities, but also ESG risks simultaneously. However, the higher level of disclosure does not mean that it can be reduced the borrowing cost.



6. CONCLUSION

The main purpose of this research is to analyze the impact of ESG rating on interest rate as a proxy for the borrowing cost in Asia Pacific, due to awareness of the value of ESG integration in the region that has been growing in the investment decision making and management processes. There are three objectives of the studies. Firstly, I appraise the impact of ESG performance and disclosure on the company's borrowing cost in the sense of accounting-based measurement. Secondly, this paper is also evaluated the isolation of each aspect of ESG score by decomposed into Environmental (E), Social, (S) and Governance (G) aspects. Finally, this paper measured the impact of the level of ESG disclosure on the companies' borrowing cost. A higher level of ESG disclosure is mitigated asymmetric information problem between borrowers and lenders.

The findings suggest that the firms have advantage from reducing borrowing cost through ESG disclosure score, but not ESG performance score, due to the difference in capturing the attribution of ESG ratings between the ESG data providers. ESG disclosure score is more robust because it is also integrated the risk management framework of firm in the scoring process. Comparing various sources of ESG score will straighten out the effect of ESG ratings on the borrowing cost. It can be concluded that lending institutions do take into account the, as an additional explanation factor over the financial factors.

Moreover, when analyzed deep down into each dimension of ESG ratings. The findings show that environmental and corporate governance aspects are the main

factors that contribute to the decreasing in cost of borrowing of the firm. The lending institutions concentrate on the dimensions that have ability to mitigate reputation risk of the firms in evaluating cost of borrowing process.

Nevertheless, the mandatory level of ESG disclosure does not reduce cost of borrowing. Mandatory disclosure is force firm to reveal the actual information of their ESG activities in all aspects. Unlike voluntary disclosure, a positive ESG firms may disclose comprehensively on their ESG activities, and those with a negative ESG activities may report minimally. Therefore, the true quality of the firms is observable, and thus reducing asymmetry information among borrowers and lenders, but it does not mean that the borrowing cost will be lessened as a result.

APPENDIX

Appendix 1 Variables description and data sources

VARIABLES	DESCRIPTION	SOURCE	UNIT
CoD	Borrowing cost is calculated by Total interest expense divided by average to total interest-bearing liability of the firm.	Bloomberg	Percentage
ESG	Total score aggregated from three aspects including Environmental, Social, and Governance score. ESG disclosure score is gathered from Bloomberg, while ESG performance score is gathered from Thomson Reuters.	Thomson Reuters Asset4/Bloomberg	Scoring 0 – 100
E	Environmental aspect score	Thomson Reuters Asset4/Bloomberg	Scoring 0 – 100
S	Social aspect score	Thomson Reuters Asset4/Bloomberg	Scoring 0 – 100
G	Governance aspect score	Thomson Reuters Asset4/Bloomberg	Scoring 0 – 100
Level	Level of ESG disclosure governed by the regulators of each country. It indicates the stricter or less strict ESG disclosure. Level is a factor which equals one for firms listed in the countries which used a higher level of disclosure and zero otherwise	Author	0 or 1
Size	Firm size is calculated by lognormal of the total assets of the firm.	Bloomberg	USD
Lev	Leverage ratio is calculated by total liabilities divided by total assets.	Bloomberg	Percentage
ROA	Return on Asset ratio is calculated by net income before extraordinary items divided by total assets.	Bloomberg	Percentage
IntCov	Interest coverage ratio is calculated by total interest-bearing liabilities divided by total interest expense.	Bloomberg	Time

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