BUSINESS SUSTAINABILITY PERFORMANCE ON COST OF EQUITY IN JAPAN MARKET

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ABSTRACT

Nowadays business sustainability is the one interesting business trend because this trend is useful for all stakeholders throughout our world. Business sustainability performance consists of two different dimensions. First is economic sustainability performance (ECON) which focuses on profitability of firms. The second dimension is non-economic sustainability which considers environmental, social response and corporate governance or ESG. This research studies in an effect between both sustainability performance and cost of equity by using panel regression because cost of equity is one of most expensive cost in firms thus if cost of equity can be reduced firm can get more value, profit and be sustained in a long term. This study uses data from Tokyo Stock Exchange which is one of the leaders in sustainable developed countries in Asia because this research uses as motivation to other countries in ASIAN to develop and implement ESG into firms. This study uses panel regression model with 119 firms by observation 805 firm-year from 2002 to 2018. The results in Japan market show economic sustainability performance is more effective to cost of equity than non-economic sustainability performance. The proxies of cost of equity (CAPM and Beta) are negatively affected by operation effort (revenue and advertisement expense) and equity effort factors (ROE and dividend paid). Most of all non-economic sustainability (ESG) is not statistically significant to cost of equity.

KEY WORDS: Sustainability/ firm performance/ cost of equity/ ESG/ Japan market

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CHAPTER I
INTRODUCTION

Nowadays business sustainability is one of major trends in business. The business sustainability trend is interested by regulator, investors also firms. This business sustainability can produce opportunity and challenges for all stakeholders. Firms' point of view can be revenue generation or reductions in investing in sustainability projects. The investor side may have more return and less risk. And regulator side shall create regulation to control and support all stakeholder's interests.

The sustainability consists of two pillars which are economic (ECON) and non-economic (ESG) sustainability. Economic sustainability considers in terms of profitability in the long run which can be in revenue increasing, expenses reduction, higher returning, etc. Non-economic sustainability consists of three factors which are environmental, social and governance also called ESG. ESG focuses on natural resources, people capital, and transparency in corporate firms which are not much considered in profitability.

King Bhumibol Adulyadej is a role model in sustainability. His majesty works have many development dimensions such as human development, environment development, researches and development in new technology and etc. His works have been proved by many world organizations such as UNDP, UN, WHO and etc. They gave his majesty many wards such as UNDP Human Development Lifetime Achievement Award. UNDP Human Development Lifetime Achievement Award ((UNDP), 2006) is the one award that proves that his majesty development work is important to human races. This award is the first time given to a person who understanding and progress in human development. In terms of non-sustainability, king Bhumibol's works, projects, and ideas cover all environment, social and governance pillars. His Majesty is the one who inspires to begin this research.

King Bhumibol Adulyadej's works can be separated into environmental pillar. His majesty's works can be represented environmental development for example:

wastewater treatment and soil improvement. The project is improved water quality by using Chaipattana Aerator. This aerator can be used as wastewater improvement equipment by adding air back to water. This water treatment project has been developed and comes out of four systems which are lagoon treatment, grass filtration, constructed wetland and mangrove forest filtration. For soil improvement project (Chaipattana Foundation, 2019), the late King Bhumibol found that much soil in the countryside was damaged by poor farming such as using too much of chemical in soil, growing the same plant continuously but did not treat soil well enough or cutting forest out. The king Bhumibol used many solutions for this problem such as vetiver grass growing for hard and dry soil and tricking soil methodology or soil aggravation to improve concentrated acid soil.

In part of social or human development, the king Bhumibol created and gave the sufficient economic philosophy (Chaipattana Foundation, 2019) to Thai people in 1970. This philosophy is one of leading way to sustainability life because the philosophy empowers all people to live by themselves. When we can live by ourselves, we can help other people to make our society be better. The main idea of sufficient was given in his Majesty's birthday speech on December 4, 1998, as "This sufficiency means to have enough to live on. Sufficiency means to lead a reasonably comfortable life, without excess, or overindulgence in luxury, but enough. Some things may seem to be extravagant, but if it brings happiness, it is permissible as long as it is within the means of the individual". In the case of corporate level, we can apply this philosophy by optimizing productivity to matching with demands of products. The sufficient economic philosophy can be a framework of sustainability from personal to large economic scale (Mongsawad, 2012).

In governance part, his majesty has shown by his works and project purposes are charity and developing human race to be able to live. His majesty also created The Chaipattana Foundation to continue his projects and development in the future. In part of good governance, his majesty also has king's precepts which call Dasavidha-rājadhamma (Puntarigvivat, 2017). These precepts have ten items such as sharing, morality, honesty and etc. These precepts can ensure leader does the right things for other peoples.

Economic sustainability is also known as profitability in the long term for firms. Firm's proposition is maximizing the value of firm, the sustainability can be used in firms by using as revenue-generating, growth of net profit or reducing cost of capital and risk of firms. The development of economic sustainability in firms tries to make the best performance of firms.

From the Capital market research forum in the topic of Green FDI in ASEAN: Environment, Social and Governance (ESG) investment on March 19th, 2019 (Stock Exchange of Thailand, 2019), this forum highlighted the importance of ESG to investors, firms, speculators and regulators. The importance of business sustainability helps firms in terms of value creation and cost reduction. The value creation for firms can be profitable projects such as creating a new product from waste in a normal process, making new green products and etc. Cost reduction projects can be reducing waste such as water treatment systems to reduce water treatment fees. The working paper of Eccles, Ioannou, and Serafeim (2012) shows that portfolio with high sustainability performance firms can give a higher return than a portfolio with low sustainability firms. In investment research forum highlighted that sustainability is not only for listed company but private firms can use this sustainable view to improve company profits and reduce costs.

Japan is the one of ESG leader investment in Asia by Japan has invested in sustainable investment assets increase from 10,000 million USD in 2011 to 473,570 million USD in 2016 (Volz, 2018). When compare investment amount in sustainable investment asset, Japan invested nearly nine times out of other Asia markets. This increasing rate of investment shows Japan market is moving their interest in sustainable investments so this study selects Japan market to investigate the relationship between sustainability performance and cost of equity. In Japan, there are many stock exchange markets such as Tokyo, Fukuoka, Osaka stock market, etc. This research focuses on Tokyo Stock Exchange because it's the largest stock exchange market in Japan.

This study investigates the relation between cost of equity and sustainability performance both pillars in economic (ECON) and non-economic (ESG) sustainability performance in Tokyo Stock Exchange market. The link between cost of equity and sustainability performance can explain the benefit of sustainability performance in firms such as ECON and ESG are possible to reduce cost of equity capital and increase value

of company. The prior study of Ng and Rezaee (2015) investigates in US market by using KLD database which provides ESG data in term of strength minus concern items but this study uses ESG data from Thomson Reuter EIKON which provide in term of percentage.

This report is separated into six sections which are the introduction, literature review, related theories and hypothesis development, data and sample selection, research methodology and empirical results and conclusion respectively.

CHAPTER II
LITERTURE REVIEW

According to these research studies in two different dimensions of business sustainability performances which consist of economic sustainability and non-economic sustainability performance. This part is separated into two parts. The first part is considering economic sustainability performance to cost of equity. The second part is non-economic sustainability performance to cost of equity.

2.1 Financial Information and Cost of Equity

The theoretical study in financial data and cost of equity has negative relation is proved by Lambert, Leuz, and Verrecchia (2007). This theoretical study creates a framework that links the disclosure of financial data to cost of capital. The model from this paper uses Capital Asset Pricing Model to explain many securities that correlate with cash flows. The impact of disclosure can make both direct and indirect impact to cost of capital. The direct effect is occurred because a higher disclosure effect on firm's evaluated risk of cash flow compares with other firm's cash flow. The indirect effect is a firm's real decision on firm's ratio of expected future cash flow. The paper shows that under derived condition an increased information quality can reduce cost of capital. This concept is derived by Diamond and Verrecchia (1991); Modigliani and Miller (1958). Diamond and Verrecchia (1991) have derived public information to reduce information asymmetry effect to reduce cost of capital. The reason of cost of capital reduction is investors have more attraction on firms then the liquidity of firm stocks also increases too. Easley and O'hara (2004) also find investors required more return when firms provide more private information to investors by using information asymmetry between uninformed and informed information investors. But Leuz and Verrecchia (2005) discuss risk from information effect to shareholder return, the

outperform financial information can improve the relationship between investors and firms which depend on the decision of invested capital.

The empirical researches between high-standard financial information can decrease cost of equity are studied by Bhattacharya, Daouk, and Welker (2003); Botosan (1997); Botosan and Plumlee (2002); Francis, LaFond, Olsson, and Schipper (2004).

A study by Bhattacharya et al. (2003) in opacity earning finds that increasing of opacity earning effects to cost of equity increasing and trading in stock market reduction. Botosan (1997) studies in the effect of disclosure level on cost of equity. The results of panel regression between market beta and disclosure level show firms with less analyst attraction and higher disclosure have a lower cost of equity.

Botosan and Plumlee (2002) study in effect of disclosure level in annual report and time on cost of equity by using the dividend discount model. Results show cost of equity has negative relation to annual report disclosure but positive relation to levels of timely disclosure.

Francis et al. (2004) studies the connection between cost of equity and several attributes of earnings: persistence, predictability, value relevance, timeliness, smoothness, conservatism and accrual quality. This study finds cost of equity is effected by account-based attributes and the most effectiveness is accrual quality.

2.2 Non-Economic Sustainability and Cost of Equity

Another dimension of business sustainability focuses on a relation of non-financial dimension and cost of equity which can separate into three pillars: environment, social and governance. This part separates into three parts of non-economic sustainability performances.

2.2.1 Environment and Cost of Equity

There are many studies the relationship between environment and cost of equity which those researches study the risks that link with cost of equity such as pollutions, lawsuit, chemical emission and also management improvement.

Spicer (1978) provides empirical evidence between financial indicators and pollution control which represents environment risk. Results show that firms with better

pollution control have higher price/earnings ratio, lower total risk, lower systematic risk, larger size, and higher profitability.

Garber and Hammitt (1998) study in “Superfund” which collect from industrial companies for past waste disposal practices effect on cost of capital both liability and equity sides. This Superfund is a sunk cost which increases cost of capital. In large chemical firms, cost of equity is increased from 0.010 -0.028%. This result shows that firms in some sectors which subjected to federal “Superfund” have a higher cost of equity to follow lawsuit.

Connors and Silva-Gao (2008) investigate effect of environment performance via chemical emission as environmental risk effects on cost of equity. Result shows that when the firm has higher chemical emission then firm also has higher cost of equity. This study also suggests environmental management of chemical emission effect cash flow risk component.

Sharfman and Fernando (2008) study the management which already improved environmental risk is associated lowering cost of equity by lowering volatility of firm’s stock price measured on beta.

2.2.2 Social and Cost of Equity

Most of social and cost of equity study in many dimensions of corporate social responsibility (CSR) such as social disclosure, CSR activities disclosure and result from investment in CSR.

Richardson and Welker (2001) evaluate the connection of financial, social exposure and cost of equity then find that financial exposure is negatively associated to cost of equity. The relationship between social disclosures and cost of equity is positive related. This study also notes that social disclosure is a benefit to organizational stakeholders than equity investors.

Mackey, Mackey, and Barney (2007) provide the theoretical model of social response investment opportunity determine. The theory shows social response activities do not generate net present value of future cash flow of firm to max but the market value of firm is maximized.

Dhaliwal, Li, Tsang, and Yang (2011) find the potential benefit of corporate social responsibility (CSR) activities exposure can decrease cost of equity from empirical study and also improve in the coverage of analyst in recent years.

El Ghoul, Guedhami, Kwok, and Mishra (2011) study in CSR and cost of capital relationship by using US firm information. This study finds the better CSR can lower cost of equity. This study also suggests firms by invest in improvement responsible for the relation of employees, environmental policies and product strategies. This research shows the importance of CSR can generate the stakeholders benefit to firm risk-reducing.

2.2.3 Governance and Cost of Equity

The prior researches between corporate governance and cost of equity are studied in many fields such as board independence, shareholder right, and corporate governance level.

Ashbaugh, Collins, and LaFond (2004) study in corporate governance attribution effect on cost of equity. The result shows board independence has a negative relation to cost of equity by reducing adverse selection and moral hazard problems.

C. S. A. Cheng, Collins, and Huang (2006) find firms with strong financial disclosure and strong shareholder rights regimes can reduce cost of equity by using cost of equity estimated from expectation earning growth valuation.

Chen, Chen, and Wei (2009) study the effect of firm-level corporate governance on cost of equity in emerging market and find that firm-level corporate governance is significantly negative on cost of equity.

The reasons that cause firms with good economic sustainability and ESG performances appear to have a low cost of equity are identified for some reasons. First, both sustainability performance can make better interaction and communication to all firm's stakeholders (Bénabou & Tirole, 2010; B. Cheng, Ioannou, & Serafeim, 2014; Eccles, Ioannou, & Serafeim, 2014). Second, shareholders shall consider ESG risk to achieve maximization of wealth (Staub-Bisang, 2012). Third, ESG sustainability performance possible to generate a firm's opportunities via identification of firm's strategies, operation, popularity, obeying, also financial risks which can affect to firm value and future performances (Kiron, Kruschwitz, Haanaes, Reeves, & Goh, 2013).

Forth, higher sustainability performance firms quite disclose their ECON and ESG sustainability activities to markets. Firms think those activities are a long-term commitment to sustainability (Borghesi, Houston, & Naranjo, 2014; Crifo, Forget, & Teyssier, 2015; Dhaliwal et al., 2011) and represent their firms to differentiate other firms with poorer sustainability (Bénabou & Tirole, 2010; B. Cheng et al., 2014; Spence, 1978). The last reason is non-financial sustainability performance is important as financial sustainability because ESG is new opportunities and risks in evaluating portfolio investment valuation.

CHAPTER III
THE RELATED THEORIES AND HYPOTHESIS DEVELOPMENT

3.1 The Related Theories

The sustainability concept is firm shall move their focuses in maximizing short term shareholder profit to consider the benefits of all stakeholders include environment, society, and community (Freeman, 1984). Eldar (2017) discusses several theories to explain in economic function and value creation: first theory is shareholder theory and second is stakeholder theory. The main ideas for business sustainability performance with both theories are maximizing positive benefits and minimizing negative effects of activities on sustainability.

Shareholder theory focuses on maximize shareholder wealth by management shall create the value of a firm and invest in projects that net present value is positive (Shleifer & Vishny, 1997).

Stakeholder theory focuses on all stakeholder interests which concern with business shall be treated fair and equally. Stakeholders are business owners, stockholders, management, supplier, customer, and other peoples who link to the business. The stakeholder theory in sustainability performance and activities can increase firm value by fulfilling firms in environment obligation, social response, and better reputation.

From the two theories above Jensen (2001) provides a theory that is educated in maximized stakeholder value shows one criterion of decision making is a long-run value of firm maximizing that needs to trade-offs with stakeholder benefits. Jensen (2001) also discusses propose of management's role which defined in shareholder theory: management shall create shareholder value but in stakeholder theory purpose role to balance conflict interests for stakeholders is not clearly defined.

Asymmetric information theory explains problems that management has more information than other stakeholders. This asymmetric of information leads to

moral hazard problems and adverse selection problems. The reduction of asymmetric helps to reduce information risk and increase a good relationship between the firm and investors.

Other concerns theories in sustainability in business are legitimacy theory and signaling or disclosure theory. The signaling/disclosure theory explains management incentives to achieve both business sustainability performances and investors react to disclosure of information (Grinblatt & Hwang, 1989). The legitimacy theory invites firms which confront social and political pressures to follow lawsuit and connect to social via ESG activities (Guthrie & Parker, 1989).

3.2 Hypothesis Development

According to sustainability performance is consists of two dimensions which are economic sustainability and non-economic sustainability, this research studies the relationship of both performances on cost of equity and the interaction between ECON and ESG. The hypothesis of this study consist of both sustainability performances.

The first hypothesis studies a relationship between economic sustainability performance and cost of equity. The economic sustainability performance is measured in many financial dimensions which considers as firm growth opportunity, operation effort, equity performance. The economic sustainability performances determine in short and long term performance of firms. This study uses some financial variables which are shown in session 4.1. According to prior empirical research in financial factors impact on cost of equity of Bhattacharya et al. (2003); Botosan (1997); Botosan and Plumlee (2002); Francis et al. (2004), this study can create the hypothesis between economic sustainability performance and cost of equity.

Hypothesis 1: There is a significant relationship between cost of equity and economic sustainability performance (ECON).

The second hypothesis studies a relationship between non-economic sustainability performance and cost of equity. According to non-economic sustainability consist of environment, social and governance, hypothesis will test by individual dimensions and also combined ESG performance. This study creates the hypothesis by

follows the prior research of Connors and Silva-Gao (2008); Garber and Hammitt (1998); Sharfman and Fernando (2008); Spicer (1978) that study in environment effects on cost of equity, Dhaliwal et al. (2011); El Ghoul et al. (2011); Richardson and Welker (2001) in social effects on cost of equity and Ashbaugh et al. (2004); Chen et al. (2009); C. S. A. Cheng et al. (2006) in governance effects on cost of equity.

Hypothesis 2: There is a significant relationship between cost of equity and non-economic sustainability performance (ESG).

The third hypothesis studies a relationship between economic sustainability performance and non-economic sustainability performance effect to cost of equity. This hypothesis separate into sub hypothesis follow each dimension of ESG. This hypothesis is created follow prior studies of Clarkson, Li, Richardson, and Vasvari (2011); De and Clayman (2010); Gompers, Ishii, and Metrick (2003); Jain, Jain, and Rezaee (2013) which study in ESG performances effect to different financial performances.

Hypothesis 3: There is a significant relationship between cost of equity and economic sustainability performance is effect by non-economic sustainability performance.

CHAPTER IV
DATA AND SAMPLE SELECTION

This part consists of five parts which are a data source, economic sustainability performance (ECON), cost of equity capital, non-economic sustainability performance (ESG factors) and control factors. Independent variables are economic sustainability and non-economic sustainability. The dependent variable is cost of equity capital.

4.1 Data source

This study uses main data source from Thomson Reuter EIKON and Thomson Reuter Datastream. This database can provide historical financial data, accounting data and also ESG score data. Thomson Reuter data source is a well-known data source in finance and globally used by many analysts. Japan is selected to study because Japan is the one country of leading non-economic sustainability or ESG in Asia by a number of ESG data in Japan is larger than other countries in Asia. Numbers of Japan firms with ESG data is available up to 460 firms and for Asia exclude Japan is over than 700 firms thus in term of data that this study can obtain Japan firms from Thomson Reuter is larger than other countries in Asia. There are many stock markets in Japan such as Tokyo, Fukuoka, Osaka stock market etc. This research is focusing on Tokyo Stock Exchange because it is the largest stock exchange in Japan. This study can be a motivation for Thailand's companies for further investing and caring about business sustainability.

This study is empirical study and the data are used as panel data regression which cross-sectional between firm (i) and fiscal year (t). By using panel data regression, this research retrieves correlation coefficient of each independent variable and control variables with dependent variable.

The selected data begin from 2001 until 2018 in the fiscal year-end period to match with ESG information from Thomson Reuter EIKON is available from fiscal year (FY) 2002 to FY2018. This study uses data in yearly to match with ESG data from Thomson Reuter which available in a year period. For some financial variables such as Accrual Quality and sale growth volatility which required to use more data to calculate, this study extends to retrieve data from FY1990 to FY2018. This study selects to retrieve data for all firms in Tokyo Stock Exchange market and then remove data which are incomplete data and missing data out of this study.

4.2 Variables

4.2.1 Independent Variables

For independent variables, this study can separate into two groups; the first group is economic sustainability performance or also called ECON and the second group is non-economic sustainability performance or ESG. All variables and descriptions are shown with all details in table 4.1.

4.2.1.1 Economic sustainability performance (ECON)

Prior study of KPMG institution KPMG (2013), Economic sustainability performance or ECON is measured in many dimensions for short term and long term profitability. ECON can consists of 8 variables: (1) Tobin'Q ratio ($TobinQ_{it}$) (2) Average return on equity for current year (ROE_{it}) (3) Firm revenue to total asset in a current year ($Sale_{it}$) (4) Sale growth from previous year and current year to total asset ($SaleGr_{it}$) (5) Market to book value of equity ($MVBV_{it}$) (6) Research and development expense in current year to total asset (RD_{it}) (7) Advertisement expense in a year to total asset (AD_{it}) and (8) A dummy variable that represent omission of dividend paid in current year ($DIVIDOM_{it}$). This study added one more variable to measure ECON which is the volatility of sale growth ($SaleGR\_SD_{it}$). This volatility of sale growth can represent a profitability risk of firms.

The first ECON variable is Tobin's Q ratio ($TobinQ_{it}$). Tobin's Q is a variable that measures the growth of firms. There are many variations of Tobin's Q ratio calculation methods and this study follows a simple calculation of Chung and

Pruitt (1994). Tobin's Q ratio is calculated from market value of firm asset or enterprise value divide by book value of firm total asset. The market value of firm or enterprise value of firms can be two proxies. The first proxy, we follow Thompson Reuter's enterprise value calculation which is calculated by market capitalization of year t plus book value of total liability at year t and minus cash or cash equivalent at year t.

$$Tobin's\ Q_{it} = \frac{(Market\ Cap_{it} + Total\ Liability_{it} - Cash\ or\ equivalent_{it})}{Total\ Asset_{it}}$$

Second proxy we follow Chung and Pruitt (1994) can be calculated by market capitalization or market value of equity at the end of fiscal year t plus market value of total liability at the end of fiscal year t plus preferred stock liquidity of firm i at fiscal year t then divide them by total asset of firm i at end of fiscal year t as following equation. We assume market value of total liability is generally same as book value of total liability and preferred stock liquidity is a small number which can be neglect because it does not affect Tobin's Q ratio.

$$Tobin's\ Q_{it} = \frac{(Market\ Cap_{it} + Preferred\ stock\ liquidity_{it} + Total\ Liability_{it})}{Total\ Asset_{it}}$$

From two proxies of enterprise value, the result of both methods of Tobin's Q calculation in our study is similar to each other in term of statistic thus we select to use only second calculation methodology for further studies. Unit of this ratio is times.

The second variable is Return on Equity on year t (ROE_{it}). We use ROE in year t which retrieve Thomson Reuter database. Thomson Reuter calculates ROE_{it} by dividing a company's net income in year t by total equity of common shares in a year t. Unit of ROE is percentage.

$$ROE_{it} = \frac{Net\ income_{it}}{Total\ Equity\ of\ common\ share_{it}}$$

The third variable is sale ($Sale_{it}$) or firm's revenue in year t and divided by total booked value of firm asset in year t. This study assumes that total revenue is same as revenue from goods and services. Total sale or total revenue of firm represent operation efficiency for each firm that firm can produce and maintain their income for long run. Unit of this ratio is times.

$$Sale_{it} = \frac{Total\ Revenue_{it}}{Book\ value\ of\ Total\ Asset_{it}}$$

Forth variable is sale growth ($SaleGR_{it}$). Sale growth is calculated by difference between $Sale_{it}$ ($revenue_{it}$) in fiscal year t and t-1 divided by book value of total asset at fiscal year t. Sale growth represents operation opportunity of firms in the long run. Unit of this ratio is times.

$$SaleGR_{it} = \frac{(Revenue_{it} - Revenue_{it-1})}{Book\ value\ of\ Total\ Asset_{it}}$$

Fifth variable is market to book value of equity ($MVBV_{it}$). This market to book value of equity measures growth of firms. Market to book value of equity is calculated by market capitalization at the end of fiscal year t divided by total booked value of equity at the end of fiscal year t. Market to book value of equity represents growth of firm in a year period. Unit of this ratio is times.

$$MVBV_{it} = \frac{Market\ capitalization_{it}}{Total\ booked\ value\ of\ equity_{it}}$$

Sixth variable is research and development expenses (RD_{it}). This R&D expenses that occur in year t of firm i then divided by total asset of firm i at year t. R&D expenses measure for long term investment of firm which firm expects to make more income in the future. Unit of this ratio is times.

$$RD_{it} = \frac{R\&D\ expense_{it}}{Book\ value\ of\ Total\ Asset_{it}}$$

Seventh variable is advertisement expenses (AD_{it}). Advertisement expense is using for making brand to be well-known and adding value to the firm for long run. We calculate AD_{it} by using advertisement expense of firm i in year t divided by total asset of firms. Unit of this ratio is times.

$$AD_{it} = \frac{Advertisement\ expense_{it}}{Book\ value\ of\ Total\ Asset_{it}}$$

Eight variable is a dummy variable of the omission of dividend. A dummy variable is given as one in the year that firm does not pay dividend to shareholder. Otherwise, it will be zero. Firm can maintain profitability and investing in long run when firm has enough money to pay dividend. Finally, this study adds volatility of sale growth or risk in sale growth ($SaleGR\_SD_{it}$) in robustness test. This volatility of sale growth represents profitability risk of firm. If firm can maintain a

stability of their sale growth, firm could be sustained. We measure this risk by calculating standard deviation of sale growth from year t to t-4.

$$SaleGR\_SD_{it} = \sqrt{\frac{\sum_{t=-4}^{0} (SaleGr_{it} - Average\ SaleGr_{it-4\ to\ it})^2}{(n-1)}}$$

After retrieved all above information, this study follows Ng and Rezaee (2015) that using eight variables from KPMG from above variables (KPMG, 2013) then minimizes those variables into a small number of factors by using Principal Component Analysis or (PCA) methodology which refers a study in organization performance (Hamann, Schiemann, Bellora, & Guenther, 2013). These factors can be easier to interpretation as business performances and also reduce multicollinearity problems between each variable. From factor analysis of eight variables exclude sale growth volatility, this study can group those variables into three factors when factor loading is more than 0.5 and Eigen value is more than 1. The results of PCA are in appendix C. The reason to obtain factors that has factor loading more than 0.5 is factor loading represents a correlation of each factor thus higher factor loading can be a higher correlation. This study finds out which factors are highly correlated and separate them into groups then use a factor analysis for individual group of variables again and store estimation result as economic factors.

The first factor is a combination between Tobin's Q ratio ($TobinQ_{it}$) and market to booked value of equity ($MVBV_{it}$). We use the first factor as growth opportunity (GR_{it}). This growth opportunity factor could explain growth of firms in the long term. The second factor is created by sale ($Sale_{it}$) and advertisement (AD_{it}). This factor represents operation efficiency (OP_{it}). The dummy variable of omission of dividend is negative relation in factor analysis thus this dummy variable need invert to match direction of the factor analysis. This dummy is changed to $Dividom\_r_{it}$. The last factor is created by ROE_{it} ratio and dummy variable of dividend paid ($Dividom\_r_{it}$). This last factor represents as equity factor (EQ_{it}). After this study obtains all factors from factor analysis, we can create a proxy for economic sustainability factor ($ECON_{it}$) by average of those three factors.

This study selects some variables as a representation of economic sustainability which mainly relate to cost of equity then use them in robustness test. The selected variables are ROE_{it}, $Sale_{it}$, $SaleGr_{it}$, $SaleGR\_SD_{it}$, RD_{it}, AD_{it} and $dividom_{it}$.

4.2.1.2 Non-Economic Sustainability

Non-economic sustainability performance measures on firm in environment, social responsibility, and governance. This study uses ESG score from Thomson Reuter EIKON database. These scores are consisting of three factors which are Environment, Social and Governance factors in ten topics (emission, environment product innovation, human right, etc.). The ESG measures are collected and calculated from over 400 company-level ESG measures then Reuter selected a critical subset of 178 ESG measures for most relevant and comparable data points refer to figure number 4.2. We obtain ESG scores of each firm into a term of percentage score from 0 to 100. Thomson Reuter ESG scores are mainly based on company public report data and some of global media (EIKON, 2018). The Thomson Reuter ESG data in Japan is available up to 430 firms in which a number of firms is nearly half of other Asia countries to show in figure number 4.1.

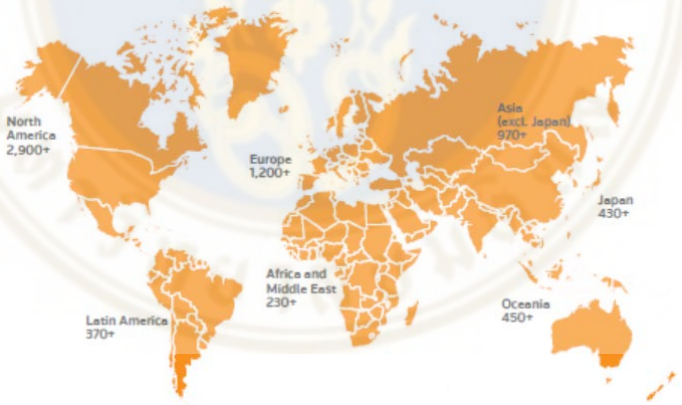

Figure 4.1 shows figures of Coverage of ESG data available in the world
(Source: EIKON (2018))

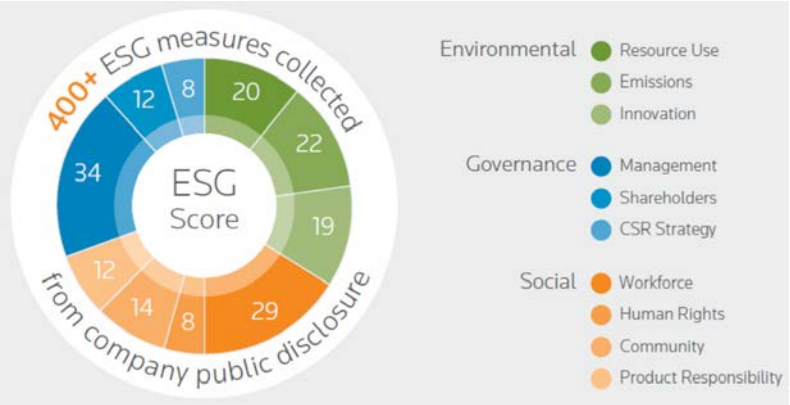

Figure 4.2 shows Thomson Reuter EIKON number of measures items in 10 ESG category

(Source: EIKON (2018))

Thomson Reuter ESG score process begins with the company public report evaluation to ESG controversies. Thomson Reuter evaluates the company public report to ESG data into 400 measures by over 150 research analysis who trained to collect ESG data. This evaluation shows disclosure in ESG information of each firm. Thomson Reuter selects 178 from 400 measures that have a relevant and comparable data points. The 178 data points can combine into ten categories for each category in ESG refer to category weight. Thomson Reuter evaluates ESG data again with 23 measures of controversies from global media sources during a period of a year. At the end of a year, Thomson Reuter combines ESG score from company public report and controversy item to create combine score as figure number 4.3.

The Thomson Reuter environment score is constructed by three categories; resource use, emission, and innovation which weighted by numbers of indicators in each category. Thomson Reuter social score is constructed by three categories; workforce, human rights, community, and product responsibility. Last Thomson Reuter governance score is constructed by management, shareholder and CSR strategy. All score are weighted by numbers of indicators in each category. Last Thomson Reuter ESG score is calculated by environment, social and governance score. Thomson Reuter ESG score is slightly weighted in social than other pillars as shown in figure number 4.4.

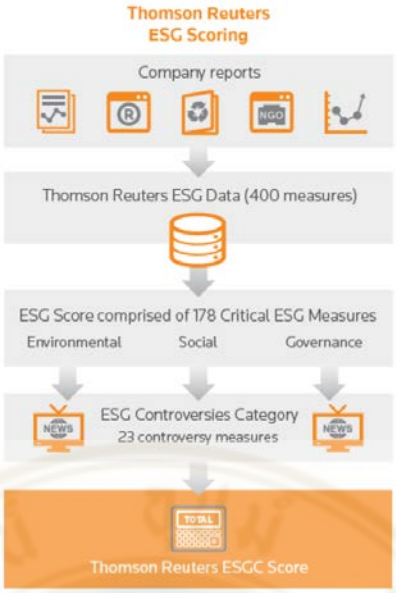

Figure 4.3 shows Process of Thomson Reuter ESG scoring

(Source: EIKON (2018))

Pillar	Category	Indicators in Rating	Weights	Pillar Weights
Environmental	Resource Use	19	11%	
	Emissions	22	12%	(11%+12%+11%)
	Innovation	20	11%	
Social	Workforce	29	16%	
	Human Rights	8	4.50%	(16%+4.5%+8%+7%)
	Community	14	8%	
	Product Responsibility	12	7%	
Governance	Management	34	19%	
	Shareholders	12	7%	(19%+7%+4.5%)
	CSR Strategy	8	4.50%	
TOTAL		178	100%	

Figure 4.4 shows Weight of each pillar and category of ESG factor

(Source: EIKON (2018))

Thomson Reuter ESG scores scale as a percentage. We can interpret that higher ESG score of firms has a better in ESG performance and better disclosure. Thomson Reuter identifies ranging of ESG score and ESG grades as figure number 4.5. This scoring range shows that firm that obtained a higher score is stronger in ESG.

Score Range	Grade
0.0 <= score <= 0.083333	D -
0.083333 < score <= 0.166666	D
0.166666 < score <= 0.250000	D +
0.250000 < score <= 0.333333	C -
0.333333 < score <= 0.416666	C
0.416666 < score <= 0.500000	C +
0.500000 < score <= 0.583333	B -
0.583333 < score <= 0.666666	B
0.666666 < score <= 0.750000	B +
0.750000 < score <= 0.833333	A -
0.833333 < score <= 0.916666	A
0.916666 < score <= 1	A +

Figure 4.5 show Score range and grading of ESG data
(Source: EIKON (2018))

4.2.2 Cost of Equity Capital

For cost of equity, this study uses four proxies cost of equity capital which refer to Capital Asset Pricing Model, finite horizontal expected return model which created by Gordon (Gordon & Gordon, 1997), a variation of the price multiple the industry-adjusted earnings-price ratio ($IndEP_{it-1}$) follow Francis, LaFond, Olsson, and Schipper (2005); Liu, Nissim, and Thomas (2002) and also added market beta or market risk into this study follows a study of disclosure with cost of equity (Botosan, 1997). All these proxies cost of equity are scaled in terms of number, not percentage.

4.2.2.1 Capital Asset Pricing Model ($CAPM_{it}$)

From Capital Asset Pricing Model (Sharpe, 1964), this study uses expected return on capital as one of cost of equity. This study calculates cost of equity by using three components of risk-free interest rate, market beta, and market risk premium. First, Japanese risk-free interest rate is occurred by zero coupon Japanese government bond yield curve and time to maturity at 10 years. This zero bond yield curve can occur at the end of years from Thomson Reuter EIKON and statistic is shown in descriptive statistic table 4.2. The systematic risk or Beta can occur from Thomson Reuter Datastream for each firms and year. Last, market risk premium or MRP for Japan market is occurred by following Damodaran risk premium (Damodaran, 2019) which depends on credit rating of each country and year. After we get all those variables to calculate cost of equity by using following formula.

$$E(R_{it}) = Rf_t + \beta_{it}(E(R_{mt}) - Rf_t)$$

Where $E(R_{it})$ is expected return on capital asset *i* at year *t* or implied cost of equity

Rf_t is risk-free interest rate at year *t*

β_i is beta of firm *i* at year *t*

$(E(R_{mt})- Rf_t)$ is market risk premium at year *t*

4.2.2.2 Market Beta or Market Risk (BE_{it})

From Capital Asset Pricing Model, this study uses market beta as a proxy cost of equity when risk-free and market risk is not taken into study. Market beta uses in a prior study of Botosan (1997) which studies between disclosure and cost of equity. This research obtains market beta from Thomson Reuter Datastream which can provide historical beta in firm i and fiscal year t. Thomson Reuter uses lead-lag regression with a monthly price and 60 months on time rolling to create market beta. Beta is plotted by using natural logarithm and base on market price index of firm's stock market.

4.2.2.3 Gordon ($Gordon_{it}$)

The implied cost of equity from Gordon (Gordon & Gordon, 1997) occurs from the expected return on a share from the finite horizon expected return model. The implied cost of equity is the internal rate of return which derive from the Gordon finite horizon expected return model. The Gordon finite horizon expected return model is based on forecasts of abnormal performance has a finite horizon and the expected return on a share is a discount rate. The expectation of earning per share and price per share are adjusted dilution effect by a number of shares is changed between years.

From base formula is

$$PPS = \sum_{t=1}^{\infty} \frac{Div\ (t)}{(1 + EXR)^t}$$

Where *PPS* is price per share of firm i

DIV (t) is dividend of firm i at period t

EXR is expected return of firm i

Assumption: 1. Dividend expectation may represent the first period of value

2. Growth is constant for all future periods.

From several assumptions, Gordon derives the above formula into the formula below.

$$P_{it} = \frac{E_t\,(EPS_{it+1})}{Gordon_{it}}$$

Where P_{it} is stock price per share at the end of year t

$E_t\,(EPS_{it+1})$ is expected earnings per share of year t+1

$Gordon_{it}$ is implied cost of equity at year t

The expected earnings per share for next year, this research obtains from I/B/E/S database and uses calculated median value from analyst forecasts. This research calculates an implied cost of equity by solving the equation above.

From descriptive statistic table number 4.2, a minimum value of implied cost of equity from Gordon is a negative. The expectation of EPS in t+1 period can be negative value which is possible occurred in some year that firm cannot make any profit or firm is in a financial crisis.

4.2.2.4 Industrial-Adjusted Earning-Price Ratio (*IndEP*$_{it}$)

Industrial-adjusted earning-price ratio (*IndEP*$_{it}$) is one of implied cost of equity that refers to study in price multiple as shorthand valuation (Dechow & Dichev, 2002; Francis et al., 2005; Francis et al., 2004; Liu et al., 2002). This study uses an industrial-adjusted earning-price ratio, first, we calculate the earning-price ratio (*EP*$_{it}$) by using earning per share at year t and price per share at year t. Industrial groups follow Fama-French 49 industrial groups which refer to a study of Fama and French (1997) and finds the median of EP in each sector and year. After we get a median of EP, we calculate the industry-adjusted EP ratio (*IndEP*$_{it}$) by finding a different between the EP ratio of a firm at year t and a median EP ratio of a firm's industrial group at year t. EPS and Price per share are adjusted by dilution effects to avoid the effect of changing a number of shares over the study period.

$$IndEP_{it} = \frac{EPS_{it}}{Price\ per\ share_{it}} - Median\ of\ EP\ ratio_{Sector,t}$$

This study uses two proxies for industrial earning to price ratios which are different by EPS that use in the calculation. First is EPS which exclude extraordinary item and second is EPS include an extraordinary item. Both EPS are already adjusted dilution effect. This study uses $IndEP\_EXD_{it}$ by EPS is excluding extraordinary item and $IndEP\_IND_{it}$ by EPS is including extraordinary items. This study also calculates two proxies more at the beginning of this study which are industrial adjusted earning price ratio without extraordinary item and dilution effect ($IndEP\_EXND_{it}$) and industrial adjusted earning price ratio included extraordinary item and exclude dilution effect ($IndEP\_INND_{it}$). Descriptive statistic results of $IndEP\_EXND_{it}$ and $IndEP\_INND_{it}$ show higher volatility and range in both variables compare with $IndEP\_EXD_{it}$ and $IndEP\_IND_{it}$. From these results those two proxies are dropped out of the study to avoid the inconsistency on the dependent variable.

The value of IndEP can be negative which effect from the calculation of industrial adjusted earning to price ratio in case the EP of a firm is nearly zero and industrial median of EP is a positive value and has value more than EP of a firm.

4.2.3 Controlled Variables

This study uses control variables to control the effect on cost of equity capital by following Ng and Rezaee (2015). Control variables consist of nine variables which are dummy of litigation risk, liquidity, leverage, size, bankruptcy risk or Altman Z-score, market beta, dummy variable of loss, total accrual and accrual quality.

Dummy variable of litigation (*LITI*) represents litigation risk of firms in some sectors which refer to Francis, Philbrick, and Schipper (1994); Matsumoto (2002). Some firms have high litigation risk which refers to Standard Industrial Code (SIC) code or standard business code of firm. Dummy variable equal to ‘1’ when a firm is in high litigation which has SIC code in 2833-2836, 3570-3577, 3600-3674, 5200-5961 and 7370. And others SIC code dummy will be zero.

We measure liquidity variable (LIQ_{it}) by using accumulate traded common share or volume during fiscal year divided by a number of common shares at the end of fiscal year. A number of share is using number that adjusted dilution effects. This variable controls the effects of liquidity of traded share during fiscal year t.

$$LIQ_{it} = \frac{Accumulate\ Traded\ common\ share_{it}}{No\ of\ common\ share_{it}}$$

The leverage variable (LEV_{it}) is measured by total liability at the end of fiscal year t divide by total assets at the end of fiscal year t. Leverage variable is used to control different of debt portion in each firm.

$$LEV_{it} = \frac{Total\ liability_{it}}{Total\ Asset_{it}}$$

Size of firm variable ($Size_{it}$) is calculated by taking natural logarithm of market value of equity at the end of fiscal year. We control effect from size of firms by using market capitalization then take natural logarithm to reduce number during regress all models.

$$Size_{it} = ln(Market\ value\ of\ equity_{it})$$

The bankruptcy risk variable is measured by following Altman's Z score (Altman, 2000). This Altman's z-score represents bankruptcy risk of firms because some firms have higher bankruptcy risk according to its sector. The lower Altman Z-score indicates the firm with higher bankruptcy risk. This study calculates Altman Z-score by using the following formula. This Altman Z-score unit shows as number.

$$Z_{it} = (0.012\,X_1 + 0.014\,X_2 + 0.033\,X_3 + 0.006\,X_4 + 0.999X_5)_{it}$$

Where Z_{it} is Altman's Z-score of firm i at year t

X_1 is working capital/ total assets of firm i at year t

X_2 is retain earning/ total assets of firm i at year t

X_3 is earning before interest and taxes/ total assets of firm i at year t

X_4 is market value equity/ book value of total liability of firm i at year t

X_5 is sales/ total assets of firm i at year t

Market beta (BE_{it}) is added for two proxies of cost of equity which are Gordon and IndEP because market beta uses as systematic risk. This market beta uses the same value as one of the proxy of cost of equity but uses as lagged term.

Dummy variable of loss ($DLOSS_{it}$) represents profitability of firm i at the end of fiscal year t. This dummy is '1' when the net income of firm is less than zero and other is '0'.

Accrual quality and total accrual are added from prior studies (Francis et al., 2005; Francis et al., 2004) find that the effect of accrual basis in the account has related to both implied cost of equity or industrial adjusted EP ratio and cost of debt. The study believes that uncertainty in accrual to capture accrual quality (AQ_{it}). The accruals quality is developed by Dichow and Dichev (Dechow & Dichev, 2002) model. This DD model measures AQ_{it} by working capital accrual map into operating cash flow realization. The AQ_{it} is affected by measurement error in accruals. This accrual quality is using as a proxy of information risk thus we add accrual quality (AQ_{it}) and total accrual (Acc_Total_{it}) variable which associate with earning.

Total accrual (Acc_Total_{it}) is measured in abnormal accrual which include both current accruals from DD model and non-current accrual. Total accrual is calculated by difference between net income and operating cash flow in fiscal year t and scaled by the average total asset of year t and t-1. Total accrual represents an unexplained portion in working capital accrual. Total accrual is derived from following equation.

$$Operating\ Cash\ flow_{it} = Net\ income\ before\ extraordinary\ items_{it} - Total\ Accrual_{it}$$

Then after solving the equation, this study uses the following equation.

$$Acc\_Total_{it} = \frac{Net\ income_{it} - Operating\ Cash\ flow_{it}}{Average\ total\ asset_{it}\ between\ t\ and\ t-1}$$

Accrual Quality (AQ_{it}) is abnormal that cannot explain by a limited set of fundamentals (PPE and change in revenue) from the modified Jones model (Jones, 1991). We construct AQ_{it} by running panel regression with random effect adjustment. The panel regression is separated into a group that follows Fama-French 49 sectors (Fama & French, 1997). After panel regression is done, we can collect a residual or estimate the error in each running. This residual (υ_{it}) is a difference between total accrual basis and cash basis which can represent of fraud risk in firm i. After we get all residual (υ_{it}) of firm i in year t then to represent an accrual risk or accrual quality (AQ_{it}) in year t by calculating standard deviation from residual year t-4 through year t or 5 years period. The larger standard deviation of residuals indicates that poorer accrual quality.

$$Acc\_Total_{it} = \alpha + \beta_1 OCF_{it-1} + \beta_2 OCF_{it} + \beta_3 OCF_{it+1} + \beta_4 \Delta Rev_{it} + \beta_5 PPE_{it} + \upsilon_{it}$$

Where Acc_Total_{it} is total accrual of firm i at the end of fiscal year t

OCF_{it-1} is operating cash flow of firm i and fiscal year t-1 scale by total asset of firm i and fiscal year t-1

OCF_{it} is operating cash flow of firm i and fiscal year t scale by total asset of firm i and fiscal year t

OCF_{it+1} is operating cash flow of firm i and fiscal year t+1 scale by total asset of firm i and fiscal year t+1

ΔRev_{it} is a change between revenue between fiscal year t and t-1 scale by total asset of firm i and year t

PPE_{it} is plant property and equipment of firm i and year t

υ_{it} is residual of firm i at fiscal year t

After collected all residuals from panel regression then to calculate accrual quality, we need to find the standard deviation of residual from year t-4 to t or 5 years period. This SD of residuals represents information risk in accrual.

$$AQ_{it} = \sqrt{\frac{(\sum_{t-4}^{t} \nu_{it})^2}{(n-1)}}$$

Where AQ_{it} is Accrual Quality of firm i at yeat t

υ_{it} is residual of firm i at fiscal year t

n is number of year period or 5 years

In the robustness test, this study includes one more control variable in this study which is market to book value to control the growth of firms and removes some of control variables out which may not relate to cost of equity. Thus this robustness test has liquidity, leverage, size, Altman's Z-score, market beta, market to book value, total accrual and accrual quality as control variables.

Market to book value of equity ($MVBV_{it}$) is measured as growth of firms. Market to book value of equity is calculated by market capitalization of firm i at the end of fiscal year t divided by total booked value of equity of firm i at the end of fiscal year t. Market to book value of equity represents growth of firm in a year.

$$MVBV_{it} = \frac{Market\ capitalization_{it}}{Total\ booked\ value\ of\ equity_{it}}$$

4.3 Descriptive Statistics and Correlation

4.3.1 Descriptive Statistic

Data that retrieve from Thomson Reuter in Tokyo Stock Exchange market show that total number of firms in Tokyo Stock Exchange market is 3,729 firms in appendix A. The ESG information in Thomson Reuter is available over than 430 firms in Japan and after we sort and filter missing data and incomplete data out, we get number of company is 147 firms with observation 1,021 firm-year refer to appendix A. This observation of 1,021 firm-year is based on same year of data without lead-lag term. The descriptive statistic for all variables is shown in table 4.2 and 4.3.

Table 4.2 describes data in the same year period and a number of observation is 1,021 firm-year. A number of firms from table 4.2 is 147 firms that are separated into Fama French 49 business sector see appendix A. The implied cost of equity is possible negative value depends on its calculation.

Table 4.3 describes a number of observation with a lagged term of independent variables. The number of observation (*N*) of a lag term is reduced to 861 firm-year for most of variables. The number observation of lagged AQ_{t-1} is 805 firm-year which less than other variables for further panel regression number of AQ_{t-1} is a limited number of observation in this study.

4.3.2 Correlation

The correlation between independent, dependent and control variables is in appendix B which consists of three tables. First, table B1 shows a correlation between ECON factors that occur for principal factor analysis and eight ECON variables. Second, table B2 shows a correlation between all variables in the same year period. Third table B3 shows a correlation between all variables with a lead-lag period which implied cost of equity in year t period is dependent variable and independent variables are lagged.

Table 4.1. Variables and Description

The symbol of variables and factors which separate into cost of equity, independent variables, sustainability performance factors, control variables and other variables with its description	
Variables	**Description**
Implied cost of equity	
$IndEP\_EXD_{it}$	Industrial Earning price ratio exclude extraordinary item with dilution adjustment.
$IndEP\_IND_{it}$	Industrial Earning price ratio include extraordinary item with dilution adjustment.
$IndEP\_EXND_{it}$	Industrial Earning price ratio exclude extraordinary item without dilution adjustment.
$IndEP\_INND_{it}$	Industrial Earning price ratio include extraordinary item without dilution adjustment.
$Gordon_{it}$	Implied cost of equity by Gordon finite horizon expected return model
$CAPM_{it}$	Expected return from Capital Asset Pricing Model
BE_{it}	Market beta
Independent variable or economic sustainability variable	
$TobinQ\_ED_{it}$	Tobin's Q ratio
ROE_{it}	Return on Equity
$Sale_{it}$	Revenue of firm scale by total asset
$SaleGr_{it}$	Revenue growth of firm scale by total asset
$SaleGR\_SD_{it}$	Volatility of revenue growth of firm
$MVBV_{it}$	Market to book value of equity
RD_{it}	R&D expense scale by total asset
AD_{it}	Advertisement expense scale by total asset
$Dividom_{it}$	Dummy variable of dividend
$Dividom\_r_{it}$	Reverse of dummy variable of dividend
Sustainability performance factors	
GR_{it}	Growth opportunity factor
OP_{it}	Operation efficiency factor
EQ_{it}	Equity factor
$ECON_{it}$	Economic sustainability factor or ECON
Env_{it}	Environment factor
Soc_{it}	Social factor
Gov_{it}	Governance factor
ESG_{it}	Non-economic sustainability factor or ESG factor
Control variables	
$LITI$	Dummy of litigation
LIQ_{it}	Liquidity measure
LEV_{it}	Leverage
$Size_{it}$	Natural logarithm of market value of equity
$ALTMAN_{it}$	Probability of bankruptcy by Altman Z-score
$DLOSS_{it}$	Dummy variable of loss
AQ_{it}	Accrual quality
Acc_Total_{it}	Scaled total accrual

Table 4.1. Variables and Description (Cont.)

The symbol of variables and factors which separate into cost of equity, independent variables, sustainability performance factors, control variables and other variables with its description	
Variables	**Description**
Other variables	
Rf_{it}	Risk-free rate of Japan market
MRP_{it}	Market Risk Premium of Japan market
Subprime	Dummy variable represent year 2008
Eurozone	Dummy variable represent year 2011 and 2012

Table 4.2. Descriptive statistic of full variables in the same year period

The descriptive statistic of sample all variables and factors include cost of equity, independent variable, economic sustainability performance factors, non-economic sustainability performance factors, control variables and other variables. This descriptive statistic of all variables are shown in current fiscal year period without lead-lag period. This data are all in fiscal year and from 2002 to 2018.

Variable	Obs.	Mean	Std. Dev.	Min	Q1	Median	Q3	Max	Skewness
Implied cost of equity									
$IndEP\_EXD_{it}$	1,021	-0.0156	0.0961	-1.8403	-0.0212	-0.0044	0.0103	0.2556	-11.0410
$IndEP\_IND_{it}$	1,021	-0.0163	0.0989	-1.8403	-0.0212	-0.0044	0.0102	0.2556	-10.5038
$IndEP\_EXND_{it}$	1,021	-0.0303	0.5170	-12.4791	-0.0246	-0.0043	0.0153	1.9694	-17.8569
$IndEP\_INND_{it}$	1,021	-0.0387	0.5630	-12.4791	-0.0250	-0.0043	0.0149	1.9694	-15.8586
$Gordon_{it}$	1,021	0.0653	0.0349	-0.0446	0.0425	0.0576	0.0788	0.3595	1.8604
$CAPM_{it}$	1,021	0.0654	0.0269	-0.0034	0.0454	0.0645	0.0819	0.1669	0.4408
BE_{it}	1,021	0.8957	0.4106	-0.0600	0.5900	0.8800	1.1600	2.3200	0.3578
Independent variables									
$TobinQ\_ED_{it}$	1,021	1.5998	0.9858	0.4960	1.0790	0.3578	1.7780	13.8226	5.4502
ROE_{it}	1,021	7.6959	14.7092	-267.7000	4.5000	8.4000	12.3000	174.6390	-6.6263
$Sale_{it}$	1,021	0.9187	0.3534	0.2065	0.6743	0.8797	1.1092	2.3996	0.7500
$SaleGr_{it}$	1,021	0.0215	0.1122	-0.7609	-0.0168	0.0270	0.0729	0.5807	-1.1338
$SaleGR\_SD_{it}$	1,021	0.0898	0.0777	0.0034	0.0384	0.0708	0.1123	0.7207	2.7402
$MVBV_{it}$	1,021	1.9776	1.4859	-7.4974	1.1099	1.6207	2.3450	17.5488	3.3974
RD_{it}	1,021	0.0357	0.0302	0.0000	0.0120	0.0293	0.0500	0.2006	1.2184
AD_{it}	1,021	0.0403	0.0482	0.0000	0.0085	0.0272	0.0526	0.4056	2.5046
$Dividom_{it}$	1,021	0.0225	0.1485	0.0000	0.0000	0.0000	0.0000	1.0000	6.4354
$Dividom\_r_{it}$	1,021	-0.0225	0.1485	-1.0000	0.0000	0.0000	0.0000	0.0000	-6.4354
Economic sustainability performance factor (ECON)									
GR_{it}	1,021	0.0000	1.0000	-3.2667	-0.5677	-0.2505	0.2312	11.7460	4.6139
OP_{it}	1,021	0.0000	1.0000	-1.6845	-0.6404	-0.2195	0.4160	5.3714	1.3935
EQ_{it}	1,021	0.0000	1.0000	-16.1522	-0.0505	0.1274	0.2879	7.3408	-6.8531
$ECON_{it}$	1,021	0.0000	0.5972	-4.8269	-0.3295	-0.0669	0.2562	4.1840	0.9834
Non-Economic sustainability performance factor (ESG)									
Env_{it}	1,021	62.3786	19.5883	11.5052	48.2620	65.5561	77.9154	97.4071	-0.4426
Soc_{it}	1,021	52.7445	21.9820	6.5258	37.0805	55.1565	70.8212	98.0885	-0.2204
Gov_{it}	1,021	56.3738	20.3467	7.8483	41.1405	59.1164	72.6624	96.3355	-0.2767

Table 4.2. Descriptive statistic of full variables in the same year period (Cont.)

The descriptive statistic of sample all variables and factors include cost of equity, independent variable, economic sustainability performance factors, non-economic sustainability performance factors, control variables and other variables. This descriptive statistic of all variables are shown in current fiscal year period without lead-lag period. This data are all in fiscal year and from 2002 to 2018.

Variable	Obs.	Mean	Std. Dev.	Min	Q1	Median	Q3	Max	Skewness
ESG_{it}	1,021	57.1270	16.4073	15.2717	45.6493	59.6606	69.3908	93.3107	-0.4197
Control variables									
LITI	1,021	0.2204	0.4147	0.0000	0.0000	0.0000	0.0000	1.0000	1.3492
LIQ_{it}	1,021	1.2632	1.1674	0.0151	0.7658	1.0632	1.4775	22.9329	9.0245
LEV_{it}	1,021	0.4594	0.1953	0.0547	0.3008	0.4578	0.6154	1.1295	0.1133
$Size_{it}$	1,021	27.3274	1.0230	24.1251	26.6037	27.2676	28.0149	30.8827	0.1846
$ALTMAN_t$	1,021	0.9337	0.3773	-0.0287	0.6841	0.9066	1.1288	2.4641	0.3831
$DLOSS_t$	1,021	0.0725	0.2594	0.0000	0.0000	0.0000	0.0000	1.0000	3.2978
AQ_t	936	0.0233	0.0193	0.0011	0.0119	0.0191	0.0290	0.2830	4.3394
Acc_Total_t	990	0.0019	0.0375	-0.6048	-0.0127	0.0035	0.0194	0.1483	-5.0126
Others variables									
Rf_t	25	0.0123	0.0085	-0.0002	0.0074	0.0132	0.0171	0.0328	0.4465
MRP_t	18	0.0630	0.0052	0.0540	0.0593	0.0614	0.0677	0.0736	0.4337

Table 4.3. Descriptive statistic of full variables in the lead-lag year period

The descriptive statistic of all variables and factors include cost of equity, independent variable, economic sustainability performance factors, non-economic sustainability performance factors, control variables and other variables. This descriptive statistic of all variables are shown in current fiscal year period with lead-lag period. The cost of equity are all in leading term in current fiscal year period. Other variables are in lagged term by using previous year t-1. This data are all in fiscal year and from 2002 to 2018.

Variable	Obs.	Mean	Std. Dev.	Min	Max	Q1	Median	Q3	Skewness
Implied cost of equity									
$IndEP\_EXD_{it}$	1,021	-0.0156	0.0961	-1.8403	0.2556	-0.0212	-0.0044	0.0103	-11.0410
$IndEP\_IND_{it}$	1,021	-0.0163	0.0989	-1.8403	0.2556	-0.0212	-0.0044	0.0102	-10.5038
$IndEP\_EXND_{it}$	1,021	-0.0303	0.5170	-12.4791	1.9694	-0.0246	-0.0043	0.0153	-17.8569
$IndEP\_INND_{it}$	1,021	-0.0387	0.5630	-12.4791	1.9694	-0.0250	-0.0043	0.0149	-15.8586
$Gordon_{it}$	1,021	0.0653	0.0349	-0.0446	0.3595	0.0425	0.0576	0.0788	1.8604
$CAPM_{it}$	1,021	0.0654	0.0269	-0.0034	0.1669	0.0454	0.0645	0.0819	0.4408
BE_{it}	1,021	0.8957	0.4106	-0.0600	2.3200	0.5900	0.8800	1.1600	0.3578
Independent variables									
$TobinQ\_ED_{it-1}$	861	1.5576	0.8866	0.4960	13.8226	1.0728	1.3217	1.7492	5.2314
ROE_{it-1}	861	7.3221	13.9997	-267.7000	61.0000	4.3000	8.3000	12.1000	-10.4734
$Sale_{it-1}$	861	0.9200	0.3509	0.2243	2.3996	0.6790	0.8811	1.1112	0.7472
$SaleGr_{it-1}$	861	0.0211	0.1146	-0.7609	0.5807	-0.0159	0.0281	0.0726	-1.3118
$SaleGR\_SD_{it-1}$	861	0.0913	0.0775	0.0034	0.7207	0.0409	0.0739	0.1161	2.5789
$MVBV_{it-1}$	861	1.9294	1.3406	0.2931	17.5488	1.0967	1.6061	2.3104	3.5822
RD_{it-1}	861	0.0368	0.0299	0.0000	0.1641	0.0131	0.0311	0.0510	1.0753
AD_{it-1}	861	0.0397	0.0466	0.0000	0.4056	0.0085	0.0277	0.0525	2.4772
$Dividom_{it-1}$	861	0.0256	0.1579	0.0000	1.0000	0.0000	0.0000	0.0000	6.0135
$Dividom\_r_{it-1}$	861	-0.0256	0.1579	-1.0000	0.0000	0.0000	0.0000	0.0000	-6.0135

Table 4.3. Descriptive statistic of full variables in the lead-lag year period (Cont.)

The descriptive statistic of all variables and factors include cost of equity, independent variable, economic sustainability performance factors, non-economic sustainability performance factors, control variables and other variables. This descriptive statistic of all variables are shown in current fiscal year period with lead-lag period. The cost of equity are all in leading term in current fiscal year period. Other variables are in lagged term by using previous year t-1. This data are all in fiscal year and from 2002 to 2018.

Variable	Obs.	Mean	Std. Dev.	Min	Max	Q1	Median	Q3	Skewness
Economic sustainability performance factor (ECON)									
GR_{it-1}	861	-0.0386	0.9001	-1.1569	11.7460	-0.5737	-0.2619	0.2038	4.4100
OP_{it-1}	861	-0.0044	0.9846	-1.6527	5.3714	-0.6353	-0.2126	0.4088	1.3960
EQ_{it-1}	861	-0.0292	1.0263	-16.1522	2.4098	-0.0548	0.1144	0.2836	-7.7186
$ECON_{it-1}$	861	-0.0241	0.5683	-4.8269	4.1840	-0.3367	-0.0847	0.2378	0.5237
Non-Economic sustainability performance factor (ESG)									
Env_{it-1}	861	62.4042	19.2328	12.3039	97.4071	48.7745	65.3846	77.6507	-0.4351
Soc_{it-1}	861	52.1444	21.5919	6.5258	98.0885	36.9989	54.3287	69.0288	-0.1973
Gov_{it-1}	861	56.4099	20.4014	7.8483	96.3355	41.2153	59.3629	72.6850	-0.3000
ESG_{it-1}	861	56.9337	16.0671	15.2717	93.3107	46.2374	59.3159	68.5439	-0.4118
Control variables									
LITI	1,021	0.2204	0.4147	0.0000	1.0000	0.0000	0.0000	0.0000	1.3492
LIQ_{it-1}	861	1.2659	1.1407	0.0151	22.9329	0.7809	1.0863	1.5106	9.8612
LEV_{it-1}	861	0.4612	0.1960	0.0547	0.9852	0.3007	0.4584	0.6195	0.0771
$Size_{it-1}$	861	27.3150	1.0072	24.5302	30.8827	26.6021	27.2575	28.0095	0.2040
$ALTMAN_{it-1}$	861	0.9329	0.3759	0.0076	2.4641	0.6872	0.9084	1.1292	0.3558
BE_{it-1}	861	0.8985	0.4137	-0.0400	2.3200	0.5900	0.8800	1.1600	0.3683
$DLOSS_{it-1}$	861	0.0755	0.2643	0.0000	1.0000	0.0000	0.0000	0.0000	3.2137
AQ_{it-1}	805	0.0232	0.0174	0.0011	0.1247	0.0122	0.0195	0.0294	2.4804
Acc_Total_{it-1}	859	0.0026	0.0328	-0.2473	0.1483	-0.0129	0.0035	0.0191	-1.2696

CHAPTER V
RESEARCH METHODOLOGY AND EMPIRICAL RESULTS

5.1 Research Methodology

This research studies the relationship between cost of equity with business sustainability performance which includes both economic side and non-economic side. The methodology in this research uses unbalance panel regression analysis with random effect model according to some of variables such as dummy variables which represent litigation risk, loss and omission of dividend might not change during study period so this study cannot use fixed effect model to this study. The model in this study includes lead and lag of variables follow Ferreira and Laux (2007).

This research studies by separate into three main parts by following Ng and Rezaee (2015). First part, study the effect of individual and combined ECON on cost of equity and implied cost of equity. Second part is the effect of individual and combined ESG on cost of equity and implied cost of equity. Third part is interaction of ECON and ESG on cost of equity. This study also includes a robustness test by using individual economic and non-economic sustainability variables on cost of equity.

This study also adds year/sector effect and lead-lag regression which reminds to fixed effect problem and endogeneity problem on the statistical model respectively. First, this study adds year and sector effect into panel regression to solve fixed effect problem in our models. This study separates business sectors by using Fama French 49 business sectors. Second from the study of Ferreira and Laux (2007) by using lead-lag regression when implied cost of equity is dependent variable at time t period, independent and control variables are lagged term at t-1. This endogeneity problem could be reduced.

5.1.1 Limitation of Fixed Effect Model

The statistical panel regression model in this study cannot be run with fixed effect model because this model has a litigation dummy variable. This dummy variable

is not be changed through time because this dummy variable represents firms with high litigation risk which refer to its business sector which refer their SIC code to create this dummy variable. If this study uses fixed effect with all model, this dummy variable will be omitted by STATA program. This dummy is like alpha term if using fixed effect model this dummy will be deleted out of this study. Thus this study is used only random effect models and also test with sectors and year effect to check the fixed effect problems.

5.1.2 Sector and Year Fixed Effect

This study is using panel regression which possible occurs fixed effect problem thus this study tries to minimize statistic fixed effect problem by using business sectors and year fixed effect by adding them into regression models. The fixed effect problem can possible to happen both two dimensions which consist of firms and years. This study uses 49 business sectors which follow Fama and French (1997) which find that firms in different business sectors have different cost of equity. Year fixed effect is used for minimizing fixed effect problems which possibly occur between years.

5.1.3 Economic Sustainability (ECON) Performance Effects on Cost of Equity

This section studies the relationship between an individual and combines of financial sustainability performances and proxies cost of equity. First of all, this study begins with the control model which uses only control variables which include *LITI*, LIQ_{it-1}, LEV_{it-1}, $Size_{it-1}$, $ALTMAN_{it-1}$, BE_{it-1}, $DLOSS_{it-1}$, Acc_total_{it-1} and AQ_{it-1}. The results of this part are shown in section 5.2.2 and separate into two groups of cost of equity.

According to this study has four proxies of cost of equity, CAPM and market beta cannot use beta as one of control variable thus studied models need to be changed by removing beta out of model by following equation (1). From the following equation, X_{it-1} is ECON factors that can be used as individual factors of GR_{it-1}, OP_{it-1}, EQ_{it-1}, $ECON_{it-1}$ or multiple factors of GR_{it-1}, OP_{it-1} and EQ_{it-1} together but in case of multiple factors coefficient of each factor are separated for each factor. Results of ECON on CAPM and market beta are shown in table 5.1 and 5.2 respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 DLOSS_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \beta_{10} Subprime + \beta_{11} Eurozone + \varepsilon \quad (1)$$

Where COC_{it} is cost of equity which either $CAPM_{it}$ or BE_{it}.

X_{it-1} is individual GR_{it-1} or OP_{it-1} or EQ_{it-1} or $ECON_{it-1}$ or multiple factors of GR_{it-1}, OP_{it-1} and EQ_{it-1} or blank.

Other variables refer to table 4.1 in section 4

Second, this study uses $Gordon_{it-1}$ and $IndEP_{it-1}$ as implied cost of equity by following equation (2) with all control variables include beta to control the market risk of each firms. From the following equation, X_{it-1} is ECON factors that can be used as individual factors of GR_{it-1}, OP_{it-1}, EQ_{it-1}, $ECON_{it-1}$ or multiple factors of GR_{it-1}, OP_{it-1} and EQ_{it-1} together but in case of multiple factors coefficient of each factor are separated for each factor. The results of ECON on Gordon, IndEP exclude extraordinary items and include extraordinary items are shown in table 5.3, 5.4 and 5.5 respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 BE_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \beta_{11} Subprime + \beta_{12} Eurozone + \varepsilon \quad (2)$$

Where COC_{it} is cost of equity which either $Gordon_{it}$ or $IndEP_{it}$.

X_{it-1} is individual GR_{it-1} or OP_{it-1} or EQ_{it-1} or $ECON_{it-1}$ or multiple factors of GR_{it-1}, OP_{it-1} and EQ_{it-1} or blank.

Other variables refer to table 4.1 in section 4

5.1.4 Non-Economic Sustainability (ESG) Performance Effects on Cost of Equity

This section studies the relationship between ESG performances on different proxies of cost of equity. This part is separated into two groups of cost of equity which use different panel regression models.

The first model uses CAPM and market beta as proxies of cost of equity by referring equation (3) where beta is removed out of control variable. All panel regression models are added $ECON_{it-1}$ factor as one of control variables to control the effect of $ECON_{it}$ in the model. This regression begins with control model in model 1. This study uses with individual ESG factors which include Env_{it-1}, Soc_{it-1}, and Gov_{it-1} in model 2 to 4 respectively. After we get results of individual factors, this study also does the regression with multiple factors of ESG factors in model 5 and combined ESG_{it-1} factor

in model 6. Results of ESG on CAPM and market beta are shown in table 5.6 and 5.7 respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \beta_{11} Subprime + \beta_{12} Eurozone + \varepsilon \quad (3)$$

Where COC_{it} is cost of equity either $CAPM_{it}$ or BE_{it}

X_{it-1} is individual Env_{it-1} or Soc_{it-1} or Gov_{it-1} or ESG_{it-1} or multiple factors of Env_{it-1}, Soc_{it-1} and Gov_{it-1} or blank.

$ECON_{it-1}$ is economic sustainability performance by average GR_{it-1}, OP_{it-1} and EQ_{it-1}

Other variables are variables referred to table 4.1 in section 4

The second model uses all control variables include beta as market risk refers to equation (4). This regression is beginning with the control model in model 1 then this study test with individual ESG factors which include Env_{it-1}, Soc_{it-1}, and Gov_{it-1} in model 2 to 4 respectively. After we got results of individual factors, this study also does the regression with multiple factors of ESG in model 5 and combined ESG_{it-1} factor in model 6. The regression results between ECON on Gordon, IndEP exclude extraordinary items and include extraordinary items are shown in table 5.8, 5.9 and 5.10 respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 BE_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \beta_{12} Subprime + \beta_{13} Eurozone + \varepsilon \quad (4)$$

Where COC_{it} is cost of equity either $Gordon_{it}$ or $IndEP_{it}$

X_{it-1} is individual Env_{it-1} or Soc_{it-1} or Gov_{it-1} or ESG_{it-1} or multiple factors of Env_{it-1}, Soc_{it-1} and Gov_{it-1} or blank.

$ECON_{it-1}$ is economic sustainability performance by average GR_{it-1}, OP_{it-1} and EQ_{it-1}

Other variables are variables referred to table 4.1 in section 4

5.1.5 Interaction between Economic Sustainability (ECON) and Non-Economic Sustainability (ESG) Performance Effects on Cost of Equity

This section studies the relationship between ECON factors and ESG factors which effect on cost of equity. The study separates into two groups follow groups of cost of equity. The first group of cost of equity are CAPM and market beta which use panel regression model follows equation (5). This study generates interaction factors by multiply $ECON_{it-1}$ factor with individual ESG factors and combined ESG factor; Env_{it-}

$_{1}$, Soc_{it-1}, Gov_{it-1} and ESG_{it-1} then new four factors are $ECON_{it-1}$ *X* Env_{it-1}, $ECON_{it-1}$ *X* Soc_{it-1}, $ECON_{it-1}$ *X* Gov_{it-1} and $ECON_{it-1}$ *X* ESG_{it-1}. First, Model 1 shows the results of the interaction between $ECON_{it-1}$ and Env_{it-1}. Model 2 shows the result of interaction between $ECON_{it-1}$ and Soc_{it-1}. Model 3 shows the result of interaction between $ECON_{it-1}$ and Gov_{it-1}. Model 4 shows the result of interaction from all multiple ESG factors and $ECON_{it-1}$. Model 5 shows the result of interaction between $ECON_{it-1}$ and ESG_{it-1} on cost of equity. The results of interaction on $CAPM_{it-1}$ and BE_{it-1} are shown in table 5.11 and 5.12 respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \beta_{12} Subprime + \beta_{13} Eurozone + \varepsilon \quad (5)$$

Where COC_{it} is cost of equity either $CAPM_{it}$ or BE_{it}

X_{it-1} is individual Env_{it-1} or Soc_{it-1} or Gov_{it-1} or ESG_{it-1} or multiple factors of Env_{it-1}, Soc_{it-1} and Gov_{it-1}.

Z_{it-1} is interaction variable; $Econ_{it-1}$ *X* Env_{it-1} or $Econ_{it-1}$ *X* Soc_{it-1} or $Econ_{it-1}$ *X* Gov_{it-1} or multiple variables by add all $Econ_{it-1}$ *X* Env_{it-1}, $Econ_{it-1}$ *X* Soc_{it-1}, $Econ_{it-1}$ *X* Gov_{it-1} or $Econ_{it-1}$ *X* ESG_{it-1}

$ECON_{it-1}$ is economic sustainability performance by average GR_{it-1}, OP_{it-1} and EQ_{it-1}

Other variables are variables referred to table 4.1 in section 4

The second groups of cost of equity are $Gordon_{it-1}$ and $IndEP_{it-1}$ which use panel regression follows equation (6). This equation is added the market beta to control variables. The results of the interaction between $ECON_{it-1}$ and ESG factors on Gordon, IndEP exclude extraordinary item and include extraordinary item are shown in table 5.13, 5.14 and 5.15 respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 BE_{it-1} + \beta_{10} DLOSS_{it-1} + \beta_{11} AQ_{it-1} + \beta_{12} ACC\_Total_{it-1} + \beta_{13} Subprime + \beta_{14} Eurozone + \varepsilon \quad (6)$$

Where COC_{it} is cost of equity either $Gordon_{it}$ or $IndEP_{it}$

X_{it-1} is individual Env_{it-1} or Soc_{it-1} or Gov_{it-1} or ESG_{it-1} or multiple factors of Env_{it-1}, Soc_{it-1} and Gov_{it-1}.

Z_{it-1} is interaction variable; $Econ_{it-1}$ *X* Env_{it-1} or $Econ_{it-1}$ *X* Soc_{it-1} or $Econ_{it-1}$ *X* Gov_{it-1} or multiple variables by add all $Econ_{it-1}$ *X* Env_{it-1}, $Econ_{it-1}$ *X* Soc_{it-1}, $Econ_{it-1}$ *X* Gov_{it-1} or $Econ_{it-1}$ *X* ESG_{it-1}

$ECON_{it-1}$ is economic sustainability performance by average GR_{it-1}, OP_{it-1} and EQ_{it-1}

Other variables are variables referred to table 4.1 in section 4

5.1.6 Robustness Test

The robustness test consists of individual financial variables and modifies panel regression equation to make cost of equity reflects to risks of firms. The robustness test is separated into two parts; the first part studies the relationship between ECON variables and cost of equity, second part studies between cost of equity and non-economic factors. This study also adds volatility of sale growth which calculated by the standard deviation of sale growth for 5 years period. This sale growth volatility represents risk of firms in profitability.

5.1.6.1 Robustness Test of Individual Economic Sustainability Variables and Cost of Equity

First, this section studies the effect of individual financial sustainability variables on cost of equity. This study uses individual variables in regression because multicollinearity problems may have occurred when using all ECON variables together. Financial sustainability variables in this study consist of ROE_{it-1}, $Sale_{it-1}$, $SaleGr_{it-1}$, $SaleGR\_SD_{it-1}$, RD_{it-1}, AD_{it-1} and $Dividom_{it-1}$. These variables represents financial performances in short and long term of firms. This section uses a panel with lead-lag regression for reducing the effect of endogeneity problem. This study separates into two groups of cost of equity. The first group uses cost of equity from $CAPM_{it}$ and $Beta_{it}$ with equation (7). Results of individual economic sustainability from both models are shown in section 5.2.5.1 and regression results are shown in Appendix G.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 MVBV_{it-1} + \beta_7 AQ_{it-1} + \beta_8 ACC\_Total_{it-1} + \varepsilon \quad (7)$$

Where COC_t is cost of equity by $CAPM_{it}$ and $Beta_{it}$

X_{it-1} is individual sustainability variables; ROE_{it-1} or $Sale_{it-1}$ or $SaleGr_{it-1}$ or $SaleGR\_SD_{it-1}$ or RD_{it-1} or AD_{it-1} or $Dividom_{it-1}$

Other variables refer to table 4.1 in section 4

The second group uses the implied cost of equity from $Gordon_{it}$ and $IndEP_{it}$ by following equation (8). The second model is different from the first model by beta is added back as a control variable according to the second model has to control market risk.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 BE_{it-1} + \beta_7 MVBV_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \varepsilon \quad (8)$$

Where COC_{it} is implied cost of equity by $Gordon_{it}$ and $IndEP_{it}$

X_{it-1} is individual sustainability variables; ROE_{it-1} or $Sale_{it-1}$ or $SaleGr_{it-1}$ or $SaleGR\_SD_{it-1}$ or RD_{it-1} or AD_{it-1} or $Dividom_{it-1}$

Other variables refer to table 4.1 in section 4

5.1.6.2 Robustness Test of Non-Economic Sustainability Performances and Cost of Equity

This part studies the relation between non-economic sustainability (ESG) performances on the implied cost of equity. This part will separate into two models. The first model uses panel regression between ESG factors and cost of equity from $CAPM_{it-1}$ and BE_{it} by equation (9). All models use control variables the same as a study between ECON variables and cost of equity in section 5.1.6.1. The summary results of between ESG factors and cost of equity are shown in section 5.2.5.2. Empirical results are shown in Appendix G.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 MVBV_{it-1} + \beta_7 AQ_{it-1} + \beta_8 ACC\_Total_{it-1} + \varepsilon \quad (9)$$

Where COC_{it} is cost of equity by $CAPM_{it}$ and $Beta_{it}$

X_{it-1} is individual ESG factors; Env_{it-1} or Soc_{it-1} or Gov_{it-1}, multiple factors of Env_{it-1}, Soc_{it-1} and Gov_{it-1} and combined ESG_{it-1}

Other variables refer to table 4.1 in section 4

The second model is using panel regression between ESG and implied cost of equity from $Gordon_{it}$ and $IndEP_{it}$ by equation (10). All models use control variables the same as a study between ECON variables and cost of equity in section 5.1.6.1. The summary results of between ESG factors and cost of equity are shown in section 5.2.5.2. Empirical results are shown in Appendix G.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 BE_{it-1} + \beta_7 MVBV_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \varepsilon \quad (10)$$

Where COC_{it} is implied cost of equity by $Gordon_{it}$ and $IndEP_{it}$

X_{it-1} is individual ESG factors; Env_{it-1} or Soc_{it-1} or Gov_{it-1}, multiple factors of Env_{it-1}, Soc_{it-1} and Gov_{it-1} and combined ESG_{it-1}

Other variables refer to table 4.1 in section 4

5.2 Empirical Results

5.2.1 Sector and Year Fixed Effect

The results of sector fixed effect which separates business sector by 49 Fama French sectors, shows that some of business sectors are statistically significant to different proxies of cost of equity. The summary results of significant sectors and signs of coefficients are displayed in Appendix D to F. The results between business sectors are not consistent and most of the sectors are not statistically significant to cost of equity thus sector effect is less useful for this study. According to the samples in this study are limited due to some variables are not available. If this study uses sector effect, sector effect will reduce the power of data explanation. When compare the benefit of sector effect to minimize fixed effect problems and power of data explanation, the power of data explanation is more important than fixed effect problems which can be solved by using year effect instead. After all results, this study does not use sectors effect for further study.

The year effect is added into all studied models to address fixed effect problems which possible to occur during use panel regression. The summary year effect results are shown the only statistically significant year and coefficient in Appendix C to F. Results from year effect find that some years during economic crises for both subprime crisis and Eurozone crisis are statistically significant at 1% or 5% and have a positive relation to some cost of equity such as CAPM and Gordon. These results mean that during economic crises all firms in Japan market are affected by economic crises and cost of equity is increased. So this study creates two dummy variables instead of using the year effect to eliminate fixed effect problems. The first dummy is the subprime variable which is ‘1’ in year 2008. The second dummy is Eurozone that is ‘1’ during 2011- 2012.

5.2.2 Economic Sustainability (ECON) Performance Effect on Cost of Equity Results

The regression results in table 5.1 to 5.5 are showing observation of sample is 805 firm-year and number of firms in the sample is 119 firms. P-values of models are less than 1% which means all models are statistically significant at 1% level and these models can be used to explain and interpret.

5.2.2.1 CAPM and market beta as cost of equity

This part shows results from cost of equity from CAPM and market beta and studies between individual of economic sustainability performance and combined factors. This results report results with the control model, individual ECON factors, multiple ECON factors, and combined ECON factor.

The result of control variables model where X_{it-1} is blank shows in table 5.1 model 1. The results shows that LIQ_{it-1}, LEV_{it-1}, $Size_{it-1}$, and Acc_Total_{it-1} are statistically significant to $CAPM_{it}$ at 5%, 1%, 5%, and 1% significant level respectively. The coefficient of LIQ_{it-1}, LEV_{it-1}, $Size_{it-1}$ and Acc_Total_{it-1} on $CAPM_{it}$ are 0.0013, 0.0516, -0.0026 and 0.0684 respectively. Signs of each variable are the same as expectations and research of Francis et al. (2005); Francis et al. (2004); Hou, van Dijk, and Zhang (2012). But $LITI$, $Altman_{it-1}$, $DLOSS_{it-1}$, AQ_{it-1} are not statistically significant to $CAPM_{it}$ which might possible causes from firms in different of the country do not have the same behavior and samples are not enough. The result of the control model on beta shows in table 5.2 model 1. The result finds that LIQ_{it-1}, LEV_{it-1}, Acc_Total_{it-1} are statically significant on market beta at 1%, 1% and 1% significant level and coefficient are 0.0275, 0.7423 and 0.8127 respectively. Signs of each variable are the same as expectations but other variables are not significant to cost of equity. The results of control variables in other models which include ECON factors are the same as control model in both CAPM and beta.

The regression results of individual ECON factors are shown in table 5.1 and 5.2 from model 2 to 4. Model 2 shows the result of growth opportunity factor which is created by Tobin's Q ratio and Market to book value. The results from both $CAPM_{it}$ and BE_{it} appear that growth opportunity is not significant to both cost of equity. Model 3 shows results of operation effort relat to cost of equity where operation effort is created by sale and advertisement expense. The results in model 3 appear that

it is statistically significant at 1% and 5% significant level on both $CAPM_{it}$ and BE_{it} respectively. There are negative relationships between operation effort on both $CAPM_{it}$ and BE_{it}. The coefficient sign is the same as expectation. The coefficient of OP_{it-1} is 0.0053 on $CAPM_{it}$ and 0.0741 on BE_{it}. This coefficient means when firms increases sale and advertisement expense, firms will reduce cost of equity on CAPM at 0.53% and beta at 7.41%. The regression in model 4 study relation of equity factor on cost of equity. The results in model 4 show that EQ_{it-1} factor which is created from ROE and dividend paid is statistically significant at 10% on both proxies and coefficient are -0.0014 and -0.0819 respectively. EQ_{it-1} has negative relationships with both $CAPM_{it}$ and BE_{it}. From model 4 can conclude that firms with higher ROE and pay dividend then firms can reduce cost of equity more than firms with lower ROE and omit to pay dividends.

The regression results of multiple and combine ECON factors are shown in table 5.1 and 5.2 from model 5 and 6. The results of model 5 study relation of multiple economic sustainability factors which include GR_{it-1}, OP_{it-1} and EQ_{it-1} on cost of equity. The results of model 5 show that OP_{it-1} and EQ_{it-1} factor are statistically significant on $CAPM_{it}$ and BE_{it} at 1% and 10% significant level respectively and have negative relations to $CAPM_{it}$ and BE_{it}. The coefficients between OP_{it-1} and EQ_{it-1} on $CAPM_{it}$ are -0.0054 and -0.0014 respectively. The coefficients between OP_{it-1} and EQ_{it-1} on Be_{it} are -0.076 and -0.0193 respectively.

The final model uses $ECON_{it-1}$ factor which created by an average of all three economic sustainability performance factors. The result of the last model finds that $ECON_{it-1}$ is statistically significant at 5% significant level for both CAPM and beta. Coefficients between $ECON_{it-1}$ and $CAPM_{it}$ and BE_{it} are -0.0045 and -0.0561 respectively. There are negative relationships between $ECON_{it-1}$ on both cost of equity which same as expectation and prior research of Ng and Rezaee (2015) thus firms with higher economic sustainability performances have a lower cost of equity.

Table 5.1. Effective of economic sustainability performance factors (ECON) on cost of equity (CAPM)

Panel regression results on $CAPM_{it}$ where $CAPM_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include GR_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 DLOSS_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \beta_{10} Subprime + \beta_{11} Eurozone + \varepsilon$$

	X_{it}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	GR_{it-1}+ OP_{it-1}+ EQ_{it-1}	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0005			-0.0007	
			(0.001)			(0.001)	
OP_{it-1}	-			-0.0053***		-0.0054***	
				(0.002)		(0.002)	
EQ_{it-1}	-				-0.0014*	-0.0014*	
					(0.0008)	(0.0008)	
$ECON_{it-1}$	-						-0.0045**
							(0.0018)
LITI	+	-0.0067	-0.0068	-0.0071*	-0.0067	-0.0073*	-0.007*
		(0.0042)	(0.0042)	(0.0041)	(0.0042)	(0.004)	(0.0041)
LIQ_{it-1}	+	0.0013**	0.0013***	0.0013**	0.0012**	0.0012**	0.0012**
		(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
LEV_{it-1}	+	0.0516***	0.0513***	0.0521***	0.0507***	0.0508***	0.0495***
		(0.0068)	(0.0068)	(0.0067)	(0.0068)	(0.0067)	(0.0068)
$Size_{it-1}$	-	-0.0026**	-0.0023*	-0.0032***	-0.0025**	-0.0026**	-0.0018
		(0.0011)	(0.0013)	(0.0011)	(0.0011)	(0.0012)	(0.0011)
$ALTMAN_{it-1}$	+	-0.0043	-0.0039	0.0074	-0.0037	0.0088	0.0009
		(0.0034)	(0.0035)	(0.0056)	(0.0034)	(0.0056)	(0.004)
$DLOSS_{it-1}$	-	-0.0019	-0.0018	-0.0019	-0.003	-0.0028	-0.0028
		(0.0024)	(0.0024)	(0.0024)	(0.0025)	(0.0025)	(0.0024)
AQ_{it-1}	+	0.0644	0.0656	0.071*	0.0555	0.0653	0.0599
		(0.0415)	(0.0416)	(0.0415)	(0.0418)	(0.0418)	(0.0415)
Acc_Total_{it-1}	+	0.0684***	0.0689***	0.0697***	0.0789***	0.0817***	0.0816***
		(0.0205)	(0.0205)	(0.0205)	(0.0214)	(0.0215)	(0.0212)
subprime	+	-0.0079***	-0.0079***	-0.0077***	-0.0079***	-0.0077***	-0.0078***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.0021)	(0.002)
Eurozone	+	0.0024	0.0024	0.0021	0.0024	0.002	0.0021
		(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
Cons		0.1157***	0.1069***	0.1191***	0.1138***	0.1031***	0.0888***
		(0.0308)	(0.0351)	(0.0306)	(0.0307)	(0.0344)	(0.0322)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0143	0.0143	0.0143	0.0143	0.0143	0.0143
Chi^2		113.7356	114.2489	123.8417	117.3540	130.3421	122.1762
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.2656	0.2699	0.2994	0.2618	0.3029	0.2838
R^2 Within		0.0766	0.0750	0.0771	0.0827	0.0807	0.0788

Table 5.2. Effective of economic sustainability performance factors (ECON) on cost of equity (Beta)

Panel regression results on $Beta_{it}$ where $Beta_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include GR_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 DLOSS_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \beta_{10} Subprime + \beta_{11} Eurozone + \varepsilon$$

	X_{it}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	GR_{it-1}+ OP_{it-1}+ EQ_{it-1}	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0017			-0.0046	
			(0.0147)			(0.0145)	
OP_{it-1}	-			-0.0741**		-0.076***	
				(0.0295)		(0.0293)	
EQ_{it-1}	-				-0.0189*	-0.0193*	
					(0.0115)	(0.0115)	
$ECON_{it-1}$	-						-0.0561**
							(0.0267)
LITI	+	-0.1291**	-0.1294**	-0.1352**	-0.1288**	-0.1357**	-0.1333**
		(0.063)	(0.0629)	(0.0616)	(0.0627)	(0.0605)	(0.0622)
LIQ_{it-1}	+	0.0275***	0.0276***	0.0274***	0.0255***	0.0257***	0.0259***
		(0.0074)	(0.0074)	(0.0074)	(0.0075)	(0.0075)	(0.0074)
LEV_{it-1}	+	0.7423***	0.7419***	0.7471***	0.7293***	0.7332***	0.7145***
		(0.0991)	(0.0998)	(0.098)	(0.0992)	(0.0986)	(0.0995)
$Size_{it-1}$	-	0.0094	0.0105	0.0011	0.0104	0.0049	0.0199
		(0.016)	(0.0184)	(0.0162)	(0.0159)	(0.0184)	(0.0166)
$ALTMAN_{it-1}$	+	-0.1131**	-0.1117**	0.053	-0.1039**	0.0699	-0.0453
		(0.0493)	(0.051)	(0.0824)	(0.0495)	(0.0833)	(0.0587)
$DLOSS_{it-1}$	-	0.0623*	0.0626*	0.062*	0.0469	0.0475	0.0501
		(0.0344)	(0.0345)	(0.0344)	(0.0356)	(0.0358)	(0.0349)
AQ_{it-1}	+	0.9636	0.9702	1.0479*	0.8395	0.948	0.8965
		(0.5996)	(0.6006)	(0.5988)	(0.6041)	(0.6045)	(0.5999)
Acc_Total_{it-1}	+	0.8127***	0.8153***	0.8284***	0.9588***	0.9881***	0.9762***
		(0.2955)	(0.296)	(0.2953)	(0.308)	(0.309)	(0.3048)
subprime	+	-0.1022***	-0.1021***	-0.0996***	-0.1023***	-0.0994***	-0.1006***
		(0.0294)	(0.0294)	(0.0294)	(0.0294)	(0.0295)	(0.0294)
Eurozone	+	0.0408*	0.0406*	0.0362	0.0403*	0.035	0.0368
		(0.0223)	(0.0224)	(0.0224)	(0.0223)	(0.0226)	(0.0224)
Cons		0.3821	0.3506	0.4516	0.359	0.3436	0.053
		(0.4492)	(0.5166)	(0.4469)	(0.4484)	(0.5077)	(0.4723)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.2051	0.2053	0.2052	0.2050	0.2058	0.2051
Chi^2		114.1721	114.4902	123.8784	117.7022	129.6419	120.5216
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3369	0.3374	0.3686	0.3335	0.3661	0.3461
R^2 Within		0.0648	0.0645	0.0661	0.0702	0.0710	0.0677

5.2.2.2 Gordon and IndEP as cost of equity

This part shows results of other two proxies of implied cost of equity which are Gordon and IndEP. The results from Gordon are shown in table 5.3. Results from both IndEP with exclude extraordinary items and with include extraordinary items are shown in table 5.4 and 5.5 respectively.

The first model is controlled model which display in model 1 for all proxies of cost of equity. The control variables which statistically significant with Gordon are LIQ_{it-1}, LEV_{it-1}, $ALTMAN_{it-1}$ and Acc_total_{it-1} at 1%, 1%, 10% and 1% significant level respectively and signs are correct as expected. Coefficient between LIQ_{it-1}, LEV_{it-1}, $ALTMAN_{it-1}$ and Acc_total_{it-1} on $Gordon_{it-1}$ are 0.0024, 0.0232, 0.0075 and 0.1479 respectively. Control models of both proxies of $IndEP_{it}$ appear that $Altman_{it-1}$ and $DLOSS_{it-1}$ are statistically significant at 5% and 1% significant level and signs are the same as predict. Coefficient between $Altman_{it-1}$ and $DLOSS_{it-1}$ on $IndEP_{it}$ exclude extraordinary item are 0.0226 and -0.0578 respectively. Coefficient between $Altman_{it-1}$ and $DLOSS_{it-1}$ on $IndEP_{it}$ exclude extraordinary item are 0.0221 and -0.0579 respectively. Results in control models of both proxies of $IndEP_{it}$ show that both significant level and coefficient are similar to each other. From results of all control models show that $IndEP_t$ is different from other proxies of cost of equity, this different could reflex that $IndEP_t$ may bias itself. The reason for this bias can happen during calculating the methodology of $IndEP_t$. $IndEP_t$ is calculated by using an industrial EP ratio median minus EP of firms which different from other proxies that calculate by individual value. This study uses the only observation that all information is available then this sample selection is possible to bias from this selection.

The results of individual ECON factors react to Gordon, IndEP exclude extraordinary items and IndEP include extraordinary items are shown in table 5.3 to 5.5 respectively. This study does panel regression by following equation (2) and changes individual economic sustainability performance factors in X_{it-1} variable then this study uses multiple factors of ECON and combined ECON factor by replacing X_{it-1} to $\beta_1 GR_{it-1} + \beta_{13} OP_{it-1} + \beta_{14} EQ_{it-1}$ and $ECON_{it-1}$. The results between GR_{it-1} and $Gordon_{it}$ has a negative significant relation at 5% significant level with coefficient 0.0028 but there is no significant relationship on both proxies for $IndEP_{it-1}$. The results of OP_{it-1} factor are not statistically significant to all proxies of $Gordon_{it-1}$ and $IndEP_{it-1}$. The last

individual factor is EQ_{it-1} and results between EQ_{it-1} and $Gordon_{it-1}$ and $IndEP_{it-1}$ are positive significant at 1% and 5% significant level respectively. The coefficient between EQ_{it-1} on $Gordon_{it-1}$, $IndEP_{it-1}$ exclude extraordinary item and $IndEP_{it-1}$ include extraordinary items are 0.006, 0.0081 and 0.008 respectively. But signs of EQ_{it-1} do not follow as expectations on all proxies of cost of equity.

Results of multiple factors are shown in model 5 and find that all results from both Gordon and IndEP still consistency with individual factor regression. GR_{it-1} and EQ_{it-1} are still statistically significant on $Gordon_{it}$ at 5% and 1% respectively. EQ_{it-1} is still significant at 5% on both proxies of $IndEP_{it}$. The coefficient of GR_{it-1} and EQ_{it-1} on $Gordon_{it}$ are -0.0028 and 0.006 respectively. The coefficient of EQ_{it-1} on $IndEP_{it}$ exclude extraordinary item and $IndEP_{it}$ include extraordinary item are 0.0084 and 0.0083 respectively.

The final combined ECON factor is $ECON_{it-1}$ which created from the average of GR_{it-1}, OP_{it-1}, and EQ_{it-1}. Results show that $ECON_{it-1}$ is positive significant to both Gordon and IndEP at 10% and 1% respectively. The coefficient of $ECON_{it-1}$ on $Gordon_{it}$, $IndEP_{it}$ exclude extraordinary item and $IndEP_{it}$ include extraordinary item are 0.005, 0.0206 and 0.0204 respectively.

All results between ECON factors on cost of equity appear that individual ECON factors response to different proxies of cost of equity. The results from CAPM and beta are the same direction and results of Gordon and IndEP also have the same direction. But results between CAMP, beta and Gordon and IndEP are different.

Table 5.3. Effective of economic sustainability performance factors (ECON) on cost of equity (Gordon)

Panel regression results on $Gordon_{it}$ where $Gordon_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include GR_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 BE_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \beta_{11} Subprime + \beta_{12} Eurozone + \varepsilon$$

	X_{it}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	$GR_{it-1}+ OP_{it-1}+ EQ_{it-1}$	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0028**			-0.0028**	
			(0.0013)			(0.0013)	
OP_{it-1}	-			0.0013		0.0014	
				(0.0024)		(0.0023)	
EQ_{it-1}	-				0.006***	0.006***	
					(0.0013)	(0.0013)	
$ECON_{it-1}$	-						0.005*
							(0.0027)
LITI	+	-0.0087**	-0.0086**	-0.0085**	-0.0087**	-0.0083**	-0.008**
		(0.0039)	(0.0037)	(0.004)	(0.0039)	(0.0036)	(0.0038)
LIQ_{it-1}	+	0.0024***	0.0025***	0.0024***	0.0031***	0.0032***	0.0026***
		(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
LEV_{it-1}	+	0.0232***	0.0192**	0.0229***	0.0266***	0.0226***	0.027***
		(0.0086)	(0.0086)	(0.0087)	(0.0086)	(0.0085)	(0.0086)
$Size_{it-1}$	-	0.0102***	0.0107***	0.0104***	0.0101***	0.0106***	0.0093***
		(0.0014)	(0.0015)	(0.0015)	(0.0014)	(0.0015)	(0.0014)
$ALTMAN_{it-1}$	+	0.0075*	0.0089**	0.0048	0.0068*	0.0052	0.0024
		(0.0041)	(0.004)	(0.0064)	(0.004)	(0.0061)	(0.0047)
BE_{it-1}	+	0.0019	0.0024	0.0022	0.0025	0.0035	0.0029
		(0.0035)	(0.0035)	(0.0036)	(0.0035)	(0.0035)	(0.0035)
$DLOSS_{it-1}$	-	0.0097**	0.0103**	0.0097**	0.0146***	0.0153***	0.0109***
		(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0043)	(0.0042)
AQ_{it-1}	+	0.0226	0.0311	0.0208	0.0607	0.0698	0.0293
		(0.0661)	(0.0656)	(0.0663)	(0.0659)	(0.0653)	(0.0658)
Acc_Total_{it-1}	+	0.1479***	0.1573***	0.1467***	0.0982***	0.1076***	0.1322***
		(0.0348)	(0.035)	(0.0349)	(0.036)	(0.0363)	(0.0362)
subprime	+	0.0574***	0.0576***	0.0574***	0.0574***	0.0576***	0.0572***
		(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0036)
Eurozone	+	0.0339***	0.0329***	0.034***	0.0342***	0.0331***	0.0342***
		(0.0027)	(0.0027)	(0.0027)	(0.0026)	(0.0027)	(0.0027)
Cons		-0.2421***	-0.2567***	-0.2454***	-0.2444***	-0.2561***	-0.2169***
		(0.0395)	(0.0408)	(0.0399)	(0.0393)	(0.0402)	(0.0394)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0254	0.0256	0.0254	0.0250	0.0253	0.0255
Chi^2		458.8891	459.8652	459.0356	492.4052	491.6890	460.0365
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3292	0.3386	0.3294	0.3469	0.3589	0.3338
R^2 Within		0.3954	0.3905	0.3967	0.4099	0.4043	0.4014

Table 5.4. Effective of economic sustainability performance factors (ECON) on cost of equity (IndEP exclude extraordinary items)

Panel regression results on $IndEP_{it}$ exclude extraordinary item where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include GR_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 BE_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \beta_{11} Subprime + \beta_{12} Eurozone + \varepsilon$$

	X_{it}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	$GR_{it-1}+ OP_{it-1}+ EQ_{it-1}$	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		0.0049			0.0049	
			(0.0038)			(0.0038)	
OP_{it-1}	-			0.0075		0.0083	
				(0.0055)		(0.0055)	
EQ_{it-1}	-				0.0081**	0.0084**	
					(0.0039)	(0.0039)	
$ECON_{it-1}$	-						0.0206***
							(0.0074)
LITI	+	0.0021	0.0023	0.003	0.0019	0.003	0.003
		(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)
LIQ_{it-1}	+	-0.0002	-0.0004	-0.0004	0.001	0.0006	0.0003
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.0324	-0.0257	-0.0354*	-0.0269	-0.0233	-0.021
		(0.0202)	(0.0208)	(0.0203)	(0.0203)	(0.021)	(0.0205)
$Size_{it-1}$	-	0.0105***	0.0093***	0.0117***	0.0107***	0.0108***	0.01***
		(0.0033)	(0.0035)	(0.0034)	(0.0033)	(0.0036)	(0.0033)
$ALTMAN_{it-1}$	+	0.0226**	0.0204**	0.0085	0.0233***	0.0056	0.0072
		(0.009)	(0.0091)	(0.0137)	(0.009)	(0.0138)	(0.0105)
BE_{it-1}	+	-0.0013	-0.0012	0.0017	-0.0013	0.0021	0.0016
		(0.0093)	(0.0093)	(0.0095)	(0.0093)	(0.0095)	(0.0093)
$DLOSS_{it-1}$	-	-0.0578***	-0.0584***	-0.058***	-0.051***	-0.0516***	-0.053***
		(0.0138)	(0.0138)	(0.0138)	(0.0141)	(0.0141)	(0.0138)
AQ_{it-1}	+	-0.047	-0.061	-0.0563	0.0266	0.0044	-0.0131
		(0.1892)	(0.1894)	(0.1892)	(0.192)	(0.1922)	(0.1888)
Acc_Total_{it-1}	+	0.0307	0.0148	0.0173	-0.036	-0.0684	-0.0602
		(0.113)	(0.1137)	(0.1134)	(0.1171)	(0.1182)	(0.1171)
subprime	+	0.0079	0.0074	0.0076	0.0077	0.0069	0.0068
		(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0124)
Eurozone	+	-0.0034	-0.0019	-0.0029	-0.003	-0.0009	-0.0004
		(0.0091)	(0.0091)	(0.0091)	(0.009)	(0.0091)	(0.0091)
Cons		-0.303***	-0.2704***	-0.3225***	-0.315***	-0.3045***	-0.2852***
		(0.0922)	(0.0956)	(0.0933)	(0.0922)	(0.0965)	(0.092)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0887	0.0887	0.0887	0.0885	0.0884	0.0883
Chi^2		52.1916	53.8893	54.1098	56.8570	60.8365	60.4666
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0618	0.0637	0.0640	0.0670	0.0715	0.0709
R^2 Within		0.0284	0.0301	0.0324	0.0339	0.0403	0.0395

Table 5.5. Effective of economic sustainability performance factors (ECON) on cost of equity (IndEP include extraordinary items)

Panel regression results on $IndEP_{it}$ include extraordinary item where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include GR_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors. Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 BE_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \beta_{11} Subprime + \beta_{12} Eurozone + \varepsilon$$

	X_{it}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	$GR_{it-1}+ OP_{it-1}+ EQ_{it-1}$	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		0.0048			0.0047	
			(0.0038)			(0.0038)	
OP_{it-1}	-			0.0076		0.0084	
				(0.0055)		(0.0055)	
EQ_{it-1}	-				0.008**	0.0083**	
					(0.0039)	(0.0039)	
$ECON_{it-1}$	-						0.0204***
							(0.0074)
LITI	+	0.0028	0.003	0.0037	0.0026	0.0037	0.0037
		(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)
LIQ_{it-1}	+	-0.0003	-0.0004	-0.0005	0.0009	0.0005	0.0003
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.0316	-0.025	-0.0346*	-0.026	-0.0227	-0.0202
		(0.0202)	(0.0209)	(0.0203)	(0.0203)	(0.0211)	(0.0205)
$Size_{it-1}$	-	0.0105***	0.0093***	0.0116***	0.0107***	0.0108***	0.01***
		(0.0033)	(0.0035)	(0.0034)	(0.0033)	(0.0036)	(0.0033)
$ALTMAN_{it-1}$	+	0.0221**	0.02**	0.0078	0.0229**	0.005	0.0069
		(0.009)	(0.0092)	(0.0137)	(0.009)	(0.0138)	(0.0105)
BE_{it-1}	+	-0.0016	-0.0015	0.0014	-0.0016	0.0018	0.0012
		(0.0093)	(0.0093)	(0.0096)	(0.0093)	(0.0095)	(0.0093)
$DLOSS_{it-1}$	-	-0.0579***	-0.0585***	-0.0581***	-0.0511***	-0.0517***	-0.0532***
		(0.0138)	(0.0138)	(0.0138)	(0.0142)	(0.0142)	(0.0139)
AQ_{it-1}	+	-0.0479	-0.0615	-0.0574	0.0246	0.0027	-0.0144
		(0.1896)	(0.1898)	(0.1896)	(0.1924)	(0.1926)	(0.1892)
Acc_Total_{it-1}	+	0.0341	0.0186	0.0206	-0.0316	-0.0639	-0.0557
		(0.1132)	(0.1139)	(0.1136)	(0.1174)	(0.1184)	(0.1174)
subprime	+	0.0079	0.0074	0.0076	0.0078	0.0069	0.0068
		(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0124)
Eurozone	+	-0.0036	-0.0021	-0.0031	-0.0032	-0.0011	-0.0006
		(0.0091)	(0.0092)	(0.0091)	(0.0091)	(0.0091)	(0.0091)
Cons		-0.3015***	-0.2698***	-0.3213***	-0.3134***	-0.3039***	-0.284***
		(0.0924)	(0.0958)	(0.0934)	(0.0924)	(0.0967)	(0.0922)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0889	0.0889	0.0888	0.0887	0.0886	0.0885
Chi^2		52.1824	53.7880	54.1444	56.7002	60.6307	60.2395
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0617	0.0636	0.0640	0.0668	0.0713	0.0707
R^2 Within		0.0282	0.0299	0.0322	0.0333	0.0397	0.0388

5.2.3 Non-Economic Sustainability (ESG) Performance Effect on Cost of Equity Result

This section shows the results of ESG factors effect on cost of equity which consists of five proxies. The results on $CAPM_{it}$, BE_{it}, $Gordon_{it}$, $IndEP_{it}$ exclude extraordinary items and include extraordinary items are shown in table 5.6 to 5.10 respectively. This study adds $ECON_{it-1}$ factor as one of control variable to control effect of ECON to cost of equity.

The results of the control model for all proxies of cost of equity are shown in model 1 of all tables. The result between control variables and $CAPM_{it-1}$ shows that $ECON_{it-1}$, *LITI*, LIQ_{it-1}, LEV_{it-1}, and Acc_total_{it-1} are statistically significant at 5%, 10%, 5%, 1% and 1% respectively. The coefficient of that $ECON_{it-1}$, *LITI*, LIQ_{it-1}, LEV_{it-1}, and Acc_total_{it-1} are -0.0045, -0.007, 0.0012, 0.0495 and 0.0816 respectively. The sign of coefficient in $ECON_{it-1}$, LIQ_{it-1}, LEV_{it-1}, and Acc_total_{it-1} are same as expectation except *LITI* is not same as expected. The result between control variables and BE_{it} shows that $ECON_{it-1}$, *LITI*, LIQ_{it-1}, LEV_{it-1}, and Acc_total_{it-1} are statistically significant at 5%, 5%, 1%, 1% and 1% respectively. The coefficient of that $ECON_{it-1}$, *LITI*, LIQ_{it-1}, LEV_{it-1} and Acc_total_{it-1} are -0.0561, -0.1333, 0.0259, 0.7145 and 0.9762 respectively. The sign of coefficient in $ECON_{it-1}$, LIQ_{it-1}, LEV_{it-1} and Acc_total_{it-1} are same as expectation except *LITI* is not same as expected. Results of control models in CAPM and Beta are same to each other except only coefficient. Control model in Gordon shows that $ECON_{it-1}$, *LITI*, LIQ_{it-1}, LEV_{it-1}, $Size_{it-1}$, $DLOSS_{it-1}$ and Acc_total_{it-1} are statistically significant to $Gordon_{it}$ at 10%, 5%, 1%, 1%, 1%, 1% and 1% significant level respectively. Coefficient of $ECON_{it-1}$, *LITI*, LIQ_{it-1}, LEV_{it-1}, $Size_{it-1}$, $DLOSS_{it-1}$ and Acc_total_{it-1} are 0.005, -0.008, 0.0026, 0.027, 0.0093, 0.0109 and 0.1322 respectively but only LIQ_{it-1}, LEV_{it-1} and Acc_total_{it-1} have sign same as expectation. Control models in both proxies of $IndEP_{it}$ show that $ECON_{it-1}$, $Size_{it-1}$ and $DLOSS_{it-1}$ are statistically significant at 1% significant level but only $DLOSS_{it-1}$ has sign same as expectation. The coefficient of $ECON_{it-1}$, $Size_{it-1}$ and $DLOSS_{it-1}$ are 0.0206, 0.01 and 0.053. The results from both proxies of $IndEP_{it}$ are similar to each other. Results in others model which uses ESG factors show that control variables are still significant and have sign same as control model thus these control variables can control effect on those models.

The results of individual ESG factors on cost of equity show that there is not any relationship between cost of equity and ESG factors except environment factor is statistically significant at 5% significant level and positive relation to market beta. The coefficient of Env_{it-1} on beta in model 2 is 0.0016 and multiple factors in model 5 is 0.0015. This coefficient is quite low and after we calculate cost of equity by using the average value of Japan risk-free interest rate and Japan market risk premium from Damodaran, the cost of equity is changed only 0.0001 or 0.01% from risk-free interest rate. Because this number is very low so we conclude that environmental factor is statistically significant but not economic significant to beta.

All results between ESG factors are not statistically significant to all cost of equity in Japan market. The reason for these result might be ESG just implement in Japan in a few years so Japan firms have not interested in ESG yet and understand how to use benefits of ESG to firms.

Table 5.6. Effective of non-economic sustainability performance factors (ESG) on cost of equity (CAPM)

Panel regression results on $CAPM_{it}$ where $CAPM_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \beta_{11} Subprime + \beta_{12} Eurozone + \varepsilon$$

	X_{it}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	ESG_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0001			0.0001	
			(0)			(0.0001)	
Soc_{it-1}	-			0		0	
				(0)		(0.0001)	
Gov_{it-1}	-				0	0	
					(0)	(0)	
ESG_{it-1}	-						0
							(0.0001)
$ECON_{it-1}$	-	-0.0045**	-0.0041**	-0.0043**	-0.0045**	-0.0042**	-0.0043**
		(0.0018)	(0.0018)	(0.0019)	(0.0018)	(0.0019)	(0.0019)
LITI	+	-0.007*	-0.0067	-0.007*	-0.007*	-0.0066	-0.007*
		(0.0041)	(0.0041)	(0.0041)	(0.0041)	(0.0042)	(0.0041)
LIQ_{it-1}	+	0.0012**	0.0012**	0.0012**	0.0012**	0.0012**	0.0012**
		(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
LEV_{it-1}	+	0.0495***	0.0486***	0.0493***	0.0495***	0.0486***	0.0491***
		(0.0068)	(0.0068)	(0.0068)	(0.0068)	(0.0068)	(0.0068)
$Size_{it-1}$	-	-0.0018	-0.0022*	-0.0019	-0.0017	-0.0021*	-0.002*
		(0.0011)	(0.0012)	(0.0012)	(0.0011)	(0.0012)	(0.0012)
$ALTMAN_{it-1}$	+	0.0009	0.0008	0.001	0.0009	0.0007	0.001
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$DLOSS_{it-1}$	-	-0.0028	-0.0027	-0.0028	-0.0029	-0.0029	-0.0028
		(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)
AQ_{it-1}	+	0.0599	0.056	0.0591	0.0585	0.0541	0.0591
		(0.0415)	(0.0415)	(0.0416)	(0.0416)	(0.0416)	(0.0415)
Acc_Total_{it-1}	+	0.0816***	0.0808***	0.0812***	0.0806***	0.0797***	0.0815***
		(0.0212)	(0.0211)	(0.0212)	(0.0212)	(0.0212)	(0.0212)
subprime	+	-0.0078***	-0.0075***	-0.0077***	-0.0079***	-0.0077***	-0.0076***
		(0.002)	(0.0021)	(0.0021)	(0.0021)	(0.0021)	(0.0021)
Eurozone	+	0.0021	0.0019	0.002	0.0022	0.002	0.002
		(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
Cons		0.0888***	0.0966***	0.0916***	0.0886***	0.0955***	0.0923***
		(0.0322)	(0.0325)	(0.0329)	(0.0322)	(0.033)	(0.0327)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0143	0.0143	0.0143	0.0143	0.0142	0.0143
Chi^2		122.1762	124.2282	121.8725	122.1374	124.0287	121.9655
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.2838	0.3008	0.2870	0.2814	0.2971	0.2894
R^2 Within		0.0788	0.0800	0.0787	0.0796	0.0813	0.0786

Table 5.7. Effective of non-economic sustainability performance factors (ESG) on cost of equity (Beta)

Panel regression results on $Beta_{it}$ where $Beta_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \beta_{11} Subprime + \beta_{12} Eurozone + \varepsilon$$

	X_{it}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	ESG_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0016**			0.0015*	
			(0.0007)			(0.0008)	
Soc_{it-1}	-			0.0009		0.0003	
				(0.0007)		(0.0008)	
Gov_{it-1}	-				-0.0001	-0.0002	
					(0.0006)	(0.0006)	
ESG_{it-1}	-						0.0015
							(0.0009)
$ECON_{it-1}$	-	-0.0561**	-0.0485*	-0.0504*	-0.0564**	-0.048*	-0.0487*
		(0.0267)	(0.0269)	(0.027)	(0.0268)	(0.0271)	(0.0271)
LITI	+	-0.1333**	-0.1258**	-0.1329**	-0.1332**	-0.126**	-0.1313**
		(0.0622)	(0.0624)	(0.0623)	(0.0625)	(0.0629)	(0.0623)
LIQ_{it-1}	+	0.0259***	0.0261***	0.0259***	0.0258***	0.026***	0.026***
		(0.0074)	(0.0074)	(0.0074)	(0.0074)	(0.0074)	(0.0074)
LEV_{it-1}	+	0.7145***	0.6971***	0.7076***	0.7139***	0.6957***	0.7036***
		(0.0995)	(0.0997)	(0.0997)	(0.0997)	(0.1)	(0.0997)
$Size_{it-1}$	-	0.0199	0.0107	0.0136	0.0201	0.01	0.0119
		(0.0166)	(0.017)	(0.0172)	(0.0167)	(0.0174)	(0.0173)
$ALTMAN_{it-1}$	+	-0.0453	-0.0479	-0.0442	-0.0454	-0.0477	-0.0441
		(0.0587)	(0.0587)	(0.0587)	(0.0589)	(0.0589)	(0.0587)
$DLOSS_{it-1}$	-	0.0501	0.0517	0.0501	0.0497	0.0505	0.0525
		(0.0349)	(0.0348)	(0.0348)	(0.0349)	(0.0348)	(0.0348)
AQ_{it-1}	+	0.8965	0.8114	0.8636	0.8888	0.7909	0.8718
		(0.5999)	(0.5991)	(0.5999)	(0.6007)	(0.6004)	(0.5993)
Acc_Total_{it-1}	+	0.9762***	0.9577***	0.9552***	0.9718***	0.9424***	0.9746***
		(0.3048)	(0.3039)	(0.305)	(0.3055)	(0.3051)	(0.3044)
subprime	+	-0.1006***	-0.0938***	-0.0946***	-0.1009***	-0.0934***	-0.093***
		(0.0294)	(0.0294)	(0.0297)	(0.0295)	(0.0297)	(0.0297)
Eurozone	+	0.0368	0.0319	0.0333	0.037*	0.0318	0.0319
		(0.0224)	(0.0224)	(0.0225)	(0.0225)	(0.0225)	(0.0226)
Cons		0.053	0.2133	0.1783	0.0536	0.2382	0.1858
		(0.4723)	(0.4765)	(0.481)	(0.4732)	(0.4825)	(0.4789)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.2051	0.2043	0.2049	0.2051	0.2043	0.2048
Chi^2		120.5216	126.0523	122.2983	119.9302	125.2143	123.1073
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3461	0.3697	0.3566	0.3458	0.3703	0.3611
R^2 Within		0.0677	0.0725	0.0689	0.0678	0.0727	0.0697

Table 5.8. Effective of non-economic sustainability performance factors (ESG) on cost of equity (Gordon)

Panel regression results on $Gordon_{it}$ where $Gordon_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 BE_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \beta_{12} Subprime + \beta_{13} Eurozone + \varepsilon$$

	X_{it}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	ESG_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0			-0.0001	
			(0.0001)			(0.0001)	
Soc_{it-1}	-			0		0	
				(0.0001)		(0.0001)	
Gov_{it-1}	-				0	0	
					(0.0001)	(0.0001)	
ESG_{it-1}	-						0
							(0.0001)
$ECON_{it-1}$	-	0.005*	0.0048*	0.0051*	0.005*	0.005*	0.005*
		(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)
LITI	+	-0.008**	-0.0081**	-0.0081**	-0.008**	-0.0083**	-0.0081**
		(0.0038)	(0.0038)	(0.0038)	(0.0038)	(0.0038)	(0.0038)
LIQ_{it-1}	+	0.0026***	0.0026***	0.0026***	0.0026***	0.0026***	0.0026***
		(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
LEV_{it-1}	+	0.027***	0.0275***	0.0267***	0.027***	0.0271***	0.0271***
		(0.0086)	(0.0087)	(0.0087)	(0.0086)	(0.0088)	(0.0087)
$Size_{it-1}$	-	0.0093***	0.0095***	0.0092***	0.0093***	0.0094***	0.0094***
		(0.0014)	(0.0015)	(0.0015)	(0.0015)	(0.0016)	(0.0016)
$ALTMAN_{it-1}$	+	0.0024	0.0025	0.0024	0.0024	0.0026	0.0024
		(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)
BE_{it-1}	+	0.0029	0.003	0.0027	0.0028	0.0029	0.0028
		(0.0035)	(0.0035)	(0.0035)	(0.0035)	(0.0035)	(0.0035)
$DLOSS_{it-1}$	-	0.0109***	0.0108**	0.0109***	0.0109***	0.0107**	0.0108***
		(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)
AQ_{it-1}	+	0.0293	0.0312	0.0287	0.0292	0.0312	0.0292
		(0.0658)	(0.066)	(0.0659)	(0.0659)	(0.0662)	(0.0659)
Acc_Total_{it-1}	+	0.1322***	0.1322***	0.1315***	0.1319***	0.1309***	0.1315***
		(0.0362)	(0.0362)	(0.0362)	(0.0363)	(0.0364)	(0.0362)
subprime	+	0.0572***	0.0571***	0.0574***	0.0572***	0.0573***	0.0572***
		(0.0036)	(0.0036)	(0.0037)	(0.0036)	(0.0037)	(0.0037)
Eurozone	+	0.0342***	0.0343***	0.0342***	0.0343***	0.0343***	0.0343***
		(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)
Cons		-0.2169***	-0.222***	-0.2156***	-0.218***	-0.22***	-0.2198***
		(0.0394)	(0.0412)	(0.0418)	(0.0398)	(0.0424)	(0.042)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0255	0.0255	0.0255	0.0255	0.0255	0.0255
Chi^2		460.0365	459.7377	460.3066	459.9401	460.0472	460.3136
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3338	0.3342	0.3332	0.3335	0.3334	0.3334
R^2 Within		0.4014	0.4016	0.4021	0.4017	0.4029	0.4018

Table 5.9. Effective of non-economic sustainability performance factors (ESG) on cost of equity (IndEP exclude extraordinary item)

Panel regression results on $IndEP_{it}$ exclude extraordinary item where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average. Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 BE_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \beta_{12} Subprime + \beta_{13} Eurozone + \varepsilon$$

	X_{it}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	ESG_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0001			0.0001	
			(0.0002)			(0.0002)	
Soc_{it-1}	-			0		0	
				(0.0002)		(0.0002)	
Gov_{it-1}	-				0	0	
					(0.0002)	(0.0002)	
ESG_{it-1}	-						0
							(0.0002)
$ECON_{it-1}$	-	0.0206***	0.0209***	0.0208***	0.0206***	0.021***	0.0208***
		(0.0074)	(0.0075)	(0.0074)	(0.0074)	(0.0075)	(0.0074)
LITI	+	0.003	0.0031	0.0029	0.003	0.0031	0.003
		(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)
LIQ_{it-1}	+	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.021	-0.0219	-0.0215	-0.021	-0.0221	-0.0215
		(0.0205)	(0.0208)	(0.0207)	(0.0205)	(0.0209)	(0.0207)
$Size_{it-1}$	-	0.01***	0.0096***	0.0097***	0.0101***	0.0096**	0.0097**
		(0.0033)	(0.0037)	(0.0037)	(0.0035)	(0.0039)	(0.0039)
$ALTMAN_{it-1}$	+	0.0072	0.0068	0.0072	0.0072	0.0068	0.0071
		(0.0105)	(0.0106)	(0.0105)	(0.0105)	(0.0106)	(0.0105)
BE_{it-1}	+	0.0016	0.001	0.0013	0.0016	0.001	0.0013
		(0.0093)	(0.0095)	(0.0094)	(0.0093)	(0.0095)	(0.0094)
$DLOSS_{it-1}$	-	-0.053***	-0.0528***	-0.053***	-0.0531***	-0.0528***	-0.053***
		(0.0138)	(0.0139)	(0.0139)	(0.0139)	(0.0139)	(0.0139)
AQ_{it-1}	+	-0.0131	-0.0177	-0.0141	-0.0135	-0.0182	-0.0143
		(0.1888)	(0.1896)	(0.189)	(0.189)	(0.19)	(0.189)
Acc_Total_{it-1}	+	-0.0602	-0.059	-0.0597	-0.0613	-0.0605	-0.0587
		(0.1171)	(0.1173)	(0.1173)	(0.1179)	(0.1181)	(0.1176)
subprime	+	0.0068	0.0071	0.007	0.0067	0.007	0.007
		(0.0124)	(0.0124)	(0.0125)	(0.0124)	(0.0125)	(0.0125)
Eurozone	+	-0.0004	-0.0006	-0.0005	-0.0003	-0.0005	-0.0006
		(0.0091)	(0.0091)	(0.0091)	(0.0091)	(0.0092)	(0.0091)
Cons		-0.2852***	-0.275***	-0.2784***	-0.2869***	-0.2756***	-0.278***
		(0.092)	(0.0991)	(0.0995)	(0.0941)	(0.1022)	(0.1017)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0883	0.0884	0.0884	0.0884	0.0885	0.0884
Chi^2		60.4666	60.4748	60.4259	60.3987	60.3399	60.4208
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0709	0.0710	0.0710	0.0709	0.0710	0.0710
R^2 Within		0.0395	0.0388	0.0392	0.0396	0.0390	0.0391

Table 5.10. Effective of non-economic sustainability performance factors (ESG) on cost of equity (IndEP include extraordinary item)

Panel regression results on $IndEP_{it}$ include extraordinary item where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average. Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 BE_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \beta_{12} Subprime + \beta_{13} Eurozone + \varepsilon$$

	X_{it}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	ESG_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0001			0.0001	
			(0.0002)			(0.0002)	
Soc_{it-1}	-			0		0	
				(0.0002)		(0.0002)	
Gov_{it-1}	-				0	0	
					(0.0002)	(0.0002)	
ESG_{it-1}	-						0.0001
							(0.0002)
$ECON_{it-1}$	-	0.0204***	0.0208***	0.0206***	0.0204***	0.0208***	0.0206***
		(0.0074)	(0.0075)	(0.0074)	(0.0074)	(0.0075)	(0.0074)
LITI	+	0.0037	0.0039	0.0036	0.0037	0.0038	0.0037
		(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)
LIQ_{it-1}	+	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.0202	-0.0214	-0.021	-0.0203	-0.0216	-0.0209
		(0.0205)	(0.0208)	(0.0208)	(0.0206)	(0.0209)	(0.0207)
$Size_{it-1}$	-	0.01***	0.0094**	0.0096***	0.0101***	0.0095**	0.0095**
		(0.0033)	(0.0037)	(0.0037)	(0.0035)	(0.0039)	(0.0039)
$ALTMAN_{it-1}$	+	0.0069	0.0065	0.0069	0.0069	0.0065	0.0068
		(0.0105)	(0.0106)	(0.0105)	(0.0105)	(0.0106)	(0.0105)
BE_{it-1}	+	0.0012	0.0006	0.0009	0.0012	0.0005	0.0009
		(0.0093)	(0.0095)	(0.0094)	(0.0093)	(0.0095)	(0.0095)
$DLOSS_{it-1}$	-	-0.0532***	-0.0528***	-0.0532***	-0.0532***	-0.053***	-0.0531***
		(0.0139)	(0.0139)	(0.0139)	(0.0139)	(0.0139)	(0.0139)
AQ_{it-1}	+	-0.0144	-0.02	-0.0159	-0.0149	-0.0205	-0.0161
		(0.1892)	(0.19)	(0.1894)	(0.1893)	(0.1903)	(0.1894)
Acc_Total_{it-1}	+	-0.0557	-0.0543	-0.0549	-0.0572	-0.0563	-0.0537
		(0.1174)	(0.1175)	(0.1175)	(0.1182)	(0.1184)	(0.1178)
subprime	+	0.0068	0.0072	0.0072	0.0067	0.0072	0.0072
		(0.0124)	(0.0125)	(0.0125)	(0.0124)	(0.0125)	(0.0125)
Eurozone	+	-0.0006	-0.0008	-0.0008	-0.0006	-0.0008	-0.0008
		(0.0091)	(0.0091)	(0.0091)	(0.0091)	(0.0092)	(0.0092)
Cons		-0.284***	-0.2715***	-0.2739***	-0.2861***	-0.2713***	-0.2742***
		(0.0922)	(0.0993)	(0.0997)	(0.0943)	(0.1024)	(0.1019)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0885	0.0886	0.0886	0.0886	0.0887	0.0886
Chi^2		60.2395	60.2878	60.2397	60.1764	60.1754	60.2187
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0707	0.0708	0.0708	0.0707	0.0709	0.0707
R^2 Within		0.0388	0.0381	0.0385	0.0390	0.0383	0.0383

5.2.4 Interaction between Economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity results

The results from all model appear that most of all interaction between ECON factors and individual ESG factors also combination factors are not statistically significant to follow ESG factors are not significant to cost of equity in section 5.2.3.

The results from CAPM in table 5.11 show that both $ECON_{it-1}$ and ESG_{it-1} factors are not significant relationship to each other but some of control factors are statistically significant to $CAPM_{it-1}$. The significant control variables are LIQ_{it-1}, LEV_{it-1} and Acc_Total_{it-1} are significant at 5%, 10% and 1%. Coefficient of LIQ_{it-1}, LEV_{it-1} and Acc_Total_{it-1} in all models are approximately around 0.0012, 0.049, and 0.08 respectively.

The results from market beta in table 5.12 show only Env_{it-1} is statistically significant to model 1 which regress interaction between individual ESG factor and ECON factors and model 4 which regress interaction of multiple ESG factors and ECON factor. Env_{it-1} is significant at 5% and 10% in model 1 and 4 respectively. The coefficient of Env_{it-1} are 0.0016 and 0.0015 in model 1 and 4 respectively but coefficients are very small so there are not economic significant to market beta.

The results from Gordon show that Env_{it-1} and Soc_{it-1} have significant interaction at 5% and 10% significant level but coefficients between Env_{it-1} and Soc_{it-1} are very small at 0.0002 and 0.0001 respectively. Thus there is not economic significant to both factors. These results interpret Env_{it-1} and Soc_{it-1} are related to Gordon but the effect is very small.

The results from IndEP show that there is not any significant relationship between $ECON_{it-1}$ and ESG factors but ECON still statistically significant to all models at 5% significant level.

Overall results show the interaction between ECON and ESG factors is not significant on cost of equity but some of control variables are still statistically significant on cost of equity.

Table 5.11. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (CAPM)

Panel regression results on $CAPM_{it}$ where $CAPM_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \beta_{12} Subprime + \beta_{13} Eurozone + \varepsilon$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	-0.0037	-0.0032	-0.0034	-0.0033	-0.003
		(0.0048)	(0.0034)	(0.004)	(0.0053)	(0.0049)
Env_{it-1}	-	0.0001			0.0001	
		(0)			(0.0001)	
Soc_{it-1}	-		0		0	
			(0)		(0.0001)	
Gov_{it-1}	-			0	0	
				(0)	(0)	
ESG_{it-1}	-					0
						(0.0001)
$Econ_{it-1}$ X Env_{it-1}	-	0			0	
		(0.0001)			(0.0001)	
$Econ_{it-1}$ X Soc_{it-1}	-		0		0	
			(0.0001)		(0.0001)	
$Econ_{it-1}$ X Gov_{it-1}	-			0	0	
				(0.0001)	(0.0001)	
$Econ_{it-1}$ X ESG_{it-1}	-					0
						(0.0001)
$LITI$	+	-0.0067	-0.007*	-0.007*	-0.0066	-0.007*
		(0.0041)	(0.0041)	(0.0042)	(0.0042)	(0.0042)
LIQ_{it-1}	+	0.0012**	0.0012**	0.0012**	0.0012**	0.0012**
		(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
LEV_{it-1}	+	0.0486***	0.0495***	0.0494***	0.0489***	0.0493***
		(0.0068)	(0.0068)	(0.0068)	(0.0069)	(0.0068)
$Size_{it-1}$	-	-0.0022*	-0.0019	-0.0017	-0.002*	-0.002*
		(0.0012)	(0.0012)	(0.0011)	(0.0012)	(0.0012)
$ALTMAN_{it-1}$	+	0.0008	0.0008	0.0008	0.0006	0.0008
		(0.0041)	(0.004)	(0.004)	(0.0041)	(0.0041)
$DLOSS_{it-1}$	-	-0.0028	-0.0029	-0.0029	-0.0029	-0.0028
		(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)
AQ_{it-1}	+	0.0554	0.0569	0.0585	0.0529	0.0577
		(0.0418)	(0.0419)	(0.0416)	(0.0422)	(0.0417)
Acc_Total_{it-1}	+	0.0807***	0.0813***	0.0807***	0.0804***	0.0815***
		(0.0211)	(0.0212)	(0.0212)	(0.0213)	(0.0212)
subprime	+	-0.0075***	-0.0077***	-0.0079***	-0.0077***	-0.0076***
		(0.0021)	(0.0021)	(0.0021)	(0.0021)	(0.0021)
Eurozone	+	0.0019	0.002	0.0022	0.002	0.002
		(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
Cons		0.0972***	0.0925***	0.0889***	0.0948***	0.0933***
		(0.0328)	(0.0329)	(0.0323)	(0.0332)	(0.0329)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0143	0.0143	0.0143	0.0143	0.0143
Chi^2		123.7893	121.7280	121.7403	124.4167	121.4975
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3004	0.2871	0.2808	0.2988	0.2887
R^2 Within		0.0802	0.0785	0.0800	0.0804	0.0789

Table 5.12. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (Beta)

Panel regression results on $Beta_{it}$ where $Beta_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \beta_{12} Subprime + \beta_{13} Eurozone + \varepsilon$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	-0.0314	-0.0263	-0.0602	-0.0392	-0.0291
		(0.0697)	(0.049)	(0.0587)	(0.0767)	(0.0711)
Env_{it-1}	-	0.0016**			0.0015*	
		(0.0007)			(0.0008)	
Soc_{it-1}	-		0.0009		0.0003	
			(0.0007)		(0.0008)	
Gov_{it-1}	-			-0.0001	-0.0002	
				(0.0006)	(0.0006)	
ESG_{it-1}	-					0.0015
						(0.0009)
$Econ_{it-1}$ X Env_{it-1}	-	-0.0002			0.0002	
		(0.0009)			(0.0013)	
$Econ_{it-1}$ X Soc_{it-1}	-		-0.0005		-0.0007	
			(0.0008)		(0.0011)	
$Econ_{it-1}$ X Gov_{it-1}	-			0.0001	0.0003	
				(0.0009)	(0.001)	
$Econ_{it-1}$ X ESG_{it-1}	-					-0.0003
						(0.0011)
$LITI$	+	-0.1253**	-0.132**	-0.1331**	-0.1244**	-0.131**
		(0.0626)	(0.0623)	(0.0627)	(0.0626)	(0.0626)
LIQ_{it-1}	+	0.026***	0.0258***	0.0258***	0.026***	0.0259***
		(0.0074)	(0.0074)	(0.0074)	(0.0074)	(0.0074)
LEV_{it-1}	+	0.6991***	0.7141***	0.7133***	0.7047***	0.7056***
		(0.1002)	(0.1003)	(0.0999)	(0.1006)	(0.1003)
$Size_{it-1}$	-	0.0103	0.013	0.02	0.0093	0.0116
		(0.0172)	(0.0173)	(0.0168)	(0.0175)	(0.0173)
$ALTMAN_{it-1}$	+	-0.0513	-0.0489	-0.0448	-0.0506	-0.0475
		(0.0602)	(0.0593)	(0.0593)	(0.0603)	(0.06)
$DLOSS_{it-1}$	-	0.0511	0.0489	0.0496	0.0492	0.052
		(0.0348)	(0.0349)	(0.035)	(0.035)	(0.0349)
AQ_{it-1}	+	0.7917	0.8192	0.8844	0.7385	0.851
		(0.6028)	(0.6051)	(0.6012)	(0.6084)	(0.6022)
Acc_Total_{it-1}	+	0.9564***	0.9603***	0.9699***	0.951***	0.975***
		(0.304)	(0.3052)	(0.3057)	(0.3062)	(0.3045)
subprime	+	-0.094***	-0.0949***	-0.1009***	-0.0935***	-0.0932***
		(0.0294)	(0.0297)	(0.0295)	(0.0298)	(0.0297)
Eurozone	+	0.0316	0.033	0.0369	0.0311	0.0319
		(0.0225)	(0.0226)	(0.0225)	(0.0227)	(0.0226)
Cons		0.2271	0.1951	0.0557	0.2551	0.1964
		(0.4796)	(0.482)	(0.474)	(0.4857)	(0.4807)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.2044	0.2050	0.2051	0.2049	0.2047
Chi^2		125.6343	122.6237	119.4089	126.4462	122.5788
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3693	0.3568	0.3458	0.3720	0.3606
R^2 Within		0.0729	0.0685	0.0678	0.0717	0.0698

Table 5.13. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (Gordon)

Panel regression results on $Gordon_{it}$ where $Gordon_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_{1\,ECON_{it-1}} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 BE_{it-1} + \beta_{10} DLOSS_{it-1} + \beta_{11} AQ_{it-1} + \beta_{12} ACC\_Total_{it-1} + \beta_{13} Subprime + \beta_{14} Eurozone + \varepsilon$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	-0.0082	-0.0012	0.0028	-0.0064	-0.0065
		(0.0064)	(0.0046)	(0.006)	(0.0073)	(0.0066)
Env_{it-1}	-	0			-0.0001	
		(0.0001)			(0.0001)	
Soc_{it-1}	-		0		0	
			(0.0001)		(0.0001)	
Gov_{it-1}	-			0	0	
				(0.0001)	(0.0001)	
ESG_{it-1}	-					0
						(0.0001)
$Econ_{it-1}$ X Env_{it-1}	-	0.0002**			0.0002	
		(0.0001)			(0.0001)	
$Econ_{it-1}$ X Soc_{it-1}	-		0.0001*		0	
			(0.0001)		(0.0001)	
$Econ_{it-1}$ X Gov_{it-1}	-			0	0	
				(0.0001)	(0.0001)	
$Econ_{it-1}$ X ESG_{it-1}	-					0.0002*
						(0.0001)
$LITI$	+	-0.0083**	-0.008**	-0.008**	-0.0085**	-0.0079**
		(0.0038)	(0.0038)	(0.0038)	(0.0038)	(0.0038)
LIQ_{it-1}	+	0.0026***	0.0026***	0.0026***	0.0026***	0.0026***
		(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
LEV_{it-1}	+	0.0266***	0.0256***	0.0271***	0.026***	0.0262***
		(0.0087)	(0.0087)	(0.0086)	(0.0088)	(0.0087)
$Size_{it-1}$	-	0.0099***	0.0093***	0.0093***	0.0098***	0.0095***
		(0.0015)	(0.0015)	(0.0015)	(0.0016)	(0.0016)
$ALTMAN_{it-1}$	+	0.0043	0.0032	0.0026	0.0043	0.0038
		(0.0047)	(0.0047)	(0.0047)	(0.0048)	(0.0047)
BE_{it-1}	+	0.0031	0.0031	0.0028	0.0031	0.0031
		(0.0035)	(0.0035)	(0.0035)	(0.0035)	(0.0035)
$DLOSS_{it-1}$	-	0.0115***	0.0114***	0.0108**	0.0116***	0.0114***
		(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)
AQ_{it-1}	+	0.0437	0.0414	0.0282	0.0472	0.0387
		(0.066)	(0.0662)	(0.066)	(0.0666)	(0.0659)
Acc_Total_{it-1}	+	0.131***	0.1315***	0.1313***	0.1309***	0.1305***
		(0.0361)	(0.0362)	(0.0364)	(0.0364)	(0.0362)
subprime	+	0.0571***	0.0573***	0.0572***	0.0573***	0.0572***
		(0.0036)	(0.0036)	(0.0036)	(0.0037)	(0.0037)
Eurozone	+	0.0347***	0.0344***	0.0342***	0.0348***	0.0344***
		(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)
Cons		-0.231***	-0.2186***	-0.2182***	-0.2289***	-0.2233***
		(0.0412)	(0.0417)	(0.0398)	(0.0424)	(0.0418)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0255	0.0255	0.0255	0.0255	0.0255
Chi^2		466.9445	463.5724	459.4574	466.0689	464.1663
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3422	0.3361	0.3342	0.3410	0.3390
R^2 Within		0.4020	0.4066	0.4018	0.4040	0.4043

Table 5.14. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (IndEP exclude extraordinary item)

Panel regression results on $IndEP_{it}$ exclude extraordinary items where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor. Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 BE_{it-1} + \beta_{10} DLOSS_{it-1} + \beta_{11} AQ_{it-1} + \beta_{12} ACC\_Total_{it-1} + \beta_{13} Subprime + \beta_{14} Eurozone + \varepsilon$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	0.0451**	0.0299**	0.0436**	0.0554***	0.0465***
		(0.0176)	(0.0124)	(0.0169)	(0.0203)	(0.018)
Env_{it-1}	-	0.0001			0.0001	
		(0.0002)			(0.0002)	
Soc_{it-1}	-		0		0	
			(0.0002)		(0.0002)	
Gov_{it-1}	-			0	0	
				(0.0002)	(0.0002)	
ESG_{it-1}	-					0
						(0.0002)
$Econ_{it-1}$ X Env_{it-1}	-	-0.0004			-0.0004	
		(0.0003)			(0.0004)	
$Econ_{it-1}$ X Soc_{it-1}	-		-0.0002		0.0001	
			(0.0002)		(0.0003)	
$Econ_{it-1}$ X Gov_{it-1}	-			-0.0004	-0.0003	
				(0.0003)	(0.0003)	
$Econ_{it-1}$ X ESG_{it-1}	-					-0.0005
						(0.0003)
$LITI$	+	0.0032	0.0028	0.0028	0.0031	0.0028
		(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)
LIQ_{it-1}	+	0.0002	0.0003	0.0003	0.0002	0.0002
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.022	-0.021	-0.0212	-0.0223	-0.021
		(0.0208)	(0.0207)	(0.0205)	(0.0209)	(0.0207)
$Size_{it-1}$	-	0.0089**	0.0095**	0.0097***	0.0089**	0.0091**
		(0.0037)	(0.0037)	(0.0035)	(0.0039)	(0.0039)
$ALTMAN_{it-1}$	+	0.0043	0.0066	0.0049	0.0032	0.0049
		(0.0107)	(0.0105)	(0.0106)	(0.0108)	(0.0106)
BE_{it-1}	+	0.0012	0.0011	0.0018	0.0015	0.0013
		(0.0095)	(0.0094)	(0.0093)	(0.0095)	(0.0094)
$DLOSS_{it-1}$	-	-0.054***	-0.054***	-0.0528***	-0.0534***	-0.0542***
		(0.0139)	(0.0139)	(0.0138)	(0.014)	(0.0139)
AQ_{it-1}	+	-0.0293	-0.0231	0.0051	-0.0116	-0.0192
		(0.1896)	(0.1893)	(0.1892)	(0.191)	(0.1889)
Acc_Total_{it-1}	+	-0.0528	-0.0586	-0.045	-0.044	-0.0497
		(0.1173)	(0.1173)	(0.1183)	(0.1186)	(0.1176)
$subprime$	+	0.0072	0.0072	0.007	0.0072	0.0073
		(0.0124)	(0.0125)	(0.0124)	(0.0125)	(0.0125)
$Eurozone$	+	-0.0017	-0.001	-0.0002	-0.0012	-0.0013
		(0.0091)	(0.0091)	(0.0091)	(0.0092)	(0.0091)
Cons		-0.2556**	-0.271***	-0.2757***	-0.2556**	-0.2614**
		(0.0998)	(0.0998)	(0.0943)	(0.103)	(0.1022)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0883	0.0884	0.0883	0.0885	0.0883
Chi^2		62.8788	61.2506	62.7637	63.6951	62.9845
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0737	0.0720	0.0736	0.0750	0.0738
R^2 Within		0.0407	0.0387	0.0415	0.0425	0.0403

Table 5.15. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (IndEP include extraordinary item)

Panel regression results on $IndEP_{it}$ include extraordinary items where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor. Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 BE_{it-1} + \beta_{10} DLOSS_{it-1} + \beta_{11} AQ_{it-1} + \beta_{12} ACC\_Total_{it-1} + \beta_{13} Subprime + \beta_{14} Eurozone + \varepsilon$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	0.0454***	0.0301**	0.0432**	0.0554***	0.0468***
		(0.0176)	(0.0124)	(0.017)	(0.0203)	(0.0181)
Env_{it-1}	-	0.0001			0.0001	
		(0.0002)			(0.0002)	
Soc_{it-1}	-		0		0	
			(0.0002)		(0.0002)	
Gov_{it-1}	-			0	0	
				(0.0002)	(0.0002)	
ESG_{it-1}	-					0.0001
						(0.0002)
$Econ_{it-1}$ X Env_{it-1}	-	-0.0004			-0.0004	
		(0.0003)			(0.0004)	
$Econ_{it-1}$ X Soc_{it-1}	-		-0.0002		0.0001	
			(0.0002)		(0.0003)	
$Econ_{it-1}$ X Gov_{it-1}	-			-0.0004	-0.0003	
				(0.0003)	(0.0003)	
$Econ_{it-1}$ X ESG_{it-1}	-					-0.0005
						(0.0003)
$LITI$	+	0.0039	0.0035	0.0035	0.0038	0.0035
		(0.0079)	(0.0079)	(0.0079)	(0.0079)	(0.0079)
LIQ_{it-1}	+	0.0001	0.0003	0.0003	0.0002	0.0002
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.0215	-0.0205	-0.0205	-0.0219	-0.0204
		(0.0208)	(0.0208)	(0.0205)	(0.0209)	(0.0207)
$Size_{it-1}$	-	0.0087**	0.0093**	0.0097***	0.0088**	0.009**
		(0.0037)	(0.0037)	(0.0035)	(0.0039)	(0.0039)
$ALTMAN_{it-1}$	+	0.0039	0.0063	0.0046	0.0028	0.0045
		(0.0107)	(0.0105)	(0.0106)	(0.0108)	(0.0106)
BE_{it-1}	+	0.0007	0.0006	0.0014	0.001	0.0009
		(0.0095)	(0.0094)	(0.0093)	(0.0096)	(0.0095)
$DLOSS_{it-1}$	-	-0.0541***	-0.0542***	-0.0529***	-0.0536***	-0.0544***
		(0.0139)	(0.0139)	(0.0139)	(0.014)	(0.0139)
AQ_{it-1}	+	-0.0318	-0.0253	0.0036	-0.0149	-0.021
		(0.19)	(0.1896)	(0.1896)	(0.1914)	(0.1893)
Acc_Total_{it-1}	+	-0.0479	-0.0538	-0.041	-0.0401	-0.0445
		(0.1175)	(0.1175)	(0.1186)	(0.1189)	(0.1178)
subprime	+	0.0073	0.0074	0.007	0.0073	0.0075
		(0.0124)	(0.0125)	(0.0124)	(0.0125)	(0.0125)
Eurozone	+	-0.002	-0.0013	-0.0004	-0.0015	-0.0016
		(0.0092)	(0.0091)	(0.0091)	(0.0092)	(0.0092)
Cons		-0.2518**	-0.2662***	-0.2749***	-0.2509**	-0.2573**
		(0.1)	(0.1)	(0.0945)	(0.1032)	(0.1024)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0885	0.0886	0.0885	0.0887	0.0885
Chi^2		62.7807	61.1477	62.4952	63.5376	62.8674
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0736	0.0718	0.0733	0.0748	0.0737
R^2 Within		0.0400	0.0380	0.0408	0.0417	0.0395

5.2.5 Robustness Test Result

5.2.5.1 Robustness Test Result of Individual Economic Sustainability Variables and Cost of Equity

The regression results are shown in Appendix G in table G1 to G5, all models have observation number is 805 firm-year and separate to 119 firms. All models are statistically significant at 1% level means that our study can use all models and interpretations.

- CAPM and Market Beta as Cost of Equity

From regression results in appendix G table G1 and G2, model 1 shows the regression between cost of equity and control variables and model 2 to 8 are added economic sustainability variables. The result in model 1 table G1 shows that liquidity, leverage, firm size, accrual quality and total accrual are significant at 1%, 1%, 5%, 10% and 1% level respectively related to CAPM and direction are same as studies of Francis et al. (2005); Francis et al. (2004); Hou et al. (2012). Coefficients of each variable show that accrual quality, total accrual, and leverage are effecting on CAPM with 0.075, 0.07 and 0.05 respectively. Liquidity and size effect on CAPM less than 0.01 are a lower impact than the three variables above. Altman Z-score, market to book value of equity and dividom are not significantly related to CAPM.

In table G2, model 1 shows LIQ_{it-1}, LEV_{it-1}, $ALTMAN_{it-1}$, QA_{it-1} and Acc_Total_{it-1} are statistically significant at 1%, 1%, 5%, 5% and 10% level respectively to beta. LIQ_{it-1}, LEV_{it-1}, QA_{it-1} and Acc_Total_{it-1} have a positive relation to beta. $ALTMAN_{it-1}$ is a negative relation to beta which means higher bankruptcy risk has higher market risk. Coefficients of significant variables show that accrual quality is most impact on Beta at 1.2129 or 121.29% followed by leverage, total accrual, Altman Z-score and liquidity at 0.782, 0.5297, 0.1194 and 0.0272 respectively.

Model 2 to model 8 show the results of individual ECON variables on cost of equity. The results of model 3, 6 and 8 show that sale, R&D expense, and omission of dividend dummy are not statistically significant to both CAPM and market beta. From table G1, sale growth, volatility of sale growth and advertisement expense are statistically significant at 1% level to $CAPM_{it}$. Sale growth has positive relation on CAPM with coefficient 0.0135 means sale growth increase effect to cost of equity ($CAPM_{it-1}$) will increase 0.0135 or 1.35%. Volatility of sale growth has positive

sign and coefficient at 0.0621 or 6.21% can be implied that firm with the high volatility of sale growth increases cost of equity because high volatility increases risk of firms thus investors expect to have a higher return to compensate increasing of risk. Advertisement expense has a negative relation to cost of equity which consistence with the result of Singh, Faircloth, and Nejadmalayeri (2005) and the coefficient is 0.0786 or 7.86% means that in Japan if firms increases advertisement expense, cost of equity will decrease. The reason is advertisement helps to enhance and stabilize cash flow, help to increase investor base and increase liquidity of stock (Singh et al., 2005). Model 2, 3, 6 and 8 which using ROE, sale, R&D expense and dividend are not statistically significant.

In table G2, market beta is statistic significant to ROE, volatility of sale growth and advertisement in model 2, 5, 7 respectively and other variables are not significant to market beta. ROE has a negative relation to market beta but the coefficient is lower than 0.01 (at 0.0014). The volatility has a positive relation to market beta with a coefficient at 1.0627 or 106.27% which mostly effects market beta. Advertisement expense has a negative relation to market beta and a coefficient is 1.0492 or 104.92%.

From the results of table G1 and G2, by comparing between CAPM and market beta, we could find that ECON variables that impact both cost of equity are volatility of sale growth and advertisement expense but different in ROE and sale growth.

- Gordon and IndEP as Implied Cost of Equity

By following panel regression in equation (8), this study uses three proxies as implied cost of equity. First, this study uses Gordon base on the finite horizon expected model estimate the implied cost of equity. Second and third proxies are IndEP from two EPS; exclude and include extraordinary items. Model 1 of all implied cost of equity proxies regress between the implied cost of equity and control variables, this model is using as control model and showing that some variables are significant to the implied cost of equity.

First, the control model result of Gordon in model 1 shows liquidity, leverage, size of firm, beta, market to book value and total accrual are statistic significant to Gordon at 5%, 1%, 1%, 2%, 1% and 1 % level respectively. The signs of

all significant variables are consistence with prior research of Francis et al. (2005); Francis et al. (2004); Hou et al. (2012). Coefficient are 0.0024, 0.0294, 0.0054, 0.0069, -0.0033 and 0.1709 respectively. Other control variables are not significant to Gordon.

The panel regression results of ECON variables on Gordon find ROE, sale, volatility of sale growth are statistic significant to Gordon at 1%, 1% and 5% level which consistent with Operation efficiency factor in a study of Gode and Mohanram (2001); Ng and Rezaee (2015). The coefficient of ROE, sale, and volatility of sale growth shows sale and volatility are higher effects at 0.0434 and 0.0422 to Gordon than ROE at 0.0004.

The control model 1 results between IndEP for both proxies (*IndEP_EXD*$_{it}$ and *IndEP_IND*$_{it}$) in table G4 and G5 show that only Altman Z-score and total accrual are significant and direction is same as prior research and expected. Leverage and size are significant to both proxies of IndEP but directions are different with expectation. The reasons that result from IndEP are different from other cost of equity possible from IndEP is bias selection. According to IndEP is calculated by EP ratio of each firms minus median of EP ratio in each Fama French 49 business sector of overall data that retrieve from Thomson Reuter which can select only one firm in a sector which limited to other variables. But for other proxies of cost of equity (*CAPM*$_{it}$, *Beta*$_{it}$, and *Gordon*$_{it}$) are depended on firms itself and it does not depend on its industrial. The ECON variables that statistic significant to IndEP are ROE, volatility of sale growth and advertisement at 1%, 1% and 10% significant level respectively. ROE has a positive relation with IndEP which consistent with the study of Ng and Rezaee (2015) and the coefficient of ROE on IndEP is 0.0012 or 0.12%. But volatility of sale growth and advertisement expense sign are not consistent with IndEP which causes from above reason.

All tables show that volatility of sale growth has a positive relationship to cost of equity (*CAPM*$_{it}$, *Beta*$_{it}$ and *Gordon*$_{it}$) means that Japanese firms will have a lowering cost of equity when firms can maintain the stability of revenue growth in the long run. Most of tables show that increasing advertisement expense can reduce cost of equity in the long run in Japan.

5.2.5.2 Robustness Test Results of Non-Economic Sustainability (ESG) Performance and Cost of Equity

First, the study uses CAPM and market beta as cost of equity. The results consist relationships of separated ESG factors, multiple ESG factors and combined ESG score on CAPM. The results between ESG factors and cost of equity are shown in appendix G table G1 to G5.

The result in model 9 shows environment score is statistically significant to CAPM and market beta with coefficient 5% and 1% respectively. Environment score has a positive relation to CAPM and beta which means firms have better environment score, cost of equity will increase. But the coefficient of environment score is 0.01% in CAPM and 0.22% in market beta that means the effect of environment score on both cost of equity is not economically significant. The results of social score are statistically significant to market beta at 5% level but not significant to CAPM in model 10. The coefficient between social score and market beta is 0.17% with a positive sign, this coefficient shows that the effect of environment on market beta is too little and might not effect real market conditions. The governance score is not significant to both CAPM and market beta means that governance doesn't effect on CAPM and Beta show in model 11.

In model 12, multiple environment, social and governance score are added to find out the effect of all ESG on cost of equity. The result of CAPM shows that the only environment pillar is significant at 10% level and a positive effect but the coefficient is still little at 0.01%. The result of beta shows that the only environment pillar is significant at 5% level and has positive relation. The coefficient is still a small effect at 0.18%.

In model 13, the Thomson Reuter ESG score is used to represent ESG score for overall ESG performance. The results of ESG combined score in model 13 show that both CAPM and beta are not significantly affected by ESG score. Second, we use the implied cost of equity from Gordon and IndEP to panel regress with ESG score. The results show that all of ESG variables are not significant to both Gordon and IndEP.

Robustness results conclude that economic sustainability variables which statistically significant to cost of equity and have negative relation are

volatility of sale growth and advertisement expenses in Japan market. The ESG factors are not significant to cost of equity in Japan market.

CHAPTER VI
CONCLUSIONS

6.1 Conclusions

The proposal of this study is finding the effects of economic (ECON) and non-economic (ESG) sustainability performance on cost of equity and implied cost of equity. This research selects information from Japanese listed firms in Tokyo Stock Exchange because Japan is one of the largest markets in Asia that can provide ESG refer to Thomson Reuter database. This research uses a panel with lead-lag regression model by regress ECON factors, ESG factors and interaction factors with individual and combined factors follow Ng and Rezaee (2015). The selected samples are consist of 119 firms and observation at 805 firm-year. This study includes business sector and year effect as fixed effect control in panel regression model. Last, the robustness test is added by testing on individual variables of both ECON and ESG.

The economic sustainability performance factors in this study are created by principal component factor analysis or PCA. From Japanese firms data, we can create three factors that include growth opportunity factor (GR_{it-1}), Operation effort factor (OP_{it-1}) and Equity effort factor (EQ_{it-1}) then create economic sustainability performance ($ECON_{it-1}$) by an average of three factors.

The effects of individual ECON factors on cost of equity is different on each proxy of cost of equity which can separate into two groups. The first group consists of $CAPM_{it}$ and market beta (BE_{it-1}). Results of the first group find that OP_{it-1}, EQ_{it-1} and $ECON_{it-1}$ are statistically significant and negative relationship to both $CAPM_{it}$ and BE_{it}. These results mean that when Japanese firms with higher operation effort and equity effort can have a lower cost of equity. This conclusion implied that Japanese firms shall maintain their operation effort and equity effort to reduce their cost of equity. The second group consists of $Gordon_{it}$ and $IndEP_{it}$ and results of this group appear that EQ_{it-1} and $ECON_{it-1}$ are statistically significant and positive relationship to $Gordon_{it}$ and $IndEP_{it}$. But the coefficients of both factors are small which tend to be not economically

significant to these proxies of cost of equity. The conclusion of this group is unclear and cannot interpret.

The results of ESG factors on both groups of cost of equity show that ESG factors do not have any significant relationship to cost of equity. The results mean that ESG factors have not effected to cost of equity in Japanese firm yet. The reason may be Japanese firms have not considered ESG factors into a firm's operations thus cost of equity could not be reduced. According to ESG factors is not significant to cost of equity thus interaction between ECON factors and ESG factors are not significant to each other.

Japanese firms have only economic sustainability performances is a negative relationship to cost of equity in CAPM and beta. Japanese firm should invest and consider two factors which are operation effort and equity effort. The non-economic sustainability performances or ESG do not have any effect on cost of equity in Japanese firms.

The industry sector and year effect and lead-lag regression are added to all models to solve statistic fixed effect and endogeneity problems. Results of sector effect show that some of business sectors are significant to cost of equity but results are different on each proxy of cost of equity. These results mean different industrial sectors effect on different proxies of cost of equity. When applying year effect to models, this study finds that during economic crisis period both subprime in 2008 and Eurozone crisis during 2011 to 2012 effect cost of equity increase. Lead-lag regression is used for all models to eliminate endogeneity problems.

The robustness test studies individual, multiple and combined economic and non-economic sustainability variables on cost of equity. This robustness test consists of two parts. The first part is individual ECON variables. The second part is individual, multiple and combined ESG factors.

The effect of individual ECON variables on cost of equity results from section 5.2.5, show ECON variables that significant to cost of equity are volatility of sale growth and advertisement expense which effect follow expectations. The volatility of sale growth has a positive relation to cost equity that means when firms have higher volatility of sale growth, cost of equity of firm will increase. These results conclude that Japanese firms with a stable of sale growth that firms can lower cost of equity. The advertisement expense affects cost of equity in Japanese firms in negative relation which

different from American firms from the prior study of Ng and Rezaee (2015) that do not relate to cost of equity capital. This result means Japanese firm can reduce cost of equity when increase advertisement expense. The other variables such as sale growth, R&D expense, and dividend omission do not have any effect on cost of equity in Japanese firms. If firms need to reduce their cost of equity and create value of firm, firms shall focus on the stability of sale growth and investing in advertisement to be a sustained firm. In Investor side, investors shall pay attention to firms with lower sale growth volatility and higher advertisement expense for sustainability firms.

The effect of ESG on cost of equity results show that only environment score has significant to cost of equity but a coefficient is a small number which means that cost of equity does not economically significant to individual and combined ESG score in Japan market.

6.2 Implication

This study uses Japanese firms to understand the relationship between business sustainability on cost of equity that different from other researches which study in the United States of America. All above results show that Japan market is different from US market which all of non-economic sustainability performances are not effect to cost of equity. These results may possibly different from the culture and trend of ESG in Japan that has begun for a few years back and also the limitation of data.

6.3 Limitation of this study

There are the limitation of information in this study such as ESG and some ECON information. Even though ESG data in Japan market from Thomson Reuter can provide more than other countries in Asia but it is around 10% out of all firms in the market (460 out of 3,729 firms). Some financial data such as advertisement, R&D expense are not available in database so retrieved data are in short period as this study has only 119 firm on observation 805 firm-year or around 7 years per firm. According

to the limitation of information, this study is possible to bias from available data in Thomson Reuter EIKON.

6.4 Suggestions

According to the limitation of data in Japan and other countries in Asia, further research shall do in case still studying between sustainability performance and cost of equity in two ways; first way is investigating for all country in Asia and Europe for more information that can retrieve or second way is waiting for more information in the future because this sustainability trend is still one famous trend in the future. Other further studies about business sustainability in firm side shall do with cost of debt, cost of capital, cash flow generation or even firm valuations. For investor side, shall do in terms of return and risk. The last regulator shall do in dimension of information disclosure of firms and revise the accounting standard.

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APPENDICIES

Appendix A: The summary of firms in Tokyo Stock Exchange separate by Fama French 49 industrial group

Table A1. Number of firm in Tokyo Stock Exchange separate into Fama-French 49 industrial groups and include number of firm and observation of samples.

Sector No.	Sector name	No. of firm	No. of Comp. sample	Obs. Sample
1	Agriculture	14	1	5
2	Food Product	99	8	81
3	Candy & Soda	20	3	23
4	Beer & Liquor	6	4	28
5	Tobacco Products	1	1	3
6	Recreation	43	10	82
7	Entertainment	41	12	0
8	Printing and Publishing	32	0	0
9	Consumer Goods	72	12	85
10	Apparel	34	2	12
11	Healthcare	20	0	0
12	Medical Equipment	34	3	42
13	Pharmaceutical Products	55	14	118
14	Chemicals	140	2	20
15	Rubber and Plastic Products	36	0	0
16	Textiles	32	1	14
17	Construction Materials	117	3	18
18	Construction	227	4	13
19	Steel Works etc.	72	2	16
20	Fabricated Products	11	0	0
21	Machinery	221	7	51
22	Electrical Equipment	56	3	39
23	Automobiles and Trucks	103	14	133
24	Aircraft	4	0	0
25	Shipbuilding, Railroad Equipment	7	0	0
26	Defense	2	0	0
27	Precious Metals	1	0	0
28	Non-Metallic and Industrial Metal Mining	5	0	0
29	Coal	0	0	0
30	Petroleum and Natural Gas	12	0	0
31	Utilities	25	0	0

Table A1. Number of firm in Tokyo Stock Exchange separate into Fama-French 49 industrial groups and include number of firm and observation of samples. (Cont.)

Sector No.	Sector name	No. of firm	No. of Comp. sample	Obs. Sample
32	Communication	29	3	17
33	Personal Services	78	1	6
34	Business Services	330	3	5
35	Computers	31	5	41
36	Computer Software	379	11	40
37	Electronic Equipment	113	5	44
38	Measuring and Control Equipment	63	3	27
39	Business Supplies	45	1	2
40	Shipping Containers	9	0	0
41	Transportation	113	0	0
42	Wholesale	269	1	3
43	Retail	275	3	16
44	Restaurants, Hotels, Motels	118	1	7
45	Banking	108	1	1
46	Insurance	18	0	0
47	Real Estate	128	3	29
48	Trading	72	0	0
49	Almost Nothing	9	0	0
Total		3729	147	1021

Appendix B: Correlation between variables

Table B1. Correlation between independent variables to estimated economic sustainability (ECON) factors from principal factor analysis.

***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

Variables		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	$F1_t$	1														
2	$F2_t$	0	1													
3	$F3_t$	0	0	1												
4	GR_t	0.99***	0.01	0.06*	1											
5	OP_t	0.05	0.9***	-0.04	0.05	1										
6	EQ_t	0.01	-0.08**	0.9***	0.09***	-0.04	1									
7	$ECON_t$	0.58***	0.47***	0.51***	0.64***	0.57***	0.59***	1								
8	$TobinQ\_ED_t$	0.96***	-0.02	0.13***	0.97***	0.03	0.18***	0.66***	1							
9	ROE_t	0.17***	0.03	0.76***	0.18***	0.01	0.78***	0.54***	0.25***	1						
10	$Sale_t$	-0.04	0.81***	0.02	-0.01	0.81***	-0.04	0.42***	-0.05	0.01	1					
11	$SaleGr_t$	0.2***	0.11***	0.64***	0.18***	0.03	0.27***	0.27***	0.18***	0.31***	0.08***	1				
12	$MVBV_t$	0.97***	0.04	-0.02	0.97***	0.06**	0	0.58***	0.9***	0.09***	0.02	0.17***	1			
13	RD_t	0.01	-0.59***	-0.09***	-0.03	-0.21***	0	-0.13***	-0.01	-0.03	-0.24***	-0.05	-0.04	1		
14	AD_t	0.12***	0.66***	-0.08***	0.09***	0.81***	-0.01	0.5***	0.1***	0	0.32***	-0.03	0.08***	-0.1***	1	
15	$Dividom\_r_t$	-0.15***	-0.15***	0.65***	-0.03	-0.07**	0.78***	0.38***	0.03	0.23***	-0.08***	0.11***	-0.09***	0.03	-0.02	1

Table B2. Correlation between all variables included cost of equity, independent variables, ECON factors, ESG factors and control variables in the same year period.

***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	$IndEP\_EXD_t$	1																														
2	$IndEP\_IND_t$	0.96***	1																													
3	$Gordon_t$	0.2***	0.18***	1																												
4	$CAPM_t$	-0.1***	-0.1***	0.16***	1																											
5	BE_t	-0.08***	-0.09***	0.19***	0.97***	1																										
6	$TobinQ\_ED_t$	0.04	0.04	-0.31***	-0.15***	-0.14***	1																									
7	ROE_t	0.7***	0.58***	0.23***	-0.07**	-0.05	0.25***	1																								
8	$Sale_t$	-0.03	-0.04	0.15***	0.01	-0.01	-0.05	0.01	1																							
9	$SaleGr_t$	0.26***	0.27***	0.09***	-0.08***	-0.06**	0.18***	0.31***	0.08***	1																						
10	$SaleGR\_SD_t$	-0.19***	-0.19***	0.1***	0.27***	0.27***	-0.04	-0.12***	0.25***	-0.24***	1																					
11	$MVBV_t$	-0.05	0.01	-0.35***	-0.06**	-0.06**	0.9***	0.09***	0.02	0.17***	0	1																				
12	RD_t	-0.01	-0.02	0.01	0.04	0.02	-0.01	-0.03	-0.24***	-0.05	-0.03	-0.04	1																			
13	AD_t	0.04	0.05	-0.09***	-0.29***	-0.3***	0.1***	0	0.32***	-0.03	0	0.08***	-0.1***	1																		
14	$Dividom_t$	-0.21***	-0.2***	-0.03	0.16***	0.17***	-0.03	-0.23***	0.08***	-0.11***	0.3***	0.09***	-0.03	0.02	1																	
15	$Dividom\_r_t$	0.21***	0.2***	0.03	-0.16***	-0.17***	0.03	0.23***	-0.08***	0.11***	-0.3***	-0.09***	0.03	-0.02	-1	1																
16	GR_t	0	0.03	-0.34***	-0.11***	-0.1***	0.97***	0.18***	-0.01	0.18***	-0.02	0.97***	-0.03	0.09***	0.03	-0.03	1															
17	OP_t	0	0	0.04	-0.17***	-0.19***	0.03	0.01	0.81***	0.03	0.15***	0.06**	-0.21***	0.81***	0.07**	-0.07**	0.05	1														
18	EQ_t	0.58***	0.5***	0.17***	-0.14***	-0.14***	0.18***	0.78***	-0.04	0.27***	-0.26***	0	0	-0.01	-0.78***	0.78***	0.09***	-0.04	1													
19	$ECON_t$	0.33***	0.3***	-0.07**	-0.24***	-0.24***	0.66***	0.54***	0.42***	0.27***	-0.07**	0.58***	-0.13***	0.5***	-0.38***	0.38***	0.64***	0.57***	0.59***	1												
20	Env_t	-0.02	-0.03	0.1***	0.35***	0.37***	-0.11***	-0.03	-0.02	-0.02	0.07**	-0.04	0.22***	-0.27***	0.09***	-0.09***	-0.08**	-0.18***	-0.07**	-0.18***	1											
21	Soc_t	-0.01	-0.02	0.09***	0.26***	0.3***	-0.1***	-0.02	-0.1***	0	-0.04	-0.04	0.34***	-0.27***	0	0	-0.07**	-0.23***	-0.01	-0.17***	0.69***	1										
22	Gov_t	0.02	0	0.01	0.05*	0.08**	0.05	0.02	-0.18***	0.02	-0.06*	0.03	0.22***	-0.12***	-0.03	0.03	0.04	-0.19***	0.03	-0.06**	0.23***	0.36***	1									
23	ESG_t	0	-0.02	0.09***	0.29***	0.32***	-0.07**	-0.01	-0.12***	0	-0.01	-0.02	0.33***	-0.28***	0.02	-0.02	-0.05	-0.25***	-0.02	-0.18***	0.82***	0.89***	0.64***	1								
24	$LITI_t$	0.03	0.01	-0.07**	-0.15***	-0.16***	0.06**	0.02	-0.17***	-0.02	-0.11***	0.01	0.47***	-0.06*	-0.05	0.05	0.04	-0.14***	0.05	-0.03	-0.06**	0.05	0.05	0.01	1							
25	LIQ_t	-0.13***	-0.15***	0.13***	0.3***	0.31***	-0.05*	-0.08***	0.08**	-0.04	0.18***	-0.02	-0.02	-0.02	0.25***	-0.25***	-0.04	0.04	-0.21***	-0.12***	0.1***	0.06*	0	0.07**	-0.08**	1						
26	LEV_t	-0.16***	-0.19***	0.19***	0.45***	0.45***	-0.32***	-0.13***	0.33***	-0.03	0.12***	-0.13***	-0.15***	-0.12***	0.23***	-0.23***	-0.23***	0.13***	-0.23***	-0.19***	0.34***	0.29***	0.05	0.29***	-0.15***	0.24***	1					
27	$Size_t$	0.06*	0.05	-0.09***	0.13***	0.14***	0.2***	0.12***	-0.28***	0.12***	-0.11***	0.22***	0.31***	-0.26***	0.01	-0.01	0.22***	-0.33***	0.07**	-0.03	0.43***	0.47***	0.32***	0.52***	0.14***	-0.08***	0.09***	1				
28	$ALTMAN_t$	0.03	0.02	0.07**	-0.05	-0.06**	0.08***	0.06*	0.93***	0.08***	0.22***	0.13***	-0.2***	0.35***	0.07**	-0.07**	0.11***	0.78***	-0.01	0.49***	-0.02	-0.09***	-0.12***	-0.1***	-0.11***	0.04	0.2***	-0.21***	1			
29	$DLOSS_t$	-0.52***	-0.53***	-0.15***	0.15***	0.13***	-0.11***	-0.46***	0.05	-0.38***	0.19***	-0.08**	0.06**	-0.05	0.16***	-0.16***	-0.1***	0	-0.39***	-0.28***	0.04	0.06**	0.01	0.05	0.02	0.12***	0.21***	-0.09***	0	1		
30	AQ_t	-0.41***	-0.41***	0.01	0.11***	0.1***	0.02	-0.23***	0.02	-0.19***	0.41***	0.03	0.17***	0	0.15***	-0.15***	0.03	0.01	-0.25***	-0.11***	0.02	-0.02	-0.04	-0.02	0.04	0.12***	-0.06*	-0.12***	-0.01	0.26***	1	
31	Acc_Total_t	0.6***	0.58***	0.21***	-0.03	-0.02	0.17***	0.53***	0.07**	0.12***	-0.03	0.13***	-0.09***	0.08**	-0.04	0.04	0.15***	0.09***	0.36***	0.34***	-0.03	-0.04	-0.05*	-0.05*	-0.02	-0.06*	-0.14***	0.06**	0.12***	-0.42***	-0.3***	1

Table B3. Correlation between all variables included cost of equity, independent variables, ECON factors, ESG factors and control variables when leading term is cost of equity and lagging term is included independent variables, ECON factors, ESG factors and control variables.

***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	$lndEP\_EXD_t$	1																															
2	$lndEP\_IND_t$	0.96***	1																														
3	$Gordon_t$	0.2***	0.18***	1																													
4	$CAPM_t$	-0.1***	-0.1***	0.16***	1																												
5	BE_t	-0.08***	-0.09***	0.19***	0.97***	1																											
6	$TobinQ\_ED_{t-1}$	0.11***	0.11***	-0.11***	-0.17***	-0.15***	1																										
7	ROE_{t-1}	0.28***	0.28***	0.16***	-0.07**	-0.09***	0.25***	1																									
8	$Sale_{t-1}$	0	0	0.13***	0.04	0.02	-0.08**	0	1																								
9	$SaleGr_{t-1}$	0.12***	0.12***	0.03	-0.02	-0.08**	0.18***	0.37***	0.07**	1																							
10	$SaleGR\_SD_{t-1}$	-0.15***	-0.15***	0.13***	0.27***	0.27***	-0.05	-0.15***	0.24***	-0.26***	1																						
11	$MVBV_{t-1}$	0.07**	0.07**	-0.11***	-0.08**	-0.06	0.89***	0.13***	0	0.16***	0.02	1																					
12	RD_{t-1}	0.01	0.02	0.01	0.01	0	0.01	-0.05	-0.25***	-0.07**	-0.03	-0.03	1																				
13	AD_{t-1}	0.06*	0.06*	-0.09***	-0.28***	-0.29***	0.08**	0	0.33***	-0.04	0.01	0.06*	-0.09***	1																			
14	$Dividom_{t-1}$	-0.11***	-0.11***	0.02	0.17***	0.19***	-0.03	-0.27***	0.11***	-0.12***	0.34***	0.12***	-0.03	0.03	1																		
15	$Dividom\_r_{t-1}$	0.11***	0.11***	-0.02	-0.17***	-0.19***	0.03	0.27***	-0.11***	0.12***	-0.34***	-0.12***	0.03	-0.03	-1	1																	
16	GR_{t-1}	0.09***	0.09***	-0.11***	-0.13***	-0.11***	0.97***	0.2***	-0.04	0.17***	-0.02	0.97***	-0.01	0.07**	0.05	-0.05	1																
17	OP_{t-1}	0.03	0.03	0.02	-0.15***	-0.16***	0	0	0.82***	0.02	0.15***	0.04	-0.21***	0.81***	0.09**	-0.09**	0.02	1															
18	EQ_{t-1}	0.24***	0.24***	0.08**	-0.16***	-0.18***	0.17***	0.77***	-0.07**	0.29***	-0.31***	0	-0.01	-0.02	-0.82***	0.82***	0.08**	-0.06*	1														
19	$ECON_{t-1}$	0.21***	0.21***	0	-0.25***	-0.26***	0.62***	0.57***	0.41***	0.28***	-0.11***	0.53***	-0.13***	0.49***	-0.42***	0.42***	0.59***	0.55***	0.61***	1													
20	Env_{t-1}	-0.01	0	0.1***	0.37***	0.39***	-0.13***	-0.08**	0	-0.05	0.09***	-0.04	0.22***	-0.26***	0.1***	-0.1***	-0.09**	-0.16***	-0.11***	-0.21***	1												
21	Soc_{t-1}	0	0	0.08**	0.28***	0.3***	-0.11***	-0.06*	-0.09***	-0.04	-0.04	-0.04	0.34***	-0.28***	0	0	-0.08**	-0.23***	-0.04	-0.2***	0.67***	1											
22	Gov_{t-1}	0.01	0.01	0.01	0.06*	0.08**	0.06*	-0.02	-0.17***	-0.01	-0.05	0.05	0.2***	-0.15***	-0.03	0.03	0.06*	-0.19***	0.01	-0.08**	0.21***	0.35***	1										
23	ESG_{t-1}	0	0	0.08**	0.31***	0.34***	-0.08**	-0.07**	-0.11***	-0.04	0	-0.02	0.33***	-0.3***	0.03	-0.03	-0.05	-0.25***	-0.06*	-0.21***	0.81***	0.89***	0.64***	1										
24	$LITI_t$	0.03	0.01	-0.07**	-0.15***	-0.16***	0.07*	0.02	-0.18***	-0.02	-0.12***	0.01	0.48***	-0.04	-0.05	0.05	0.04	-0.14***	0.05	-0.03	-0.09***	0.03	0.03	-0.01	1								
25	LIQ_{t-1}	-0.06*	-0.06*	0.14***	0.28***	0.3***	-0.05	-0.1***	0.08**	-0.04	0.19***	0	-0.04	0.01	0.29***	-0.29***	-0.03	0.06*	-0.25***	-0.13***	0.1***	0.05	0.01	0.07**	-0.09***	1							
26	LEV_{t-1}	-0.1***	-0.1***	0.21***	0.49***	0.49***	-0.33***	-0.19***	0.35***	-0.02	0.13***	-0.1***	-0.19***	-0.11***	0.24***	-0.24***	-0.22***	0.15***	-0.27***	-0.19***	0.35***	0.27***	0.04	0.28***	-0.18***	0.24***	1						
27	$Size_{t-1}$	0.12***	0.12***	0.13***	0.1***	0.12***	0.22***	0.1***	-0.29***	0.1***	-0.1***	0.23***	0.32***	-0.26***	0.02	-0.02	0.23***	-0.33***	0.05	-0.04	0.4***	0.45***	0.3***	0.49***	0.13***	-0.08**	0.06*	1					
28	$ALTMAN_{t-1}$	0.04	0.04	0.06*	-0.03	-0.04	0.05	0.03	0.93***	0.07*	0.21***	0.1***	-0.21***	0.36***	0.1***	-0.1***	0.08**	0.79***	-0.05	0.47***	0.01	-0.09***	-0.11***	-0.08**	-0.12***	0.05	0.22***	-0.22***	1				
29	BE_{t-1}	-0.06	-0.06*	0.2***	0.91***	0.94***	-0.13***	-0.06*	0.01	-0.06*	0.27***	-0.03	-0.01	-0.29***	0.18***	-0.18***	-0.08**	-0.17***	-0.15***	-0.24***	0.38***	0.3***	0.09**	0.33***	-0.17***	0.31***	0.46***	0.15***	-0.05	1			
30	$DLOSS_{t-1}$	-0.22***	-0.22***	0.04	0.12***	0.17***	-0.12***	-0.53***	0.04	-0.39***	0.19***	-0.05	0.05	-0.04	0.18***	-0.18***	-0.09***	0	-0.43***	-0.31***	0.06*	0.07**	0.02	0.07*	0.01	0.1***	0.2***	-0.09***	0	0.13***	1		
31	AQ_{t-1}	-0.05	-0.05	0.03	0.08**	0.08**	0.02	-0.19***	0.03	-0.2***	0.42***	0.05	0.2***	0.03	0.18***	-0.18***	0.04	0.04	-0.24***	-0.1***	0.05	0.01	-0.04	0.01	0.05	0.09**	-0.06*	-0.1***	0.03	0.08**	0.22***	1	
32	Acc_Total_{t-1}	0.07**	0.07**	0.1***	-0.01	-0.04	0.19***	0.52***	0.08**	0.11***	0	0.15***	-0.11***	0.08**	-0.05	0.05	0.17***	0.1***	0.34***	0.36***	-0.09***	-0.09***	-0.11***	-0.12***	-0.01	-0.02	-0.17***	0.03	0.09***	-0.03	-0.44***	-0.08**	1

Appendix C: Factor analysis by principal factor analysis (PCA)

Table C1. The factor loading of each independent variables on factors where factor1 to 3 have Eigen value over than 1 by using Principle Component Analysis (PCA).

Variable	Factor1	Factor2	Factor3	Uniqueness
$TobinQ\_ED_{it}$	0.9583	-0.0218	0.1335	0.0633
ROE_{it}	0.1668	0.0268	0.7632	0.3889
$Sale_{it}$	-0.0439	0.8095	0.0166	0.3426
$SaleGr_{it}$	0.1997	0.1107	0.6393	0.5391
$MVBV_{it}$	0.9686	0.0351	-0.0222	0.0600
RD_{it}	0.0086	-0.5850	-0.0855	0.6504
AD_{it}	0.1170	0.6581	-0.0835	0.5462
$Dividom\_r_{it}$	-0.1536	-0.1476	0.6461	0.5372

Table C2. Factor loading and percentage of total variance on individual economic sustainability performance factors which created by Principle Component Analysis (PCA).

Factor	Factor loading	% Total variance
GR_{it}		0.9484
- $TobinQ\_ED_{it}$	0.9739	
- $MVBV_{it}$	0.9739	
OP_{it}		0.6597
- $Sale_{it}$	0.8122	
- AD_{it}	0.8122	
EQ_{it}		0.6137
- ROE_{it}	0.7834	
- $Dividom\_r_{it}$	0.7834	

Appendix D: Summary of Sectors and Year Effect Results between Economic Sustainability (ECON) Performances on Cost of equity

Table D1. Effective of economic sustainability performance factors (ECON) on cost of equity (CAPM) with sector and year effect

Panel regression results on $CAPM_{it}$ with sector and year effect where $CAPM_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include Gr_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 DLOSS_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1}$$

	X_{it-1}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	$GR_{it-1}+OP_{it-1}+EQ_{it-1}$	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0009			-0.0011	
			(0.001)			(0.001)	
OP_{it-1}	-			-0.0014		-0.0015	
				(0.0019)		(0.0019)	
EQ_{it-1}	-				-0.0015**	-0.0015**	
					(0.0007)	(0.0007)	
$ECON_{it-1}$	-						-0.0041**
							(0.0018)
$LITI$	+	-0.0006	-0.001	-0.0007	-0.0004	-0.0009	-0.0009
		(0.0073)	(0.0069)	(0.0072)	(0.0073)	(0.0067)	(0.0069)
LIQ_{it-1}	+	0.0014***	0.0015***	0.0014***	0.0012**	0.0013***	0.0013***
		(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
LEV_{it-1}	+	0.0449***	0.0456***	0.0451***	0.0441***	0.0449***	0.0445***
		(0.0069)	(0.0068)	(0.0069)	(0.0069)	(0.0067)	(0.0068)
$Size_{it-1}$	-	-0.0009	-0.0004	-0.0011	-0.0009	-0.0004	-0.0003
		(0.0012)	(0.0013)	(0.0012)	(0.0012)	(0.0013)	(0.0012)
$ALTMAN_{it-1}$	+	-0.0035	-0.0026	-0.0001	-0.0025	0.002	0.002
		(0.0036)	(0.0037)	(0.0058)	(0.0037)	(0.0058)	(0.0043)
$DLOSS_{it-1}$	-	0.0019	0.0021	0.0019	0.0007	0.0011	0.0012
		(0.0023)	(0.0023)	(0.0023)	(0.0024)	(0.0024)	(0.0023)
AQ_{it-1}	+	0.0386	0.0412	0.0411	0.0287	0.0343	0.0344
		(0.0387)	(0.0387)	(0.0388)	(0.0389)	(0.0391)	(0.0387)
Acc_Total_{it-1}	+	0.055***	0.057***	0.0554***	0.0664***	0.0695***	0.068***
		(0.0191)	(0.0192)	(0.0191)	(0.0199)	(0.0201)	(0.0198)
Cons		0.0454	0.0303	0.0452	0.0428	0.0239	0.02
		(0.0372)	(0.0396)	(0.0369)	(0.0371)	(0.0391)	(0.0377)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0130	0.0131	0.0131	0.0130	0.0132	0.0131
Chi^2		410.7270	435.9879	416.7203	415.7036	452.2869	441.3848
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.6206	0.6254	0.6203	0.6206	0.6259	0.6259
R^2 Within		0.2256	0.2211	0.2261	0.2313	0.2268	0.2257
Sector	Co-eff sign	+	+	+	+	+	+
	Sig.	21, 35, 37, 38	21-23, 35-38	21-23, 35, 37, 38	21, 35, 37, 38	21-23, 35-38, 47	21-23, 35-38, 47
Year	Co-eff sign	+	+	+	+	+	+
	Sig.	09, 12, 13	09, 12, 13	09, 12, 13	06, 09, 12, 13, 16	06, 09, 12, 13, 16	06, 09, 12, 13, 16

Table D2. Effective of economic sustainability performance factors (ECON) on cost of equity (Beta) with sector and year effect

Panel regression results on $Beta_{it}$ with sector and year effect where $Beta_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include Gr_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 DLOSS_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1}$$

	X_{it-1}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	GR_{it-1}+ OP_{it-1}+ EQ_{it-1}	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0084			-0.0117	
			(0.0151)			(0.015)	
OP_{it-1}	-			-0.0214		-0.0226	
				(0.0294)		(0.0287)	
EQ_{it-1}	-				-0.0252**	-0.0256**	
					(0.0113)	(0.0114)	
$ECON_{it-1}$	-						-0.0621**
							(0.0271)
LITI	+	-0.0216	-0.0249	-0.023	-0.0178	-0.0235	-0.0256
		(0.1096)	(0.1045)	(0.1082)	(0.1098)	(0.1027)	(0.1042)
LIQ_{it-1}	+	0.0219***	0.0227***	0.022***	0.0189**	0.0198***	0.0205***
		(0.0074)	(0.0075)	(0.0075)	(0.0076)	(0.0076)	(0.0075)
LEV_{it-1}	+	0.7368***	0.7447***	0.7385***	0.7212***	0.7299***	0.7256***
		(0.1057)	(0.1041)	(0.1053)	(0.1058)	(0.1036)	(0.1041)
$Size_{it-1}$	-	-0.0048	-0.0008	-0.0072	-0.0041	-0.0009	0.0042
		(0.0184)	(0.0198)	(0.0186)	(0.0184)	(0.0197)	(0.0185)
$ALTMAN_{it-1}$	+	-0.0659	-0.0575	-0.0155	-0.0501	0.014	0.0176
		(0.0556)	(0.0574)	(0.0891)	(0.056)	(0.0895)	(0.0659)
$DLOSS_{it-1}$	-	0.0586	0.0615*	0.059*	0.039	0.0427	0.0478
		(0.0357)	(0.0361)	(0.0358)	(0.0367)	(0.0371)	(0.0362)
AQ_{it-1}	+	0.5084	0.539	0.5464	0.3379	0.4142	0.445
		(0.5979)	(0.5982)	(0.5997)	(0.6012)	(0.603)	(0.5972)
Acc_Total_{it-1}	+	0.7673***	0.7894***	0.7734***	0.9618***	0.9996***	0.9628***
		(0.2955)	(0.2968)	(0.2958)	(0.3075)	(0.3099)	(0.3059)
Cons		0.2376	0.1096	0.2384	0.1912	0.0127	-0.1288
		(0.566)	(0.6047)	(0.5627)	(0.566)	(0.599)	(0.5752)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.2021	0.2035	0.2025	0.2014	0.2034	0.2028
Chi^2		294.5067	317.5294	300.7996	299.0662	332.5677	324.3589
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.6122	0.6151	0.6118	0.6129	0.6160	0.6168
R^2 Within		0.0943	0.0914	0.0949	0.1020	0.0989	0.0952
Sector	Co-eff sign	+	+	+	+	+	+
	Sig.	21-22, 35, 37-38	21-22, 35-38	21-22, 35-38	21-22, 35-38	19, 21-23, 35-38	19, 21-23, 35-38
Year	Co-eff sign	+	+	+	+	+	+
	Sig.	09-17	06, 09-17	09-17	06, 09-17	06, 09-17	06, 09-17

Table D3. Effective of economic sustainability performance factors (ECON) on cost of equity (Gordon) with sector and year effect

Panel regression results on $Gordon_{it}$ with sector and year effect where $Gordon_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include Gr_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 BE_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	GR_{it-1}+ OP_{it-1}+ EQ_{it-1}	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0037***			-0.0036***	
			(0.0014)			(0.0014)	
OP_{it-1}	-			0.0016		0.0014	
				(0.0025)		(0.0022)	
EQ_{it-1}	-				0.0059***	0.0059***	
					(0.0013)	(0.0012)	
$ECON_{it-1}$	-						0.0054**
							(0.0028)
LITI	+	-0.0086	-0.0083	-0.0086	-0.009	-0.0084	-0.0088
		(0.0074)	(0.0069)	(0.0074)	(0.007)	(0.0062)	(0.0072)
LIQ_{it-1}	+	0.0027***	0.0029***	0.0027***	0.0035***	0.0038***	0.0029***
		(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
LEV_{it-1}	+	0.0191*	0.016*	0.0194**	0.0216**	0.019**	0.0218**
		(0.0098)	(0.0095)	(0.0098)	(0.0095)	(0.0089)	(0.0098)
$Size_{it-1}$	-	0.0068***	0.0074***	0.0069***	0.006***	0.006***	0.006***
		(0.0015)	(0.0015)	(0.0016)	(0.0015)	(0.0014)	(0.0015)
$ALTMAN_{it-1}$	+	0.0142***	0.0173***	0.0104	0.0126***	0.0122*	0.0077
		(0.005)	(0.005)	(0.0076)	(0.0048)	(0.0069)	(0.0059)
BE_{it-1}	+	-0.0032	-0.0037	-0.0032	-0.0012	-0.0014	-0.0022
		(0.0038)	(0.0038)	(0.0038)	(0.0038)	(0.0037)	(0.0038)
$DLOSS_{it-1}$	-	0.0017	0.0025	0.0017	0.0065	0.0073*	0.0027
		(0.0042)	(0.0043)	(0.0042)	(0.0043)	(0.0043)	(0.0043)
AQ_{it-1}	+	-0.0368	-0.0308	-0.0403	0.002	0.0017	-0.0341
		(0.065)	(0.0643)	(0.0652)	(0.0644)	(0.0632)	(0.0648)
Acc_Total_{it-1}	+	0.1549***	0.1644***	0.154***	0.1072***	0.1196***	0.1366***
		(0.0344)	(0.0344)	(0.0344)	(0.0356)	(0.0358)	(0.0357)
Cons		-0.1667***	-0.1881***	-0.1662***	-0.145***	-0.1464***	-0.1387***
		(0.0481)	(0.0486)	(0.0481)	(0.0464)	(0.0451)	(0.0489)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0244	0.0246	0.0244	0.0242	0.0246	0.0244
Chi^2		653.1142	670.6463	653.1486	697.2273	729.3149	660.9430
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.4785	0.4876	0.4785	0.4981	0.5087	0.4814
R^2 Within		0.4522	0.4467	0.4535	0.4602	0.4518	0.4592
Sector	Co-eff sign	+	+	+	+	+	+
	Sig.	14, 42	14, 19, 42	14, 42	14, 23, 42	14, 23, 42	14, 42
Year	Co-eff sign	+	+	+	+	+	+
	Sig.	08, 11, 12, 18	08, 11, 12, 18	08, 11, 12, 18	08, 11, 12	08, 11, 12, 18	08, 11, 12, 18

Table D4. Effective of economic sustainability performance factors (ECON) on cost of equity (IndEP exclude extraordinary item) with sector and year effect

Panel regression results on $IndEP_{it}$ exclude extraordinary item with sector and year effect where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include Gr_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 BE_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	$GR_{it-1}+ OP_{it-1}+ EQ_{it-1}$	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0025			-0.002	
			(0.0044)			(0.0044)	
OP_{it-1}	-			0.0052		0.006	
				(0.0068)		(0.0068)	
EQ_{it-1}	-				0.009**	0.0091**	
					(0.004)	(0.004)	
$ECON_{it-1}$	-						0.013
							(0.0085)
LITI	+	-0.0229	-0.0227	-0.0231	-0.0233	-0.0234	-0.0236
		(0.0183)	(0.0183)	(0.0183)	(0.0182)	(0.0182)	(0.0183)
LIQ_{it-1}	+	0.0005	0.0006	0.0004	0.0021	0.0021	0.0009
		(0.003)	(0.003)	(0.003)	(0.0031)	(0.0031)	(0.003)
LEV_{it-1}	+	0.0061	0.0042	0.0075	0.0106	0.0107	0.0128
		(0.027)	(0.0273)	(0.0271)	(0.027)	(0.0273)	(0.0273)
$Size_{it-1}$	-	0.0089**	0.0095**	0.0095**	0.0085**	0.0096**	0.0081**
		(0.004)	(0.0042)	(0.0041)	(0.004)	(0.0042)	(0.0041)
$ALTMAN_{it-1}$	+	0.0337**	0.0356**	0.0219	0.0335**	0.0216	0.0205
		(0.0137)	(0.0141)	(0.0206)	(0.0137)	(0.0208)	(0.0162)
BE_{it-1}	+	0.0046	0.0039	0.0045	0.0071	0.0065	0.007
		(0.0123)	(0.0123)	(0.0123)	(0.0123)	(0.0124)	(0.0123)
$DLOSS_{it-1}$	-	-0.0535***	-0.0529***	-0.0539***	-0.0458***	-0.0457***	-0.0512***
		(0.0147)	(0.0147)	(0.0147)	(0.015)	(0.0151)	(0.0147)
AQ_{it-1}	+	0.1552	0.167	0.1464	0.2405	0.2409	0.1681
		(0.2042)	(0.2054)	(0.2045)	(0.2071)	(0.2084)	(0.2041)
Acc_Total_{it-1}	+	0.1035	0.1094	0.0976	0.026	0.0234	0.0508
		(0.1175)	(0.118)	(0.1177)	(0.1221)	(0.1232)	(0.1222)
Cons		-0.2839**	-0.3044**	-0.2839**	-0.2751**	-0.2917**	-0.2435*
		(0.1337)	(0.1388)	(0.1337)	(0.1334)	(0.1385)	(0.1361)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0873	0.0873	0.0873	0.0870	0.0871	0.0872
Chi^2		120.7531	120.9485	121.2784	126.4586	127.2704	123.3456
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.1382	0.1386	0.1389	0.1440	0.1451	0.1409
R^2 Within		0.0604	0.0603	0.0627	0.0662	0.0688	0.0659
Sector	Co-eff sign	Not sig	Not sig	-	-	-	-
	Sig.	Not sig	Not sig	19	19	19	19
Year	Co-eff sign	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig
	Sig.	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig

Table D5. Effective of economic sustainability performance factors (ECON) on cost of equity (IndEP include extraordinary item) with sector and year effect

Panel regression results on $IndEP_{it}$ include extraordinary item with sector and year effect where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M4 are panel regression results on individual economic sustainability performance (ECON) factors include Gr_{it-1}, OP_{it-1} and EQ_{it-1} respectively. Column M5 shows a result of multiple factors in ECON factors. Column M6 is a regression result of $ECON_{it-1}$ factor where $ECON_{it-1}$ calculated by average of Gr_{it-1}, OP_{it-1} and EQ_{it-1} factors. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LITI + \beta_3 LIQ_{it-1} + \beta_4 LEV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ALTMAN_{it-1} + \beta_7 BE_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	GR_{it-1}	OP_{it-1}	EQ_{it-1}	GR_{it-1}+ OP_{it-1}+ EQ_{it-1}	$ECON_{it-1}$
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
GR_{it-1}	-		-0.0027			-0.0023	
			(0.0044)			(0.0044)	
OP_{it-1}	-			0.0054		0.0061	
				(0.0068)		(0.0068)	
EQ_{it-1}	-				0.0089**	0.009**	
					(0.004)	(0.004)	
$ECON_{it-1}$	-						0.0127
							(0.0085)
LITI	+	-0.024	-0.0237	-0.0242	-0.0244	-0.0245	-0.0247
		(0.0183)	(0.0183)	(0.0183)	(0.0183)	(0.0183)	(0.0183)
LIQ_{it-1}	+	0.0004	0.0005	0.0003	0.002	0.002	0.0008
		(0.003)	(0.003)	(0.003)	(0.0031)	(0.0031)	(0.003)
LEV_{it-1}	+	0.009	0.0069	0.0104	0.0135	0.0133	0.0155
		(0.0271)	(0.0273)	(0.0271)	(0.0271)	(0.0274)	(0.0274)
$Size_{it-1}$	-	0.0089**	0.0096**	0.0094**	0.0085**	0.0096**	0.0081**
		(0.004)	(0.0042)	(0.0041)	(0.004)	(0.0042)	(0.0041)
$ALTMAN_{it-1}$	+	0.0335**	0.0356**	0.0214	0.0334**	0.0214	0.0207
		(0.0137)	(0.0141)	(0.0206)	(0.0137)	(0.0208)	(0.0162)
BE_{it-1}	+	0.0046	0.0038	0.0045	0.0071	0.0063	0.0069
		(0.0123)	(0.0123)	(0.0123)	(0.0123)	(0.0124)	(0.0124)
$DLOSS_{it-1}$	-	-0.0532***	-0.0525***	-0.0536***	-0.0456***	-0.0455***	-0.051***
		(0.0147)	(0.0147)	(0.0147)	(0.015)	(0.0151)	(0.0148)
AQ_{it-1}	+	0.1517	0.1646	0.1427	0.2359	0.2372	0.1643
		(0.2044)	(0.2056)	(0.2048)	(0.2074)	(0.2087)	(0.2044)
Acc_Total_{it-1}	+	0.1088	0.1154	0.1028	0.0323	0.0303	0.0577
		(0.1176)	(0.1182)	(0.1179)	(0.1223)	(0.1233)	(0.1224)
Cons		-0.2832**	-0.3056**	-0.2832**	-0.2745**	-0.2931**	-0.2439*
		(0.1339)	(0.139)	(0.1339)	(0.1336)	(0.1387)	(0.1363)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0874	0.0874	0.0874	0.0871	0.0872	0.0873
Chi^2		121.6027	121.8676	122.1632	127.1479	128.0570	124.0301
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.1390	0.1395	0.1397	0.1446	0.1458	0.1416
R^2 Within		0.0600	0.0599	0.0624	0.0654	0.0681	0.0652
Sector	Co-eff sign	Not sig	Not sig	-	-	-	-
	Sig.	Not sig	Not sig	19	19	19	19
Year	Co-eff sign	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig
	Sig.	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig

Appendix E: Summary of Sectors and Year Effect Results between Non-Economic Sustainability (ESG) Performances on Cost of equity

Table E1. Effective of non-economic sustainability performance factors (ESG) on cost of equity (CAPM) with sector and year effect

Panel regression results on $CAPM_{it}$ with sector and year effect where $CAPM_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0001			0.0001	
			(0)			(0.0001)	
Soc_{it-1}	-			0		0	
				(0)		(0.0001)	
Gov_{it-1}	-				0	0	
					(0)	(0)	
ESG_{it-1}	-						0
							(0.0001)
$ECON_{it-1}$	-	-0.0041**	-0.0039**	-0.0041**	-0.0043**	-0.0042**	-0.0042**
		(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0018)
$LITI$	+	-0.0009	-0.0006	-0.001	-0.0016	-0.0018	-0.0011
		(0.0069)	(0.0069)	(0.007)	(0.0069)	(0.007)	(0.0069)
LIQ_{it-1}	+	0.0013***	0.0013***	0.0013***	0.0013***	0.0013***	0.0013***
		(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
LEV_{it-1}	+	0.0445***	0.0438***	0.0445***	0.045***	0.0446***	0.0446***
		(0.0068)	(0.0068)	(0.0068)	(0.0068)	(0.0068)	(0.0068)
$Size_{it-1}$	-	-0.0003	-0.0005	-0.0002	0	-0.0001	-0.0002
		(0.0012)	(0.0012)	(0.0013)	(0.0012)	(0.0013)	(0.0013)
$ALTMAN_{it-1}$	+	0.002	0.0017	0.002	0.002	0.0017	0.002
		(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)
$DLOSS_{it-1}$	-	0.0012	0.0012	0.0012	0.001	0.001	0.0012
		(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
AQ_{it-1}	+	0.0344	0.0326	0.0343	0.0309	0.0286	0.0344
		(0.0387)	(0.0387)	(0.0387)	(0.0388)	(0.0388)	(0.0387)
Acc_Total_{it-1}	+	0.068***	0.0676***	0.068***	0.0667***	0.0666***	0.0681***
		(0.0198)	(0.0198)	(0.0198)	(0.0198)	(0.0198)	(0.0198)
Cons		0.02	0.0246	0.0189	0.0173	0.0168	0.0187
		(0.0377)	(0.038)	(0.039)	(0.0375)	(0.0389)	(0.0384)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0131	0.0131	0.0131	0.0131	0.0131	0.0131
Chi^2		441.3848	440.6238	438.7270	448.1634	444.6525	442.1094
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.6259	0.6282	0.6255	0.6278	0.6295	0.6258
R^2 Within		0.2257	0.2278	0.2257	0.2270	0.2296	0.2256
Sector	Co-eff sign	+	+	+	+	+	+
	Sig.	21, 22, 23, 35, 36-38	21, 22, 35, 36-38	21, 22, 23, 35, 36-38	21, 22, 23, 35, 36-38	21, 22, 35, 36-38	21, 22, 23, 35, 36-38
Year	Co-eff sign	+	+	+	+	+	+
	Sig.	06, 09, 12, 13, 16	06, 09, 12, 13, 16	06, 09, 12, 13, 16	09, 12, 13, 16	06, 09, 12, 13, 16	06, 09, 12, 13, 16

Table E2. Effective of non-economic sustainability performance factors (ESG) on cost of equity (Beta) with sector and year effect

Panel regression results on $Beta_{it}$ with sector and year effect where $Beta_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_{2\,ECON_{it-1}} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 DLOSS_{it-1} + \beta_9 AQ_{it-1} + \beta_{10} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0008			0.0011	
			(0.0007)			(0.0008)	
Soc_{it-1}	-			-0.0002		-0.0006	
				(0.0007)		(0.0008)	
Gov_{it-1}	-				-0.0006	-0.0006	
					(0.0006)	(0.0006)	
ESG_{it-1}	-						-0.0002
							(0.001)
$ECON_{it-1}$	-	-0.0621**	-0.0594**	-0.0632**	-0.0643**	-0.0638**	-0.0631**
		(0.0271)	(0.0272)	(0.0274)	(0.0271)	(0.0274)	(0.0274)
$LITI$	+	-0.0256	-0.0213	-0.0298	-0.0349	-0.0406	-0.0289
		(0.1042)	(0.1048)	(0.1056)	(0.1031)	(0.1051)	(0.1046)
LIQ_{it-1}	+	0.0205***	0.0208***	0.0204***	0.0203***	0.0204***	0.0204***
		(0.0075)	(0.0075)	(0.0075)	(0.0075)	(0.0075)	(0.0075)
LEV_{it-1}	+	0.7256***	0.7159***	0.7285***	0.7338***	0.7297***	0.7295***
		(0.1041)	(0.1046)	(0.105)	(0.1037)	(0.1048)	(0.1047)
$Size_{it-1}$	-	0.0042	0.0008	0.006	0.0073	0.0074	0.0056
		(0.0185)	(0.0188)	(0.0193)	(0.0186)	(0.0194)	(0.0193)
$ALTMAN_{it-1}$	+	0.0176	0.0133	0.0183	0.0176	0.0134	0.0183
		(0.0659)	(0.0662)	(0.0661)	(0.0656)	(0.066)	(0.0659)
$DLOSS_{it-1}$	-	0.0478	0.0485	0.0477	0.0453	0.0462	0.0475
		(0.0362)	(0.0362)	(0.0362)	(0.0363)	(0.0363)	(0.0363)
AQ_{it-1}	+	0.445	0.4193	0.4447	0.3983	0.3656	0.444
		(0.5972)	(0.5975)	(0.5976)	(0.5987)	(0.5993)	(0.5977)
Acc_Total_{it-1}	+	0.9628***	0.9573***	0.9658***	0.9452***	0.9492***	0.9641***
		(0.3059)	(0.3058)	(0.3064)	(0.3067)	(0.307)	(0.3062)
Cons		-0.1288	-0.064	-0.1779	-0.1645	-0.2057	-0.1581
		(0.5752)	(0.5798)	(0.5962)	(0.5722)	(0.5946)	(0.5867)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.2028	0.2026	0.2028	0.2031	0.2028	0.2030
Chi^2		324.3589	323.0266	321.7765	332.6139	328.4612	326.1393
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.6168	0.6187	0.6162	0.6187	0.6201	0.6167
R^2 Within		0.0952	0.0971	0.0953	0.0962	0.0990	0.0951
Sector	Co-eff sign	+	+	+	+	+	+
	Sig.	19, 21-23, 35-38	21, 22, 35-38	19, 21-23, 35-38	21-23, 35-38	21, 22, 35-38	19, 21-23, 35-38
Year	Co-eff sign	+	+	+	+	+	+
	Sig.	06, 09-17	06, 07, 09-17	06, 09-17	06, 09-17	06, 09-17	06, 09-17

Table E3. Effective of non-economic sustainability performance factors (ESG) on cost of equity (Gordon) with sector and year effect

Panel regression results on $Gordon_{it}$ with sector and year effect where $Gordon_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 BE_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		-0.0001			-0.0001	
			(0.0001)			(0.0001)	
Soc_{it-1}	-			0		0	
				(0.0001)		(0.0001)	
Gov_{it-1}	-				0	0	
					(0.0001)	(0.0001)	
ESG_{it-1}	-						0
							(0.0001)
$ECON_{it-1}$	-	0.0054**	0.0051*	0.0055*	0.0055**	0.0055*	0.0053*
		(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)
$LITI$	+	-0.0088	-0.0095	-0.0089	-0.0085	-0.0084	-0.0095
		(0.0072)	(0.0073)	(0.0075)	(0.0074)	(0.0076)	(0.0075)
LIQ_{it-1}	+	0.0029***	0.0028***	0.0029***	0.0029***	0.0028***	0.0028***
		(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
LEV_{it-1}	+	0.0218**	0.0237**	0.0218**	0.0215**	0.0224**	0.0227**
		(0.0098)	(0.0099)	(0.0101)	(0.0099)	(0.0102)	(0.0101)
$Size_{it-1}$	-	0.006***	0.0067***	0.0061***	0.006***	0.0064***	0.0064***
		(0.0015)	(0.0016)	(0.0017)	(0.0016)	(0.0018)	(0.0017)
$ALTMAN_{it-1}$	+	0.0077	0.0082	0.0077	0.0077	0.008	0.0079
		(0.0059)	(0.0059)	(0.006)	(0.0059)	(0.006)	(0.006)
BE_{it-1}	+	-0.0022	-0.0021	-0.0022	-0.0022	-0.0021	-0.0023
		(0.0038)	(0.0038)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
$DLOSS_{it-1}$	-	0.0027	0.0025	0.0027	0.0028	0.0026	0.0026
		(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)
AQ_{it-1}	+	-0.0341	-0.0304	-0.0333	-0.0319	-0.0263	-0.034
		(0.0648)	(0.0649)	(0.0649)	(0.0651)	(0.0653)	(0.0649)
Acc_Total_{it-1}	+	0.1366***	0.136***	0.136***	0.1367***	0.1343***	0.136***
		(0.0357)	(0.0357)	(0.0358)	(0.0358)	(0.0358)	(0.0357)
Cons		-0.1387***	-0.1531***	-0.1416***	-0.1387***	-0.1455***	-0.1487***
		(0.0489)	(0.0501)	(0.0532)	(0.0497)	(0.0539)	(0.0524)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0244	0.0244	0.0244	0.0244	0.0244	0.0244
Chi^2		660.9430	662.2951	659.2411	659.5255	659.9774	659.6138
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.4814	0.4821	0.4810	0.4809	0.4815	0.4812
R^2 Within		0.4592	0.4603	0.4596	0.4599	0.4619	0.4594
Sector	Co-eff sign	+	+	+	+	+	+
	Sig.	14, 42	14, 42	14, 42	14, 42	14	14, 42
Year	Co-eff sign	+	+	+	+	+	+
	Sig.	08, 11, 12, 18	08, 11, 12, 18	08, 11, 12, 18	08, 11, 12, 18	08, 11, 12, 18	08, 11, 12, 18

Table E4. Effective of non-economic sustainability performance factors (ESG) on cost of equity (IndEP exclude extraordinary item) with sector and year effect

Panel regression results on $IndEP_{it}$ exclude extraordinary items with sector and year effect where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 BE_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0001			0.0001	
			(0.0002)			(0.0003)	
Soc_{it-1}	-			0		0	
				(0.0002)		(0.0002)	
Gov_{it-1}	-				-0.0002	-0.0002	
					(0.0002)	(0.0002)	
ESG_{it-1}	-						-0.0001
							(0.0003)
$ECON_{it-1}$	-	0.013	0.0133	0.0128	0.0128	0.0128	0.0125
		(0.0085)	(0.0085)	(0.0086)	(0.0085)	(0.0086)	(0.0086)
LITI	+	-0.0236	-0.0231	-0.0244	-0.0266	-0.027	-0.0258
		(0.0183)	(0.0184)	(0.019)	(0.0186)	(0.0192)	(0.019)
LIQ_{it-1}	+	0.0009	0.001	0.0009	0.0009	0.001	0.0009
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LEV_{it-1}	+	0.0128	0.0113	0.014	0.0151	0.0144	0.0161
		(0.0273)	(0.0281)	(0.0283)	(0.0275)	(0.0286)	(0.0284)
$Size_{it-1}$	-	0.0081**	0.0077*	0.0085*	0.0094**	0.0094*	0.0092*
		(0.0041)	(0.0043)	(0.0046)	(0.0043)	(0.0048)	(0.0048)
$ALTMAN_{it-1}$	+	0.0205	0.0203	0.0207	0.0211	0.0211	0.0211
		(0.0162)	(0.0162)	(0.0162)	(0.0162)	(0.0162)	(0.0162)
BE_{it-1}	+	0.007	0.0068	0.007	0.0062	0.006	0.0069
		(0.0123)	(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0124)
$DLOSS_{it-1}$	-	-0.0512***	-0.051***	-0.0511***	-0.0514***	-0.0511***	-0.0513***
		(0.0147)	(0.0148)	(0.0147)	(0.0147)	(0.0148)	(0.0147)
AQ_{it-1}	+	0.1681	0.1655	0.1684	0.1559	0.1528	0.1678
		(0.2041)	(0.2045)	(0.2043)	(0.2046)	(0.2051)	(0.2043)
Acc_Total_{it-1}	+	0.0508	0.0508	0.0518	0.0445	0.0461	0.0506
		(0.1222)	(0.1223)	(0.1225)	(0.1224)	(0.1229)	(0.1223)
Cons		-0.2435*	-0.2354*	-0.2543*	-0.2677*	-0.2696*	-0.2694*
		(0.1361)	(0.1399)	(0.1511)	(0.1386)	(0.1523)	(0.1491)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0872	0.0872	0.0872	0.0872	0.0873	0.0872
Chi^2		123.3456	123.2556	123.2131	124.1887	123.9823	123.3941
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.1409	0.1410	0.1409	0.1419	0.1420	0.1411
R^2 Within		0.0659	0.0656	0.0659	0.0663	0.0659	0.0662
Sector	Co-eff sign	-	-	-	-	-	-
	Sig.	19	19	19	19	19	19
Year	Co-eff sign	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig
	Sig.	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig

Table E5. Effective of non-economic sustainability performance factors (ESG) on cost of equity (IndEP include extraordinary item) with sector and year effect

Panel regression results on $IndEP_{it}$ include extraordinary items with sector and year effect where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where control variables are added to regression also $ECON_{it-1}$ factor. Column M2 to M4 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M5 shows a result of multiple factors in ESG factors. Column M6 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 ECON_{it-1} + \beta_3 LITI + \beta_4 LIQ_{it-1} + \beta_5 LEV_{it-1} + \beta_6 SIZE_{it-1} + \beta_7 ALTMAN_{it-1} + \beta_8 BE_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Env_{it-1}	-		0.0001			0.0001	
			(0.0002)			(0.0003)	
Soc_{it-1}	-			0		0	
				(0.0002)		(0.0002)	
Gov_{it-1}	-				-0.0002	-0.0002	
					(0.0002)	(0.0002)	
ESG_{it-1}	-						-0.0001
							(0.0003)
$ECON_{it-1}$	-	0.0127	0.0129	0.0125	0.0124	0.0125	0.0122
		(0.0085)	(0.0085)	(0.0086)	(0.0085)	(0.0086)	(0.0086)
$LITI$	+	-0.0247	-0.0241	-0.0252	-0.0279	-0.0279	-0.0267
		(0.0183)	(0.0184)	(0.019)	(0.0186)	(0.0192)	(0.019)
LIQ_{it-1}	+	0.0008	0.0009	0.0008	0.0009	0.0009	0.0008
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LEV_{it-1}	+	0.0155	0.0136	0.0163	0.0179	0.0166	0.0186
		(0.0274)	(0.0281)	(0.0284)	(0.0275)	(0.0286)	(0.0285)
$Size_{it-1}$	-	0.0081**	0.0076*	0.0083*	0.0095**	0.0093*	0.0091*
		(0.0041)	(0.0043)	(0.0046)	(0.0043)	(0.0048)	(0.0048)
$ALTMAN_{it-1}$	+	0.0207	0.0204	0.0208	0.0214	0.0213	0.0213
		(0.0162)	(0.0162)	(0.0163)	(0.0162)	(0.0163)	(0.0163)
BE_{it-1}	+	0.0069	0.0067	0.0069	0.006	0.0058	0.0068
		(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0124)
$DLOSS_{it-1}$	-	-0.051***	-0.0507***	-0.0509***	-0.0512***	-0.0509***	-0.0511***
		(0.0148)	(0.0148)	(0.0148)	(0.0148)	(0.0148)	(0.0148)
AQ_{it-1}	+	0.1643	0.1611	0.1645	0.1513	0.1477	0.164
		(0.2044)	(0.2048)	(0.2046)	(0.2049)	(0.2054)	(0.2046)
Acc_Total_{it-1}	+	0.0577	0.0578	0.0583	0.051	0.0522	0.0575
		(0.1224)	(0.1225)	(0.1227)	(0.1226)	(0.123)	(0.1225)
Cons		-0.2439*	-0.234*	-0.2507*	-0.2696*	-0.2671*	-0.2681*
		(0.1363)	(0.1401)	(0.1513)	(0.1388)	(0.1525)	(0.1494)
Obs.		805	805	805	805	805	805
No of firm		119	119	119	119	119	119
RMS Error		0.0873	0.0874	0.0874	0.0873	0.0874	0.0874
Chi^2		124.0301	123.9768	123.8776	124.9966	124.8099	124.0489
P-Value		0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.1416	0.1417	0.1416	0.1427	0.1428	0.1418
R^2 Within		0.0652	0.0649	0.0652	0.0657	0.0653	0.0654
Sector	Co-eff sign	-	-	-	-	-	-
	Sig.	19	19	19	19	19	19
Year	Co-eff sign	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig
	Sig.	Not sig	Not sig	Not sig	Not sig	Not sig	Not sig

Appendix F: Summary of sectors and year effect results of Interaction between ECON and ESG on Cost of Equity

Table F1. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (CAPM)

Panel regression results on $CAPM_{it}$ with sector and year effect where $CAPM_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	-0.0033	-0.0018	-0.0045	-0.0038	-0.0024
		(0.0044)	(0.0031)	(0.0037)	(0.0047)	(0.0045)
Env_{it-1}	-	0.0001			0.0001	
		(0)			(0.0001)	
Soc_{it-1}	-		0		0	
			(0)		(0.0001)	
Gov_{it-1}	-			0	0	
				(0)	(0)	
ESG_{it-1}	-					0
						(0.0001)
$Econ_{it-1}$ X Env_{it-1}	-	0			0	
		(0.0001)			(0.0001)	
$Econ_{it-1}$ X Soc_{it-1}	-		0		-0.0001	
			(0.0001)		(0.0001)	
$Econ_{it-1}$ X Gov_{it-1}	-			0	0	
				(0.0001)	(0.0001)	
$Econ_{it-1}$ X ESG_{it-1}	-					0
						(0.0001)
$LITI$	+	-0.0007	-0.0013	-0.0016	-0.002	-0.0012
		(0.007)	(0.0068)	(0.0069)	(0.0067)	(0.0069)
LIQ_{it-1}	+	0.0013***	0.0013***	0.0013***	0.0013***	0.0013***
		(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
LEV_{it-1}	+	0.0438***	0.0454***	0.045***	0.0457***	0.0449***
		(0.0069)	(0.0068)	(0.0068)	(0.0068)	(0.0069)
$Size_{it-1}$	-	-0.0005	-0.0003	0	-0.0002	-0.0003
		(0.0012)	(0.0013)	(0.0012)	(0.0013)	(0.0013)
$ALTMAN_{it-1}$	+	0.0016	0.0014	0.002	0.0014	0.0017
		(0.0044)	(0.0043)	(0.0043)	(0.0044)	(0.0044)
$DLOSS_{it-1}$	-	0.0012	0.001	0.001	0.0009	0.0011
		(0.0023)	(0.0024)	(0.0023)	(0.0024)	(0.0023)
AQ_{it-1}	+	0.0317	0.0302	0.0306	0.0243	0.0329
		(0.0389)	(0.0391)	(0.0388)	(0.0394)	(0.0389)
Acc_Total_{it-1}	+	0.0675***	0.069***	0.0665***	0.068***	0.0684***
		(0.0198)	(0.0199)	(0.0198)	(0.0199)	(0.0198)
Cons		0.0252	0.0231	0.0173	0.0207	0.0203
		(0.0383)	(0.0389)	(0.0377)	(0.0386)	(0.0386)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0131	0.0131	0.0131	0.0132	0.0131
Chi^2		437.5069	451.0993	445.4466	466.1485	442.5471
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.6281	0.6291	0.6276	0.6350	0.6267
R^2 Within		0.2281	0.2240	0.2269	0.2255	0.2256
Sector	Co-eff sign	+	+	+	+	+
	Sig.	21-22, 35-38	21-23, 35-38, 47	21-23, 35-38	21-23, 35-38	21-23, 35-38, 47
Year	Co-eff sign	+	+	+	+	+
	Sig.	06, 09, 12, 13, 16	06, 09, 12, 13, 16	06, 09, 12, 13, 16	09, 12, 13, 16	06, 09, 12, 13, 16

Table F2. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (Beta)

Panel regression results on $Beta_{it}$ with sector and year effect where $Beta_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 DLOSS_{it-1} + \beta_{10} AQ_{it-1} + \beta_{11} ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}XGov_{it-1}$	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	-0.0423	-0.0226	-0.0679	-0.051	-0.0284
		(0.0674)	(0.048)	(0.0569)	(0.0727)	(0.0688)
Env_{it-1}	-	0.0008			0.0011	
		(0.0007)			(0.0008)	
Soc_{it-1}	-		-0.0003		-0.0007	
			(0.0007)		(0.0008)	
Gov_{it-1}	-			-0.0006	-0.0007	
				(0.0006)	(0.0006)	
ESG_{it-1}	-					-0.0003
						(0.001)
$Econ_{it-1}$ X Env_{it-1}	-	-0.0002			0.0006	
		(0.0009)			(0.0012)	
$Econ_{it-1}$ X Soc_{it-1}	-		-0.0008		-0.0013	
			(0.0008)		(0.001)	
$Econ_{it-1}$ X Gov_{it-1}	-			0.0001	0.0002	
				(0.0009)	(0.001)	
$Econ_{it-1}$ X ESG_{it-1}	-					-0.0006
						(0.0011)
$LITI$	+	-0.0224	-0.034	-0.0346	-0.0441	-0.0315
		(0.1054)	(0.1031)	(0.1036)	(0.1012)	(0.1045)
LIQ_{it-1}	+	0.0207***	0.0203***	0.0203***	0.0206***	0.0203***
		(0.0075)	(0.0075)	(0.0075)	(0.0076)	(0.0075)
LEV_{it-1}	+	0.7173***	0.743***	0.733***	0.7472***	0.7342***
		(0.1051)	(0.1046)	(0.1039)	(0.104)	(0.105)
$Size_{it-1}$	-	0.0004	0.0039	0.0074	0.0055	0.0048
		(0.0189)	(0.0192)	(0.0186)	(0.0192)	(0.0193)
$ALTMAN_{it-1}$	+	0.0096	0.0081	0.0183	0.0079	0.011
		(0.0677)	(0.0662)	(0.0663)	(0.0666)	(0.0673)
$DLOSS_{it-1}$	-	0.0479	0.0454	0.0452	0.0437	0.0464
		(0.0362)	(0.0364)	(0.0363)	(0.0366)	(0.0364)
AQ_{it-1}	+	0.3992	0.3711	0.3943	0.2854	0.4139
		(0.6013)	(0.603)	(0.5998)	(0.6081)	(0.6006)
Acc_Total_{it-1}	+	0.9559***	0.9805***	0.9425***	0.9673***	0.9694***
		(0.3059)	(0.3069)	(0.3071)	(0.3086)	(0.3065)
Cons		-0.0481	-0.0986	-0.1657	-0.1237	-0.1248
		(0.5851)	(0.5939)	(0.5739)	(0.5895)	(0.5896)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.2026	0.2034	0.2031	0.2041	0.2032
Chi^2		320.2136	335.5435	329.9594	351.7027	327.0742
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.6188	0.6201	0.6186	0.6258	0.6179
R^2 Within		0.0975	0.0937	0.0962	0.0952	0.0952
Sector	Co-eff sign	+	+	+	+	+
	Sig.	21, 22, 35-38	9, 19, 21-23, 35-38	21, 22, 35-38	19, 21-23, 35-38	19, 21-23, 35-38
Year	Co-eff sign	+	+	+	+	+
	Sig.	06, 07, 09-17	09-17	06, 09-17	09-17	06, 09-17

Table F3. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (Gordon)

Panel regression results on $Gordon_{it}$ with sector and year effect where $Gordon_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 BE_{it-1} + \beta_{10} DLOSS_{it-1} + \beta_{11} AQ_{it-1} + \beta_{12} ACC\_Total_{it-1} +$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	-0.0036	0.0018	0.0052	-0.0016	-0.0014
		(0.0065)	(0.0046)	(0.0059)	(0.0071)	(0.0067)
Env_{it-1}	-	-0.0001			-0.0001	
		(0.0001)			(0.0001)	
Soc_{it-1}	-		0		0	
			(0.0001)		(0.0001)	
Gov_{it-1}	-			0	0	
				(0.0001)	(0.0001)	
ESG_{it-1}	-					0
						(0.0001)
$Econ_{it-1}$ X Env_{it-1}	-	0.0001			0.0002	
		(0.0001)			(0.0001)	
$Econ_{it-1}$ X Soc_{it-1}	-		0.0001		0	
			(0.0001)		(0.0001)	
$Econ_{it-1}$ X Gov_{it-1}	-			0	-0.0001	
				(0.0001)	(0.0001)	
$Econ_{it-1}$ X ESG_{it-1}	-					0.0001
						(0.0001)
$LITI$	+	-0.009	-0.0086	-0.0085	-0.0077	-0.0091
		(0.0074)	(0.0072)	(0.0074)	(0.0072)	(0.0074)
LIQ_{it-1}	+	0.0029***	0.0029***	0.0029***	0.0029***	0.0029***
		(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
LEV_{it-1}	+	0.0226**	0.0211**	0.0215**	0.0215**	0.0219**
		(0.01)	(0.0099)	(0.0099)	(0.0099)	(0.0101)
$Size_{it-1}$	-	0.007***	0.0059***	0.0061***	0.006***	0.0066***
		(0.0016)	(0.0017)	(0.0016)	(0.0017)	(0.0017)
$ALTMAN_{it-1}$	+	0.0096	0.0083	0.0077	0.009	0.009
		(0.006)	(0.0059)	(0.006)	(0.0059)	(0.006)
BE_{it-1}	+	-0.002	-0.0017	-0.0022	-0.0016	-0.002
		(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
$DLOSS_{it-1}$	-	0.003	0.003	0.0028	0.003	0.003
		(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)
AQ_{it-1}	+	-0.0194	-0.0283	-0.0314	-0.0181	-0.0279
		(0.0653)	(0.0651)	(0.0653)	(0.0657)	(0.0651)
Acc_Total_{it-1}	+	0.1341***	0.1381***	0.136***	0.1382***	0.1347***
		(0.0356)	(0.0358)	(0.0358)	(0.036)	(0.0357)
Cons		-0.1639***	-0.1382***	-0.141***	-0.1364***	-0.1545***
		(0.0507)	(0.0527)	(0.0501)	(0.0526)	(0.0527)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0243	0.0246	0.0244	0.0246	0.0244
Chi^2		664.8465	663.5099	658.0182	667.8289	661.3510
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.4826	0.4820	0.4805	0.4856	0.4813
R^2 Within		0.4608	0.4606	0.4603	0.4584	0.4608
Sector	Co-eff sign	+	+	+	+	+
	Sig.	14, 42	14, 42	14, 42	14, 42	14, 42
Year	Co-eff sign	+	+	+	+	+
	Sig.	08, 11-12	08, 11-12	08, 11-12	08, 11-12	08, 11-12

Table F4. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (IndEP exclude extraordinary item)

Panel regression results on $IndEP_{it}$ exclude extraordinary items with sector and year effect where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 BE_{it-1} + \beta_{10} DLOSS_{it-1} + \beta_{11} AQ_{it-1} + \beta_{12} ACC\_Total_{it-1} +$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	0.0255	0.0153	0.0249	0.0315	0.025
		(0.0195)	(0.014)	(0.0178)	(0.0219)	(0.02)
Env_{it-1}	-	0.0001			0.0001	
		(0.0002)			(0.0003)	
Soc_{it-1}	-		0		0	
			(0.0002)		(0.0002)	
Gov_{it-1}	-			-0.0002	-0.0002	
				(0.0002)	(0.0002)	
ESG_{it-1}	-					-0.0001
						(0.0003)
$Econ_{it-1}$ X Env_{it-1}	-	-0.0002			-0.0002	
		(0.0003)			(0.0004)	
$Econ_{it-1}$ X Soc_{it-1}	-		-0.0001		0.0001	
			(0.0003)		(0.0004)	
$Econ_{it-1}$ X Gov_{it-1}	-			-0.0002	-0.0002	
				(0.0003)	(0.0003)	
$Econ_{it-1}$ X ESG_{it-1}	-					-0.0002
						(0.0003)
$LITI$	+	-0.0238	-0.0245	-0.0262	-0.0275	-0.0261
		(0.0184)	(0.019)	(0.0186)	(0.0192)	(0.019)
LIQ_{it-1}	+	0.0008	0.0009	0.0009	0.0008	0.0008
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LEV_{it-1}	+	0.0126	0.0146	0.0145	0.0146	0.0175
		(0.0281)	(0.0285)	(0.0275)	(0.0287)	(0.0285)
$Size_{it-1}$	-	0.0074*	0.0083*	0.0091**	0.009*	0.0088*
		(0.0043)	(0.0047)	(0.0043)	(0.0048)	(0.0048)
$ALTMAN_{it-1}$	+	0.0188	0.0204	0.0195	0.0189	0.0195
		(0.0163)	(0.0163)	(0.0163)	(0.0165)	(0.0164)
BE_{it-1}	+	0.0064	0.0066	0.0058	0.006	0.0061
		(0.0124)	(0.0125)	(0.0124)	(0.0126)	(0.0124)
$DLOSS_{it-1}$	-	-0.0517***	-0.0515***	-0.0512***	-0.0512***	-0.052***
		(0.0148)	(0.0148)	(0.0147)	(0.0149)	(0.0148)
AQ_{it-1}	+	0.15	0.1629	0.1679	0.1541	0.1572
		(0.2058)	(0.2059)	(0.2052)	(0.2089)	(0.2049)
Acc_Total_{it-1}	+	0.0546	0.0523	0.0528	0.0557	0.0555
		(0.1225)	(0.1226)	(0.1229)	(0.1236)	(0.1225)
Cons		-0.2247	-0.2494	-0.2579*	-0.261*	-0.2563*
		(0.1408)	(0.1528)	(0.1392)	(0.1539)	(0.1504)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0873	0.0873	0.0872	0.0874	0.0873
Chi^2		123.6589	123.1081	124.7176	124.5737	123.7863
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.1415	0.1410	0.1426	0.1431	0.1417
R^2 Within		0.0663	0.0657	0.0678	0.0681	0.0667
Sector	Co-eff sign	-	-	-	-	-
	Sig.	19	19	19	19	19
Year	Co-eff sign	Not sig	Not sig	Not sig	Not sig	Not sig
	Sig.	Not sig	Not sig	Not sig	Not sig	Not sig

Table F5. Interaction result between economic sustainability (ECON) and non-economic sustainability (ESG) performance on cost of equity (IndEP include extraordinary item)

Panel regression results on $IndEP_{it}$ include extraordinary items with sector and year effect where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is interaction result between Env_{it-1} and $ECON_{it-1}$ factor. Column M2 is interaction result between Soc_{it-1} and $ECON_{it-1}$ factor. Column M3 is interaction result between Gov_{it-1} and $ECON_{it-1}$ factor. Column M4 is panel regression result of interaction when all individual ESG factors are added on $ECON_{it-1}$ factor. Column M5 is regression result of interaction between combined ESG_{it-1} factor and combined $ECON_{it-1}$ factor. Sector and year effect are shown coefficient sign and significant sector and year.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 ECON_{it-1} + \beta_2 X_{it-1} + \beta_3 Z_{it-1} + \beta_4 LITI + \beta_5 LIQ_{it-1} + \beta_6 LEV_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ALTMAN_{it-1} + \beta_9 BE_{it-1} + \beta_{10} DLOSS_{it-1} + \beta_{11} AQ_{it-1} + \beta_{12} ACC\_Total_{it-1} +$$

	X_{it-1}	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
	Z_{it-1}	$Econ_{it-1}$ X Env_{it-1}	$Econ_{it-1}$ X Soc_{it-1}	$Econ_{it-1}$ X Gov_{it-1}	$Econ_{it-1}$ X Env_{it-1} + $Econ_{it-1}$ X Soc_{it-1} +$Econ_{it-1}$XGov_{it-1}	$Econ_{it-1}$ X ESG_{it-1}
Variable	Exp. Sign	(1)	(2)	(3)	(4)	(5)
$ECON_{it-1}$	-	0.0258	0.0155	0.0242	0.0314	0.0251
		(0.0196)	(0.0141)	(0.0179)	(0.0219)	(0.02)
Env_{it-1}	-	0.0001			0.0001	
		(0.0002)			(0.0003)	
Soc_{it-1}	-		0		0	
			(0.0002)		(0.0002)	
Gov_{it-1}	-			-0.0002	-0.0002	
				(0.0002)	(0.0002)	
ESG_{it-1}	-					-0.0001
						(0.0003)
$Econ_{it-1}$ X Env_{it-1}	-	-0.0002			-0.0002	
		(0.0003)			(0.0004)	
$Econ_{it-1}$ X Soc_{it-1}	-		-0.0001		0.0001	
			(0.0003)		(0.0004)	
$Econ_{it-1}$ X Gov_{it-1}	-			-0.0002	-0.0002	
				(0.0003)	(0.0003)	
$Econ_{it-1}$ X ESG_{it-1}	-					-0.0002
						(0.0003)
$LITI$	+	-0.0248	-0.0253	-0.0275	-0.0285	-0.027
		(0.0184)	(0.019)	(0.0186)	(0.0192)	(0.019)
LIQ_{it-1}	+	0.0007	0.0008	0.0009	0.0007	0.0007
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LEV_{it-1}	+	0.015	0.0169	0.0173	0.0171	0.02
		(0.0282)	(0.0285)	(0.0275)	(0.0288)	(0.0286)
$Size_{it-1}$	-	0.0073*	0.0082*	0.0092**	0.0089*	0.0087*
		(0.0043)	(0.0047)	(0.0043)	(0.0049)	(0.0048)
$ALTMAN_{it-1}$	+	0.0189	0.0204	0.0198	0.019	0.0196
		(0.0163)	(0.0163)	(0.0163)	(0.0165)	(0.0164)
BE_{it-1}	+	0.0062	0.0064	0.0057	0.0057	0.0059
		(0.0124)	(0.0125)	(0.0124)	(0.0126)	(0.0124)
$DLOSS_{it-1}$	-	-0.0515***	-0.0513***	-0.051***	-0.0511***	-0.0519***
		(0.0148)	(0.0148)	(0.0148)	(0.0149)	(0.0148)
AQ_{it-1}	+	0.1449	0.1579	0.1629	0.1464	0.153
		(0.2061)	(0.2062)	(0.2055)	(0.2092)	(0.2052)
Acc_Total_{it-1}	+	0.0617	0.0589	0.0591	0.0615	0.0626
		(0.1227)	(0.1228)	(0.1231)	(0.1238)	(0.1227)
Cons		-0.2228	-0.2448	-0.2602*	-0.2576*	-0.2545*
		(0.141)	(0.153)	(0.1394)	(0.1541)	(0.1506)
Obs.		805	805	805	805	805
No of firm		119	119	119	119	119
RMS Error		0.0874	0.0874	0.0873	0.0875	0.0874
Chi^2		124.4317	123.7968	125.4811	125.3849	124.4807
P-Value		0.00	0.00	0.00	0.00	0.00
R^2 overall		0.1423	0.1417	0.1433	0.1439	0.1423
R^2 Within		0.0656	0.0650	0.0670	0.0674	0.0660
Sector	Co-eff sign	-	-	-	-	-
	Sig.	19	19	19	19	19
Year	Co-eff sign	Not sig	Not sig	Not sig	Not sig	Not sig
	Sig.	Not sig	Not sig	Not sig	Not sig	Not sig

Appendix G: Robustness test results: Panel regression on individual ECON variables and ESG without industrial and year effect

Table G1. Effective of economic and non-economic sustainability performance variables on cost of equity (CAPM)

Panel regression results on $CAPM_{it}$ where $CAPM_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression.
Column M2 to M8 are panel regression results on individual economic sustainability performance (ECON) variables which are ROE_{it-1}, $Sale_{it-1}$, $SaleGr_{it-1}$, $SaleGR\_SD_{it-1}$, RD_{it-1}, AD_{it-1} and $Dividom_{it-1}$ respectively.
Column M9 to M11 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M12 shows a result of multiple factors in ESG factors. Column M13 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 MVBV_{it-1} + \beta_7 AQ_{it-1} + \beta_8 ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	ROE_{it-1}	$Sale_{it-1}$	$SaleGr_{it-1}$	$SaleGR\_SD_{it-1}$	RD_{it-1}	AD_{it-1}	$Dividom_{it-1}$	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ROE_{it-1}	+		-0.0001											
			(0.0001)											
$Sale_{it-1}$	+			-0.0057										
				(0.0115)										
$SaleGr_{it-1}$	+				0.0135***									
					(0.0051)									
$SaleGR\_SD_{it-1}$	+					0.0621***								
						(0.0114)								
RD_{it-1}	-						0.057							
							(0.046)							
AD_{it-1}	-							-0.0786***						
								(0.0271)						
$Dividom_{it-1}$	-								0.0052					
									(0.0046)					
Env_{it-1}	-									0.0001**			0.0001*	
										(0)			(0.0001)	
Soc_{it-1}	-										0.0001		0	
											(0)		(0.0001)	
Gov_{it-1}	-											0	0	
												(0)	(0)	
ESG_{it-1}	-													0.0001
														(0.0001)
LIQ_{it-1}	+	0.0014***	0.0014***	0.0014***	0.0013***	0.0012**	0.0013***	0.0014***	0.0013**	0.0014***	0.0014***	0.0014***	0.0014***	0.0014***
		(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
LEV_{it-1}	+	0.0527***	0.053***	0.0536***	0.052***	0.0494***	0.0541***	0.0512***	0.0517***	0.0511***	0.0519***	0.0526***	0.0509***	0.0516***
		(0.0067)	(0.0066)	(0.007)	(0.0067)	(0.0066)	(0.0068)	(0.0066)	(0.0068)	(0.0067)	(0.0067)	(0.0067)	(0.0068)	(0.0067)
$Size_{it-1}$	-	-0.0026**	-0.0023*	-0.0027**	-0.0031**	-0.0019	-0.0029**	-0.0031**	-0.0026**	-0.0033***	-0.0031**	-0.0026**	-0.0034***	-0.0033**
		(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0013)	(0.0013)	(0.0012)	(0.0013)	(0.0013)
$ALTMAN_{it-1}$	+	-0.0041	-0.0039	0.0012	-0.0052	-0.0057*	-0.0042	-0.0002	-0.0037	-0.0039	-0.0038	-0.0041	-0.0039	-0.0037
		(0.0035)	(0.0034)	(0.0112)	(0.0035)	(0.0034)	(0.0035)	(0.0037)	(0.0035)	(0.0035)	(0.0035)	(0.0035)	(0.0035)	(0.0035)
$MVBV_{it-1}$	-	-0.0008	-0.0009	-0.0009	-0.0009	-0.0009	-0.0007	-0.0007	-0.0009	-0.0006	-0.0006	-0.0008	-0.0005	-0.0006
		(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
AQ_{it-1}	+	0.075*	0.0703*	0.0753*	0.0853**	0.0142	0.065	0.0803*	0.0719*	0.0666	0.0705*	0.0746*	0.065	0.0706*
		(0.0417)	(0.0422)	(0.0417)	(0.0417)	(0.0425)	(0.0424)	(0.0416)	(0.0418)	(0.0417)	(0.0418)	(0.0417)	(0.0418)	(0.0417)
Acc_Total_{it-1}	+	0.0704***	0.0856***	0.071***	0.065***	0.0723***	0.0736***	0.071***	0.071***	0.071***	0.0707***	0.0702***	0.0705***	0.0719***
		(0.0189)	(0.0227)	(0.0189)	(0.0189)	(0.0185)	(0.019)	(0.0189)	(0.0189)	(0.0188)	(0.0189)	(0.0189)	(0.0189)	(0.0189)
Cons		0.1148***	0.1069***	0.1163***	0.1294***	0.0954***	0.119***	0.1265***	0.1137***	0.1275***	0.125***	0.1151***	0.1297***	0.1258***
		(0.034)	(0.0337)	(0.0341)	(0.0343)	(0.0336)	(0.0341)	(0.0339)	(0.034)	(0.0344)	(0.0348)	(0.034)	(0.035)	(0.0346)
Obs.		805	805	805	805	805	805	805	805	805	805	805	805	805
No of firm		119	119	119	119	119	119	119	119	119	119	119	119	119
RMS Error		0.0145	0.0146	0.0145	0.0144	0.0142	0.0145	0.0145	0.0145	0.0144	0.0145	0.0145	0.0144	0.0145
Chi^2		93.5224	97.9543	93.4645	100.1313	126.1812	95.1192	105.5631	94.8811	98.7207	94.9336	93.1441	98.0666	95.8218
P-Value		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.2596	0.2628	0.2606	0.2510	0.3218	0.2716	0.2968	0.2592	0.2893	0.2717	0.2589	0.2888	0.2785
R^2 Within		0.0487	0.0503	0.0487	0.0624	0.0736	0.0479	0.0510	0.0510	0.0528	0.0501	0.0488	0.0531	0.0508

Table G2. Effective of economic and non-economic sustainability performance variables on cost of equity (Beta)

Panel regression results on $Beta_{it}$ where $Beta_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression.
Column M2 to M8 are panel regression results on individual economic sustainability performance (ECON) variables which are ROE_{it-1}, $Sale_{it-1}$, $SaleGr_{it-1}$, $SaleGR\_SD_{it-1}$, RD_{it-1}, AD_{it-1} and $Dividom_{it-1}$ respectively.
Column M9 to M11 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M12 shows a result of multiple factors in ESG factors. Column M13 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 MVBV_{it-1} + \beta_7 AQ_{it-1} + \beta_8 ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	ROE_{it-1}	$Sale_{it-1}$	$SaleGr_{it-1}$	$SaleGR\_SD_{it-1}$	RD_{it-1}	AD_{it-1}	$Dividom_{it-1}$	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	$Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}$	ESG_{it-1}
Variable	Exp sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ROE_{it-1}	+		-0.0014*											
			(0.0008)											
$Sale_{it-1}$	+			-0.1656										
				(0.1716)										
$SaleGr_{it-1}$	+				-0.1041									
					(0.0745)									
$SaleGR\_SD_{it-1}$	+					1.0627***								
						(0.165)								
RD_{it-1}	-						0.5789							
							(0.6799)							
AD_{it-1}	-							-1.0492***						
								(0.4023)						
$Dividom_{it-1}$	-								0.089					
									(0.067)					
Env_{it-1}	-									0.0022***			0.0018**	
										(0.0007)			(0.0008)	
Soc_{it-1}	-										0.0017**		0.0009	
											(0.0007)		(0.0008)	
Gov_{it-1}	-											0.0002	-0.0001	
												(0.0006)	(0.0006)	
ESG_{it-1}	-													0.0025***
														(0.0009)
LIQ_{it-1}	+	0.0272***	0.0272***	0.027***	0.0274***	0.0246***	0.0269***	0.0273***	0.0253***	0.0271***	0.0267***	0.0271***	0.0268***	0.027***
		(0.0075)	(0.0075)	(0.0075)	(0.0075)	(0.0073)	(0.0075)	(0.0075)	(0.0076)	(0.0074)	(0.0074)	(0.0075)	(0.0074)	(0.0074)
LEV_{it-1}	+	0.782***	0.7846***	0.8105***	0.7859***	0.7214***	0.797***	0.7621***	0.7647***	0.7515***	0.7639***	0.7804***	0.7464***	0.7575***
		(0.0989)	(0.0979)	(0.1034)	(0.0989)	(0.0974)	(0.1004)	(0.0983)	(0.0997)	(0.099)	(0.099)	(0.0991)	(0.0993)	(0.099)
$Size_{it-1}$	-	-0.002	0.0025	-0.0031	0.0015	0.0097	-0.0043	-0.0087	-0.0011	-0.0156	-0.0152	-0.0027	-0.0199	-0.0171
		(0.0181)	(0.018)	(0.0182)	(0.0183)	(0.0179)	(0.0183)	(0.0181)	(0.0181)	(0.0185)	(0.0189)	(0.0182)	(0.019)	(0.0189)
$ALTMAN_{it-1}$	+	-0.1194**	-0.1119**	0.0339	-0.1103**	-0.146***	-0.1208**	-0.0649	-0.1113**	-0.1158**	-0.1107**	-0.1185**	-0.1124**	-0.1089**
		(0.0512)	(0.0508)	(0.1669)	(0.0515)	(0.0503)	(0.0512)	(0.0547)	(0.0515)	(0.051)	(0.0512)	(0.0513)	(0.0513)	(0.0512)
$MVBV_{it-1}$	-	-0.0058	-0.0066	-0.008	-0.005	-0.0062	-0.0044	-0.0043	-0.007	-0.0005	0.0001	-0.0055	0.0015	0.0008
		(0.0098)	(0.0097)	(0.0101)	(0.0098)	(0.0096)	(0.0099)	(0.0097)	(0.0098)	(0.0099)	(0.0101)	(0.0099)	(0.0101)	(0.0101)
AQ_{it-1}	+	1.2129**	1.0721*	1.2266**	1.1285*	0.1921	1.1158*	1.2734**	1.1585*	1.0466*	1.0924*	1.2139**	1.0059*	1.1061*
		(0.6035)	(0.6105)	(0.6037)	(0.6063)	(0.6087)	(0.6146)	(0.6022)	(0.6046)	(0.6023)	(0.6036)	(0.604)	(0.6035)	(0.6022)
Acc_Total_{it-1}	+	0.5297*	0.8641***	0.5469**	0.5704**	0.5621**	0.562**	0.5364**	0.5389**	0.5415**	0.5375**	0.5346*	0.5389**	0.567**
		(0.2723)	(0.3261)	(0.2729)	(0.2737)	(0.2653)	(0.275)	(0.2721)	(0.2723)	(0.2707)	(0.2714)	(0.2731)	(0.2714)	(0.2715)
Cons		0.6651	0.5485	0.695	0.5597	0.3297	0.7018	0.8448*	0.6462	0.9047*	0.929*	0.673	1.0007*	0.92*
		(0.5018)	(0.4984)	(0.5029)	(0.5069)	(0.495)	(0.5037)	(0.5021)	(0.502)	(0.5054)	(0.5124)	(0.503)	(0.5136)	(0.509)
Obs.		805	805	805	805	805	805	805	805	805	805	805	805	805
No of firm		119	119	119	119	119	119	119	119	119	119	119	119	119
RMS Error		0.2084	0.2091	0.2083	0.2083	0.2028	0.2084	0.2084	0.2082	0.2071	0.2076	0.2084	0.2069	0.2074
Chi^2		89.2053	95.8217	90.0074	91.3651	133.7026	90.0178	99.1183	90.9594	99.6206	95.2210	88.7738	99.8215	96.8773
P-Value		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.3155	0.3146	0.3177	0.3193	0.3785	0.3191	0.3482	0.3159	0.3532	0.3343	0.3161	0.3545	0.3429
R^2 Within		0.0389	0.0442	0.0395	0.0398	0.0791	0.0384	0.0412	0.0417	0.0483	0.0450	0.0390	0.0500	0.0465

Table G3. Effective of economic and non-economic sustainability performance variables on cost of equity (Gordon)

Panel regression results on $Gordon_{it}$ where $Gordon_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression.
Column M2 to M8 are panel regression results on individual economic sustainability performance (ECON) variables which are ROE_{it-1}, $Sale_{it-1}$, $SaleGr_{it-1}$, $SaleGR\_SD_{it-1}$, RD_{it-1}, AD_{it-1} and $Dividom_{it-1}$ respectively.
Column M9 to M11 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M12 shows a result of multiple factors in ESG factors. Column M13 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 BE_{it-1} + \beta_7 MVBV_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	ROE_{it-1}	$Sale_{it-1}$	$SaleGr_{it-1}$	$SaleGR\_SD_{it-1}$	RD_{it-1}	AD_{it-1}	$Dividom_{it-1}$	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ROE_{it-1}	+		0.0004***											
			(0.0001)											
$Sale_{it-1}$	+			0.0434***										
				(0.0102)										
$SaleGr_{it-1}$	+				0.0046									
					(0.0108)									
$SaleGR\_SD_{it-1}$	+					0.0422**								
						(0.0194)								
RD_{it-1}	-						0.0209							
							(0.0469)							
AD_{it-1}	-							-0.0353						
								(0.0284)						
$Dividom_{it-1}$	-								-0.0127					
									(0.0084)					
Env_{it-1}	-									-0.0001			-0.0001	
										(0.0001)			(0.0001)	
Soc_{it-1}	-										-0.0001		-0.0001	
											(0.0001)		(0.0001)	
Gov_{it-1}	-											0	0	
												(0.0001)	(0.0001)	
ESG_{it-1}	-													-0.0001
														(0.0001)
LIQ_{it-1}	+	0.0024**	0.0027**	0.0025**	0.0024**	0.0022**	0.0024**	0.0026**	0.0027**	0.0024**	0.0024**	0.0024**	0.0024**	0.0024**
		(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
LEV_{it-1}	+	0.0294***	0.0316***	0.0162**	0.0294***	0.0305***	0.0302***	0.0289***	0.0312***	0.0314***	0.031***	0.0293***	0.0317***	0.0311***
		(0.0078)	(0.0075)	(0.0082)	(0.0078)	(0.0078)	(0.008)	(0.0076)	(0.0079)	(0.0079)	(0.0079)	(0.0078)	(0.0079)	(0.0079)
$Size_{it-1}$	-	0.0054***	0.0049***	0.0066***	0.0054***	0.0055***	0.0052***	0.0049***	0.0055***	0.0063***	0.0063***	0.0055***	0.0066***	0.0066***
		(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0014)	(0.0013)	(0.0013)	(0.0014)	(0.0015)	(0.0014)	(0.0015)	(0.0015)
$ALTMAN_{it-1}$	+	0.0053	0.0048	-0.0301***	0.0053	0.0035	0.0055	0.0063*	0.0056	0.0057	0.0053	0.0052	0.0055	0.0054
		(0.0035)	(0.0034)	(0.0089)	(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0035)	(0.0035)	(0.0035)	(0.0035)	(0.0035)
BE_{it-1}	+	0.0069**	0.0069**	0.0077**	0.0069**	0.0047	0.0068*	0.0062*	0.0071**	0.0081**	0.0076**	0.007**	0.0082**	0.0078**
		(0.0035)	(0.0034)	(0.0034)	(0.0035)	(0.0036)	(0.0035)	(0.0035)	(0.0035)	(0.0036)	(0.0036)	(0.0035)	(0.0036)	(0.0036)
$MVBV_{it-1}$	-	-0.0033***	-0.0038***	-0.0027***	-0.0034***	-0.0033***	-0.0032***	-0.0034***	-0.0031***	-0.0035***	-0.0035***	-0.0033***	-0.0036***	-0.0035***
		(0.0009)	(0.0009)	(0.0009)	(0.001)	(0.0009)	(0.001)	(0.0009)	(0.001)	(0.001)	(0.001)	(0.0009)	(0.001)	(0.001)
AQ_{it-1}	+	0.1125	0.1642**	0.1069	0.1179*	0.0477	0.1043	0.1167*	0.1292*	0.1228*	0.118*	0.1119	0.1231*	0.1187*
		(0.0702)	(0.0699)	(0.0689)	(0.0716)	(0.0761)	(0.0725)	(0.0693)	(0.0713)	(0.0706)	(0.0705)	(0.0702)	(0.0706)	(0.0704)
Acc_Total_{it-1}	+	0.1709***	0.0757	0.1525***	0.1689***	0.1713***	0.1724***	0.177***	0.1675***	0.1669***	0.1669***	0.1689***	0.1655***	0.1635***
		(0.0389)	(0.0466)	(0.0388)	(0.039)	(0.0388)	(0.0392)	(0.039)	(0.0388)	(0.0389)	(0.0389)	(0.0392)	(0.0392)	(0.039)
Cons		-0.1048***	-0.0964***	-0.1421***	-0.1047***	-0.1078***	-0.1008***	-0.0905**	-0.1095***	-0.1258***	-0.1266***	-0.1074***	-0.1321***	-0.131***
		(0.0357)	(0.0344)	(0.036)	(0.0359)	(0.0356)	(0.0379)	(0.0353)	(0.036)	(0.0383)	(0.0388)	(0.0363)	(0.0394)	(0.0394)
Obs.		805	805	805	805	805	805	805	805	805	805	805	805	805
No of firm		119	119	119	119	119	119	119	119	119	119	119	119	119
RMS Error		0.0329	0.0330	0.0328	0.0329	0.0329	0.0329	0.0332	0.0328	0.0329	0.0329	0.0330	0.0330	0.0329
Chi^2		99.6258	122.5098	124.2160	98.8981	105.4788	98.4402	107.8136	100.6545	101.5976	100.6632	100.3234	102.7199	101.0719
P-Value		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.1178	0.1335	0.1381	0.1180	0.1233	0.1181	0.1197	0.1203	0.1206	0.1201	0.1181	0.1212	0.1206
R^2 Within		0.0138	0.0216	0.0200	0.0143	0.0136	0.0137	0.0119	0.0164	0.0157	0.0151	0.0138	0.0157	0.0156

Table G4. Effective of economic and non-economic sustainability performance variables on cost of equity (IndEP exclude extraordinary item)

Panel regression results on $IndEP_{it}$ exclude extraordinary item where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M8 are panel regression results on individual economic sustainability performance (ECON) variables which are ROE_{it-1}, $Sale_{it-1}$, $SaleGr_{it-1}$, $SaleGR\_SD_{it-1}$, RD_{it-1}, AD_{it-1} and $Dividom_{it-1}$ respectively. Column M9 to M11 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M12 shows a result of multiple factors in ESG factors. Column M13 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 BE_{it-1} + \beta_7 MVBV_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	ROE_{it-1}	$Sale_{it-1}$	$SaleGr_{it-1}$	$SaleGR\_SD_{it-1}$	RD_{it-1}	AD_{it-1}	$Dividom_{it-1}$	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ROE_{it-1}	+		0.0012***											
			(0.0003)											
$Sale_{it-1}$	+			-0.0252										
				(0.0273)										
$SaleGr_{it-1}$	+				-0.0004									
					(0.0293)									
$SaleGR\_SD_{it-1}$	+					-0.1737***								
						(0.0514)								
RD_{it-1}	-						0.0107							
							(0.1216)							
AD_{it-1}	-							0.1386*						
								(0.0762)						
$Dividom_{it-1}$	-								-0.0281					
									(0.0222)					
Env_{it-1}	-									0			0.0001	
										(0.0002)			(0.0002)	
Soc_{it-1}	-										0		0	
											(0.0002)		(0.0002)	
Gov_{it-1}	-											0	0	
												(0.0002)	(0.0002)	
ESG_{it-1}	-													0
														(0.0002)
LIQ_{it-1}	+	-0.0006	0	-0.0006	-0.0006	0.0004	-0.0006	-0.001	0.0002	-0.0006	-0.0006	-0.0006	-0.0006	-0.0006
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.003)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.0381*	-0.0316	-0.0304	-0.0381*	-0.0426**	-0.0377*	-0.0368*	-0.034*	-0.0387*	-0.038*	-0.0381*	-0.0385*	-0.0381*
		(0.0203)	(0.0202)	(0.022)	(0.0203)	(0.0202)	(0.0208)	(0.0203)	(0.0206)	(0.0206)	(0.0205)	(0.0203)	(0.0207)	(0.0205)
$Size_{it-1}$	-	0.0105***	0.0099***	0.0097***	0.0105***	0.0098***	0.0104***	0.0116***	0.0106***	0.0103***	0.0106***	0.0106***	0.0104***	0.0105***
		(0.0034)	(0.0034)	(0.0035)	(0.0034)	(0.0034)	(0.0037)	(0.0034)	(0.0034)	(0.0038)	(0.0038)	(0.0035)	(0.004)	(0.0039)
$ALTMAN_{it-1}$	+	0.0208**	0.0202**	0.0411*	0.0208**	0.0281***	0.0208**	0.0155	0.0214**	0.0206**	0.0208**	0.0207**	0.0205**	0.0208**
		(0.0092)	(0.0091)	(0.0239)	(0.0092)	(0.0094)	(0.0092)	(0.0096)	(0.0092)	(0.0092)	(0.0092)	(0.0092)	(0.0093)	(0.0092)
BE_{it-1}	+	-0.004	-0.0048	-0.0043	-0.004	0.0054	-0.004	0	-0.0035	-0.0044	-0.0039	-0.004	-0.0043	-0.004
		(0.0092)	(0.0092)	(0.0093)	(0.0093)	(0.0096)	(0.0092)	(0.0095)	(0.0092)	(0.0095)	(0.0094)	(0.0093)	(0.0095)	(0.0094)
$MVBV_{it-1}$	-	0.004	0.0029	0.0036	0.004	0.0037	0.004	0.0037	0.0043*	0.004	0.0039	0.004	0.004	0.004
		(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)
AQ_{it-1}	+	-0.2361	-0.0982	-0.232	-0.2366	0.0352	-0.2402	-0.2442	-0.1952	-0.2392	-0.2357	-0.2364	-0.2393	-0.2363
		(0.1863)	(0.188)	(0.1864)	(0.19)	(0.2018)	(0.192)	(0.1861)	(0.189)	(0.1874)	(0.1868)	(0.1865)	(0.1877)	(0.1868)
Acc_Total_{it-1}	+	0.2077**	-0.0678	0.2198**	0.2078**	0.2076**	0.2089**	0.197*	0.2019*	0.2088**	0.2074**	0.2068*	0.2077*	0.2079**
		(0.1048)	(0.1254)	(0.1057)	(0.1053)	(0.1042)	(0.1058)	(0.1049)	(0.1049)	(0.1051)	(0.1051)	(0.1057)	(0.106)	(0.1056)
Cons		-0.3038***	-0.2978***	-0.2797***	-0.3038***	-0.2901***	-0.301***	-0.3362***	-0.3121***	-0.2978***	-0.3054***	-0.305***	-0.3018***	-0.3031***
		(0.0932)	(0.0924)	(0.0968)	(0.0934)	(0.0927)	(0.0985)	(0.0948)	(0.0934)	(0.1001)	(0.101)	(0.0951)	(0.1033)	(0.1027)
Obs.		805	805	805	805	805	805	805	805	805	805	805	805	805
No of firm		119	119	119	119	119	119	119	119	119	119	119	119	119
RMS Error		0.0894	0.0886	0.0894	0.0895	0.0888	0.0895	0.0893	0.0894	0.0895	0.0895	0.0895	0.0896	0.0895
Chi^2		35.8702	51.9110	36.7112	35.8253	47.7464	35.8331	39.2831	37.4941	35.8531	35.8270	35.8297	35.7892	35.8254
P-Value		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0431	0.0613	0.0441	0.0431	0.0567	0.0431	0.0471	0.0450	0.0432	0.0431	0.0431	0.0432	0.0431
R^2 Within		0.0317	0.0415	0.0253	0.0317	0.0443	0.0314	0.0356	0.0328	0.0310	0.0318	0.0318	0.0311	0.0316

Table G5. Effective of economic and non-economic sustainability performance variables on cost of equity (IndEP include extraordinary item)

Panel regression results on $IndEP_{it}$ include extraordinary item where $IndEP_{it}$ is a proxy of cost of equity appear in decimal number. Column M1 is control model result where only control variables are added to regression. Column M2 to M8 are panel regression results on individual economic sustainability performance (ECON) variables which are ROE_{it-1}, $Sale_{it-1}$, $SaleGr_{it-1}$, $SaleGR\_SD_{it-1}$, RD_{it-1}, AD_{it-1} and $Dividom_{it-1}$ respectively. Column M9 to M11 are panel regression results on individual non-economic sustainability (ESG) factors include Env_{it-1}, Soc_{it-1} and Gov_{it-1} respectively. Column M12 shows a result of multiple factors in ESG factors. Column M13 is a regression result of ESG_{it-1} factor where ESG_{it-1} is calculated by Thomson Reuter weighted average.
Standard errors are shown below coefficient. ***, **, * indicate significance at p-value less than 1%, 5% and 10% level, respectively.

$$COC_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 LIQ_{it-1} + \beta_3 LEV_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 ALTMAN_{it-1} + \beta_6 BE_{it-1} + \beta_7 MVBV_{it-1} + \beta_8 AQ_{it-1} + \beta_9 ACC\_Total_{it-1} + \varepsilon$$

	X_{it-1}	-	ROE_{it-1}	$Sale_{it-1}$	$SaleGr_{it-1}$	$SaleGR\_SD_{it-1}$	RD_{it-1}	AD_{it-1}	$Dividom_{it-1}$	Env_{it-1}	Soc_{it-1}	Gov_{it-1}	Env_{it-1}+ Soc_{it-1}+ Gov_{it-1}	ESG_{it-1}
Variable	Exp sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ROE_{it-1}	+		0.0012***											
			(0.0003)											
$Sale_{it-1}$	+			-0.0262										
				(0.0274)										
$SaleGr_{it-1}$	+				0.0002									
					(0.0294)									
$SaleGR\_SD_{it-1}$	+					-0.1744***								
						(0.0515)								
RD_{it-1}	-						0.026							
							(0.1218)							
AD_{it-1}	-							0.1406*						
								(0.0763)						
$Dividom_{it-1}$	-								-0.028					
									(0.0223)					
Env_{it-1}	-									0			0.0001	
										(0.0002)			(0.0002)	
Soc_{it-1}	-										0		0	
											(0.0002)		(0.0002)	
Gov_{it-1}	-											0	0	
												(0.0002)	(0.0002)	
ESG_{it-1}	-													0
														(0.0002)
LIQ_{it-1}	+	-0.0006	-0.0001	-0.0007	-0.0006	0.0004	-0.0007	-0.001	0.0002	-0.0006	-0.0006	-0.0006	-0.0006	-0.0006
		(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.003)	(0.0029)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
LEV_{it-1}	+	-0.0374*	-0.031	-0.0294	-0.0374*	-0.042**	-0.0365*	-0.0361*	-0.0334	-0.0382*	-0.0375*	-0.0374*	-0.0381*	-0.0376*
		(0.0204)	(0.0203)	(0.022)	(0.0204)	(0.0203)	(0.0209)	(0.0204)	(0.0206)	(0.0207)	(0.0206)	(0.0204)	(0.0208)	(0.0206)
$Size_{it-1}$	-	0.0106***	0.0099***	0.0097***	0.0106***	0.0099***	0.0103***	0.0116***	0.0107***	0.0102***	0.0105***	0.0107***	0.0104***	0.0104***
		(0.0034)	(0.0034)	(0.0035)	(0.0034)	(0.0034)	(0.0037)	(0.0034)	(0.0034)	(0.0038)	(0.0038)	(0.0036)	(0.004)	(0.0039)
$ALTMAN_{it-1}$	+	0.0203**	0.0197**	0.0415*	0.0203**	0.0276***	0.0204**	0.0149	0.0209**	0.0201**	0.0203**	0.0203**	0.0201**	0.0203**
		(0.0092)	(0.0091)	(0.024)	(0.0092)	(0.0094)	(0.0092)	(0.0096)	(0.0092)	(0.0092)	(0.0092)	(0.0092)	(0.0093)	(0.0092)
BE_{it-1}	+	-0.0045	-0.0053	-0.0048	-0.0045	0.005	-0.0045	-0.0004	-0.004	-0.0049	-0.0045	-0.0044	-0.0049	-0.0046
		(0.0093)	(0.0092)	(0.0093)	(0.0093)	(0.0096)	(0.0093)	(0.0095)	(0.0093)	(0.0095)	(0.0094)	(0.0093)	(0.0095)	(0.0094)
$MVBV_{it-1}$	-	0.0039	0.0028	0.0035	0.0039	0.0036	0.004	0.0036	0.0042*	0.004	0.0039	0.0039	0.0039	0.0039
		(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0025)
AQ_{it-1}	+	-0.236	-0.0996	-0.2317	-0.2357	0.0363	-0.2458	-0.2442	-0.1951	-0.24	-0.2365	-0.2364	-0.2405	-0.2368
		(0.1867)	(0.1884)	(0.1867)	(0.1903)	(0.2022)	(0.1923)	(0.1864)	(0.1894)	(0.1877)	(0.1871)	(0.1868)	(0.1881)	(0.1871)
Acc_Total_{it-1}	+	0.2119**	-0.0604	0.2245**	0.2118**	0.2118**	0.2148**	0.201*	0.2061**	0.2133**	0.2121**	0.2107**	0.212**	0.2127**
		(0.105)	(0.1257)	(0.1059)	(0.1056)	(0.1044)	(0.106)	(0.1051)	(0.1051)	(0.1053)	(0.1053)	(0.1059)	(0.1062)	(0.1058)
Cons		-0.3042***	-0.2982***	-0.2791***	-0.3041***	-0.2905***	-0.2974***	-0.337***	-0.3125***	-0.2964***	-0.3026***	-0.3058***	-0.2993***	-0.3012***
		(0.0934)	(0.0926)	(0.097)	(0.0936)	(0.0929)	(0.0987)	(0.095)	(0.0936)	(0.1003)	(0.1012)	(0.0952)	(0.1035)	(0.1029)
Obs.		805	805	805	805	805	805	805	805	805	805	805	805	805
No of firm		119	119	119	119	119	119	119	119	119	119	119	119	119
RMS Error		0.0896	0.0888	0.0896	0.0897	0.0890	0.0897	0.0895	0.0896	0.0897	0.0897	0.0897	0.0898	0.0897
Chi^2		35.7330	51.3306	36.6471	35.6882	47.6455	35.7357	39.2330	37.3422	35.7363	35.6898	35.6962	35.6626	35.6932
P-Value		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2 overall		0.0430	0.0607	0.0441	0.0430	0.0565	0.0430	0.0470	0.0449	0.0430	0.0430	0.0430	0.0430	0.0430
R^2 Within		0.0321	0.0409	0.0254	0.0321	0.0440	0.0313	0.0360	0.0330	0.0312	0.0320	0.0323	0.0314	0.0318