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Impact of Business Sustainability Performance on Cost of Capital in Emerging Economies

by

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This study is wholeheartedly dedicated to Honorable ***Syed Ansir Sibtain Naqvi****, who was the source of inspiration and gave me strength when I thought of giving up, who continually provide his moral and spiritual support in this long journey. Secondly, I dedicate this work to my beloved father,* ***Mr. Mazhar Hussain****, you raised me up so I can stand on mountains and my dear mother* ***Mrs. Nasreen Akhtar*** *for always being there for me for listening to me. Lastly, I dedicate this work to my beloved wife* ***Mrs. Rubab Batool*** *for sharing all my triumphs, tears and fears, to my brothers and sister, relatives, mentor and friends for their valuable guidance and support.*

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CERTIFICATE OF APPROVAL

This is to certify that the research work presented in the thesis, entitled "**Impact of Business Sustainability Performance on Cost of Capital in Emerging Economies**" was conducted under the supervision of **Dr. Arshad Hassan**. No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the **Department of Management Sciences, Capital University of Science and Technology** in partial fulfillment of the requirements for the degree of Doctor in Philosophy in the field of **Management Sciences.** The open defence of the thesis was conducted on **May 23, 2023**.

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List of Publications

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Abstract

The goal of value creation is achieved by a firm when its management strives to safeguard the stakeholder's interests. An important aspect to be focused in this regard is sustainability performance which comprises of following dimensions i.e. economic, environmental, social and governance (EESG) and it is reflected in managerial actions, strategies and reporting.

This study investigates whether cost of capital is affected by Economic Sustainability Performance (ECON) and Environmental, Social and Governance (TESG) components of sustainability individually and in aggregate. The sample consists of non-financial firms from the emerging markets including Brazil, Russia, India, China, South Africa and Pakistan. Sample for this study consists of 3000 observations of 300 non-financial firms from 6 different countries, 50 firms from each country for the period 2009-2018. This study employs fixed effect model as well as System GMM (Generalized Method of Moments) considering the panel structure of the data.

Results of the analysis show that financial and non-financial sustainability performance dimensions (ECON and TESG) are negatively related with Cost of Capital (COC), Cost of Equity (COE) and Cost of Debt (COD). When this study decomposes (ECON) dimension in-to operation efficiency (OP), growth (GR) and research (RES) factor, results display that firms with higher operational efficiency (OP) and more research efforts (RES) have lower overall cost of financing. However, a firm's growth opportunity does not influence the COC and its components. Results of (TESG) on COC and its components show that only environmental (ENV) and governance (GOV) sustainability performance are negatively related with COC and its components. However, there exists no relationship between social (SOC) sustainability performance with COC and its components. Moreover, TESG moderates the ECON-COC, ECON-COD and ECON-COE relationship individually and in aggregate.

To sum up, sustainability performance indicators are priced by the market and contribute towards reduction of cost of financing. Therefore, sustainability performance measures are beneficial for policy makers, companies and their management, investors and regulators.

Key words: Cost of capital, Cost of equity, Cost of debt, Sustainability performance, Economic sustainability performance, Environmental, social and governance sustainability performance, Growth Factor, Operation Efficiency, Research Factor.

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Abbreviations

ACC	Accrual
BCG	Boston Consulting Group
BETA	Beta
BOD	Board of Directors
COC	Cost of Capital
COD	Cost of Debt
COE	Cost of Equity
CSR	Corporate Social Responsibility
ECON	Economic Sustainability Performance
GDP	GDP Growth
GMM	Generalized Method of Moments
GR	Growth Factor
INF	Inflation
LEV	Leverage
LIQU	Liquidity
MSP	Money Supply
OP	Operation Efficiency Factor
POP	Population
RES	Research Effort Factor
SIZE	Firm Size
TESG	Environmental, Social and Governance Sustainability Performance
UNGC	United Nations Global Compact

Chapter 1

Introduction

1.1 Background of the Study

Business sustainability has attracted significant attention after the global crises of 2007-2009. Public companies are required to warrant sustainability in long term and are accountable to multiple stakeholders. Brundtland (1987) defined sustainability or sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Starik and Kanashiro (2013) pointed out that this definition primarily focuses on environmental sustainability. Sustainable Performance information is demanded by global investors, required by regulators and scholars working on assurance and reporting of performance related to sustainability (Brockett and Rezaee, 2012; Rezaee, 2016). When all the stakeholder's interests are considered by the management and economic sustainability performance (ECON) and environmental, social and governance (TESG) sustainability performance integrates into managerial actions, strategies and reporting, the goal of value creation is achieved.

Lawmakers, investment community, regulators and stakeholders monitor global businesses to focus on sustainability in today's business environment. The focus of business sustainability has been evolved from corporate social responsibility (CSR) and ESG sustainability performance to initiatives which can foster higher

financial performance and revenue growth (IFAC, 2015). Rezaee (2017a) pointed out that CSR, business sustainability and triple bottom line of focusing on ESG have been used interchangeably in the reports and previous literature. Scholars consider CSR as a component of sustainability and it has progressed to central point of business strategies (Rezaee, 2016; Kiron et al., 2015; Jain et al., 2016; Ng and Rezaee, 2015).

Wijen (2014) pointed out that business sustainability is the highly opaque and evolving field and the relation between ECON and TESG sustainability performance may be viewed as competing / conflicting or completing / complementing (Rezaee, 2016, 2017a). The guidelines are still voluntary for most part of sustainability (Gilbert et al., 2011). Starik and Kanashiro (2013) argued that although there are number of different theories of sustainability, there is still a need for strategic, pragmatic, and imperative approach to sustainability.

Business sustainability has progressed from a starting point of corporate governance and CSR to integrate into corporate mission, culture, strategy, management processes, reporting and business model. Kiron et al. (2015) explained that a research conducted by Boston Consulting Group (BCG), MIT Sloan and United Nations Global Compact (UNGC) suggests that business sustainability is moving away from opportunistic and isolated efforts with a main emphasis on CSR and towards a more holistic, integrated and strategic approach taking on all sustainability performance dimensions and engaging different stakeholders. Therefore, organizations, their executives and board of directors (BOD) can utilize this framework to advance sustainability from its green-washing and current branding status to the strategic imperative of integrating business sustainability into corporate culture and business model in creating all stakeholder's shared value. Investors can also take benefit from the proposed framework as they can consider various financial (ECON) and non-financial (TESG) sustainability performance dimensions into their investment decisions (Rezaee, 2017a).

The framework presented in Table No. 1.1 consists of four integrated sustainability strategies which are shared value creation, theory implication, sustainability continuous performance improvement and performance assurance and reporting. This study also presents the implications and relevance of sustainability framework

Table 1.1: An Integrated Sustainability Framework

Stakeholders	Capitals	Risks	Performance	Shared Value	Actions	Sustainability Initiative	Sustainability Theories	Sustainability Reporting / Assurance
Management	Strategic Capital	Failure	Purpose / Mission	Strategic planning	Management performance	Long-term strategic decisions reporting	Stewardship	Management discussion & analysis
Shareholders	Financial Capital	Financial	Economic/ financial	Create shareholder value	Improve market and accounting performance, earnings, growth, R&D investment	Management fiduciary duty is to create shareholder value.	Agency/ Shareholder	Financial statements and audit reports
Governance Participants	Human Capital	Strategic/ Operational	Governance	Effective governance and ethical culture	Independent board, board committees, executive compensation, internal controls	Management should design and implement effective corporate governance measures to protect stakeholder interests.	Shareholder/ Stakeholder	Governance reports and assurance
Society	Social Capital	Reputation	Social	Corporate Social Responsibility	Customer satisfaction, work environment, corporate giving	Management should invest in corporate social responsibility (CSR) activities that create good brand, image and reputation.	Legitimacy/ Signaling	Social reports and assurance
Environment	Compliance / Regulatory Capital	Compliance	Environmental	Leave a better environment for the next generation	Understanding of complex climatic dynamics, compliance with environmental laws	Management should comply with all applicable environmental laws, rules, regulations, and best practices to mitigate environmental risks.	Institutional	Environmental reports and assurance

to business organizations and future research. The proposed framework can be used by management in order to integrate both ECON (financial) and TESG (non-financial) dimension of sustainability performance into its managerial processes, business model, production design, reporting from purchasing and inbound logistics, outbound logistics, manufacturing processes to distribution, environmental and social initiatives, and customer services (Rezaee, 2017a).

This framework also aims to bridge the conflict between attaining sustainable financial (ECON) performance in creating value for shareholder and attaining sustainable non-financial (TESG) performance in guarding other stakeholder's interest which provides the theoretical foundation to test the possible connection between ECON and TESG sustainability performance dimensions. There is vast literature available related to the understanding of CSR drivers and its impact on market and financial performance and firm value. However, the previous research is conducted in an isolated manner and does not reveal the integrated effects of ECON (financial) and TESG (non-financial) sustainability performance. This framework can also be employed by academicians into curriculum of their schools. Although, business sustainability is important to investors, corporations and business community, there is limited research regarding the status of business sustainability education. In recent years, interest in and demand for sustainability education is increased and more law and business schools are planning to include this into their curriculum (Rezaee and Homayoun, 2014)

There are multiple research prospects in sustainability, including environmental sustainability, sustainability in education, corporate governance, sustainable supply chain management, sustainability in economic, cultural, social, governance and ethical context, integrated reporting on sustainability performance, sustainability policy and practices, assurance on sustainability reporting, policy makers role who are considered standard-setters in business sustainability advancement.

There are many unanswered questions regarding TESG factors in the financial market (Starks, 2021). Liang and Renneboog (2020); Gillan et al. (2021) pointed out that creditors and shareholders may price TESG performance of companies depending on their objectives and incentives, in the form of less volatile and higher cash flows, and also on company's perceived risk. There is no consensus yet on

the relationship between business sustainability performance and Cost of Equity (COE) and Cost of Debt (COD). Some previous research describes a negative relationship between business sustainability performance and COD (Du et al., 2017; Oikonomou et al., 2014) and COE (El Ghoul et al., 2018). However, there are also studies which predict a positive relationship between these variables (Menz, 2010; Magnanelli and Izzo, 2017). Some studies are inconclusive about the relationship (Salama et al., 2011; Gregory et al., 2014).

As we are aware that shareholders and debt holders are not exposed to same risks, therefore, response to sustainability is not likely to be aligned. Previous literature also points out that there are other factors which have an impact on the relationship between sustainability performance and COC, such as financial transparency, stakeholder orientation and governance (Gupta, 2018; Dhaliwal et al., 2014) and industry membership (El Ghoul et al., 2018; Reverte, 2012). From the previous literature, it shows that this concept is evolved from CSR to ESG, ESG to sustainability performance, sustainability performance to impact performance. These terms are still used interchangeably.

It is pertinent to mention that investment and business decisions made by global investors utilize information related to sustainability performance along-with company's financials (Rogers, 2015). Moreover, for making investment decisions, investment professionals use sustainability performance information (CFA, 2015). Research oriented scholar's shown keen interest on sustainability performance research and there is much research on CSR. The term CSR, triple bottom line and business sustainability are used to focus on environmental, social and governmental aspects (TESG) interchangeably in previous literature. However, business sustainability is more evident as compared with corporate social responsibility and gained acceptance in recent years (GRI, 2013; Brockett and Rezaee, 2012; Rezaee, 2017a). CSR is rightly said to focus poorly on corporate responsibility, while sustainability focuses on sustainable performance and long-term growth strategies.

Sustainability has the emphasis on activities which create financial (ECON) and non-financial (TESG) sustainability performance by improving corporate governance and maximizing opportunities for business and reducing environmental and social harms. The ultimate goal is to gain long term success in generating value

for stakeholders. It is evident from current research that business sustainability mainly focuses on CSR and moving from opportunistic and isolated efforts towards more holistic, integrated and strategic approach fetching diverse stakeholders and incorporating all dimensions of sustainability performance (Kiron et al., 2015). The sustainability terms CSR, ESG, ESGEE, SEGE and TESG are used by various research scholars with some exceptions. Sustainability Performance is classified into two components in the past research. First, financial component (ECON) emphases on attaining financial performance for generating shareholders value in long term and Second, non-financial component (TESG) which protects stakeholder's interests excluding shareholders (Jain et al., 2016; Ng and Rezaee, 2015).

Sustainability entails that there should be sustainability performance reporting, standards, risks and theories understanding and certifying that sustainability is integrated into business model, academic research and corporate culture. Keeping in view, this study emphasizes on sustainability theories, sustainability risks, sustainability performance and sustainability assurance and reporting.The eventual goal in this regard is value creation for stakeholders which can be achieved by reducing financing cost through sustainability.

In a nutshell, there are four integrated themes related to sustainability framework. First theme focuses on framework that builds between business sustainability and it's financial (ECON) and non-financial (TESG) component of sustainability performance dimensions and is constructed on and motivated by stakeholder theory, along-with other related theories which are legitimacy, shareholder, stewardship, signaling and institutional in giving justification for reporting information related to sustainability and attracting sustainability performance. Talking about second theme which deals with firm's value maximization which is the ultimate objective and goal of the firm.

This goal achievement lies on protecting all stakeholders' interests. Organizations are found guilty for primarily focusing on value creation for shareholders and maximization of profit with fewer attention to their business impact on society and environment (Porter and Kramer, 2011). Shared value concept can be defined as "policies and practices that enhance the competitiveness of a company while

simultaneously advancing the economic and social conditions in the communities in which it operates" (Porter and Kramer, 2011).

The next (third) theme focuses on the time horizon of balancing short term and long term performance in financial (ECON) and non-financial (TESG) sustainability performance dimensions. The final and fourth theme is the multidimensional nature of sustainability performance in financial (ECON) and non-financial (TESG) areas. The relative importance of financial and non-financial components of sustainability performance dimensions with each other's respect and their contribution towards creation of value of firms is affected by whether dimensions of sustainability performance are regarded as conflicting with, competing with, or complementing each other.

Sustainability theories discuss the business (corporate) organization's role in society and their relation with suppliers, creditors, employees, government, customers and society. The foremost aim of these theories is to discuss the connections among sustainability performance dimensions, possible strains, the integration and various constraints set on shareholders' value creation goals. These compatible and interrelated theories focus on individual and on collective basis regarding different components (financial and non-financial) of performance related to sustainability in an attempt to generate value for stakeholders.

Measures of sustainability performance should be derived from external factors of technology, CSR, reputation, globalization, utilization of natural resources and competition as well as internal factors of risk profile, corporate culture, strategy, strengths and weaknesses. Integration of ECON (financial) and TESG (non-financial) sustainability performance dimensions into business model, corporate infrastructure, and management processes enable firms to optimize production processes, achieve cost effectiveness and efficiency, conserve scarce resources, increase productivity, identify product innovations, and promote corporate reputation. Business activities are classified as essential or non-essential and value adding or non-value adding (Agrawal et al., 2006). The achievement of ECON (financial) and TESG (non-financial) sustainability performance dimensions and facets of continuous improvements allows companies to move toward addressing the principal objectives of sustainability in shared value creation which can be

achieved by reducing financing cost through sustainability.

Overall, TESG (non-financial) sustainability performance may be viewed as vital activity that may or may not help in creating shareholder value. Companies that focus on their ECON (financial) and their disclosure consistently and significantly outperform those companies with no commitment to TESG (non-financial) sustainability performance (Eccles et al., 2014). The negative relationship between ECON and COE is moderated through TESG (non-financial) sustainability performance and thus help in improving firm value (Ng and Rezaee, 2015).

This discussion elaborates ECON (financial) and TESG (non-financial) sustainability performance dimensions and their key performance indicators (KPI). The objective function in this context is to maximize value of the firm by attaining financial sustainable performance while keeping in view the attainment of TESG (non-financial) sustainability as a constraint levied on objective function. Financial and non-financial (EESG) sustainability performance dimensions' integration into corporate infrastructure, management processes and business models permit firms to detect product innovations, improve production processes, to conserve scarce resources, increase productivity, achieve cost effectiveness and efficiency and promote corporate reputation.

Sustainability emphases on the activities that create ECON (financial) and TESG (non-financial) sustainability performance through enhancing business opportunity and corporate governance effectiveness and reducing social and environmental harms and above all acquiring success in long term in creating value for stakeholders. The Global Reporting Initiative (GRI) in its sustainability guidelines (G4) endorses an integrated reporting on five economic, environmental, social, governance and ethical (EESGE) sustainability performance dimensions with ethical dimension being incorporated into other dimensions (Global Reporting Initiative, 2013).

1.2 Sustainability and Cost of Financing

Companies finance their investment project either through debt or equity financing, both of which have costs. Equity holder's demand return for their investment

in equity of the firm and is named COE. Derived using portfolio theory, Capital Asset Pricing Model (CAPM) suggests that the systematic component of a company's stock return is a proxy for the required return of equity. Although risks that are company-specific could be diversified away, certain company-specific characteristics still affect required return of equity. It is argued that company's assessed covariance with other company's cash flows is affected by high quality accounting disclosures and this directly and indirectly affecting COE (Lambert et al., 2007).

There are several studies that attempt to link some components of sustainability reporting to financial reporting quality and COE. McDermott (2012) finds a positive (negative) association between firm's future profitability with high-quality (low-quality) financial reporting and investment in CSR which suggests that CSR investment efficiency is improved by high-quality financial reporting by reducing moral hazard. Dhaliwal et al. (2011) reports that COE in the year reduces with company's superior CSR performance after initiating CSR programs and thus obtained more analyst coverage and dedicated institutional investors and the ability to raise equity capital. Botosan (1997) found no association between voluntary disclosure and COE.

There are multiple studies which provide a negative relationship between sustainability and COE (Ng and Rezaee, 2015; Hmaittane et al., 2022; Gupta, 2018; Matthiesen and Salzmann, 2017). There are studies which provide a positive relationship between sustainability and COE (Dahiya and Singh, 2020; Yeh et al., 2020). Chava (2014) explored the impact of environmental concerns and strengths on COE and found no significant relationship between environmental strengths and COE. Moreover, environmental concerns enhances the COE.

Inconsistent results of prior related studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON (financial) and TESG (non-financial) component of sustainability performance with COE.

Debt financing is crucial to companies in financing their investments and advancing their growth. COD is the return demanded by bondholders when they purchase debt securities issued by a corporation and is typically affected by the risk free

rate of return, characteristics of the bonds (e.g., maturity date, coupon rate, call terms) and the probability of default (Merton, 1974). Sustainability relationship is with uncertainty. When there is high uncertainty, there is high risk and vice versa. Sustainability reduces uncertainty and ultimately risk is reduced which reduces the cost of financing. Firms are more vigilant which are concerned about sustainability and their sustainability risks ultimately reduces with their commitment.

It is argued that there is positive relationship between environmental risk management and COD (Sharfman and Fernando, 2008). It is further argued that there is no significant relationship between CSR and COD. The study used a US sample of firms for the period 1991-2006 and COD is measured as reduced loan spreads (Goss and Roberts, 2011). The another study examined the relationship between CSR and COD and used a sample of Chinese companies and found that companies with extremely high or low CSR experience a higher COD (Ye and Zhang, 2011). Chava (2014) pointed out that firms having environmental concerns have to pay higher spreads on their loans. Some researchers found the positive relationship between external capital raising activities and financial disclosures (Healy and Palepu, 2001; Lang and Lundholm, 2000; Frankel et al., 1995). Zhang and Ding (2006) found the positive association between financial disclosures and lower COD.

There are multiple studies which provide a negative relationship between sustainability and COD (Hasan et al., 2017; Ge and Liu, 2015; Fonseka et al., 2019; Eliwa et al., 2021). There are studies which provide a positive relationship between sustainability and COD (Hoepner et al., 2016; Erragragui, 2018). There are studies which provide inconclusive results and urges the researches to further examine the relationship (Fonseka et al., 2019; Eliwa et al., 2021). Fonseka et al. (2019) argued that this relationship also yet to be investigated in emerging markets.

Inconsistent results of prior related studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON (financial component) and TESG (non-financial component) of sustainability performance and COD. Further, disclosures of ECON and TESG provide valuable information to debt holders about the financing, operating, reputation and compliance risks. More transparent

information about these risks will assist debt holders in evaluating their investment and such information is also a primary driver of COD financing. Sustainability performance has an impact on risk of firm. Due to sustainability performance, risk of both equity providers and debt provides changes. Therefore, there is no difference regarding impact of sustainability performance on COD and COE.

COC includes COE and COD. Previous research confirms that investors' uncertainty about company's sustainable profitability is reduced through higher disclosure quality, which ultimately decreases the COC (Leuz and Wysocki, 2008). In an analytical setting, Gao (2010) tried to explain the relation between financial disclosures and COC and provided evidence that in many instances investor welfare is improved through disclosure quality and as a result COC is reduced.

Clark et al. (2015) pointed out that with the help of good governance, there will be reduction in information asymmetry which ultimately lowers the COC. Prior research has addressed the relationship between quality of financial disclosure and COC. Moreover, the theoretical research further clarifies that investors' uncertainty about company's sustainable profitability is reduced through higher disclosure quality, which in turns reduces the COC, and this is basically the investor's expected risk premium (Healy and Palepu, 2001).

There are multiple studies which provide a negative relationship between sustainability and COC (Gillan et al., 2021; El Ghoul et al., 2011; Hong and Kacperczyk, 2009; Pástor et al., 2021; Wong et al., 2021; Ould Daoud Ellili, 2020). There are studies which provide a positive relationship between sustainability and COC (Nazir et al., 2022; Atan et al., 2018; Gjergji et al., 2021). Johnson (2020) studies sector wise relation between ESG disclosures and COC and found inverse relationship between ESG disclosure and cost of capital for consumer goods and services sector and positive relationship for industrial sector.

Inconsistent results of prior related studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON (financial component) and TESG (non-financial component) of sustainability performance and COC.

1.3 Motivation of the Study

This study is motivated by the following factors: Firstly, due to its dependence on stakeholder theory, this study consists of external as well as internal stakeholders. There is a reciprocal relationship between firm and stakeholders in a sense that their wellbeing is influenced by firm's performance and they contribute towards the value creation of the firm which can be achieved by reducing financing cost through sustainability. The two theories i.e. Stakeholder Theory (Friedman, 1984) and Enlightened Value Maximization Theory (Jensen, 2001) identify the maximization of firm performance and firm long term value as the condition for matching all stakeholders' interests. Secondly, previous research is scattered on the sustainability relationship with COE (Dhaliwal et al., 2011; Botosan, 1997), COD (Sharfman and Fernando, 2008; Chava, 2014; Goss and Roberts, 2011; Zhang and Ding, 2006; Ye and Zhang, 2011), COC (Leuz and Wysocki, 2008; Gao, 2010; Clark et al., 2015). Inconsistent results of previous related studies along with the fact that these studies only addressed a single dimension of sustainability performance motivates us to examine the financial (ECON) and non-financial (TESG) components of sustainability with COC, COE and COD. Gianfrate et al. (2018) discussed this issue and pointed out that this inconsistency may be due to other variables that play a significant role in this relationship, such as industry membership, type of measure used, other institutional and cultural factors and choice of sample. Moreover, when there are mix results in the previous literature then it creates room to check the relationship in a region that what sort of relationship exists in that particular region and that provides an insight for decision makers.

1.4 Problem Statement

Capital Structure remained hot topic in finance literature from its very inception. One of the fundamental deciding factor is its cost which over the period of time have been tried to be captured through multiple proxies in the finance literature as multiple costs associated with the capital are returns for the significant stakeholders. One fundamental question arises that whether COC is also being affected

by the cost of other stakeholders like environment, society etc. Sustainability talks about all stakeholders instead of focusing on shareholders.

If such relationship exists what could be the direction of relationship and these socially responsible attributes have same direction of relationship with COC, COE and COD. In this study, we aim to explore the relationship as well as direction of relationship and variation of relationships between financial (ECON), non-financial (TESG) sustainability performance and COC, COE and COD.

1.5 Research Questions

This study addresses the following three questions: -

- First, what is the relationship between sustainability performance and Cost of financing?
- Second, whether sustainable performance has an impact on cost of equity and cost of debt?
- Third, do environmental, social and governance (TESG) sustainability performance moderates the relationship between economic sustainability performance (ECON) and cost of financing?

Cost of financing means cost of capital (COC), cost of equity (COE) and cost of debt (COD).

Nature of debt and equity financing are substantially different. Due to the nature of debt security, debt-holders focus at down-side risk, while equity-holders pay attention to both down-side risks and up-side potential of companies. Since business sustainability can create more incentives for management to refocus its goal and make strategic decisions from a long-term prospect, up-side potential and downside risks are not uniformly affected by business sustainability. This study posit that risks faced by equity-holders are going to be more significantly affected by business sustainability than risks faced by debt-holders.

1.6 Research Objectives

This study focuses on individual and joint impact of both economic sustainability performance (ECON) (financial) and environmental, social and governance (TESG) (non-financial) dimensions of sustainability performance on cost of financing.

- To provide insight about the relationship between sustainability performance and cost of financing.
- To separately examine the impact of sustainability performance on cost of debt and cost of equity.
- To explore the moderating role of environmental, social and governance (TESG) sustainability performance (non-financial) on the link between economic sustainability performance (ECON) and cost of financing.

Cost of financing means cost of capital (COC), cost of equity (COE) and cost of debt (COD).

1.7 Contribution of the Study

This study contributes in a number of ways. The relation between financial (ECON) and non-financial (TESG) components of sustainability performance and cost of financing is explored in emerging economies. Cost of financing means cost of capital (COC), cost of equity (COE) and Cost of Debt (COD). When ECON is bifurcated into components through exploratory factor analysis (EFA), there comes operational efficiency (OP), growth opportunities (GR) and research effort (RES) factor while non-financial components are environmental (ENV), social (SOC) and governance (GOV) standards. This study contributes by capturing the direct relationship of different measures of sustainability performance dimensions with cost of financing both individually and jointly. The study also contributes by studying the moderating effect of TESG, a composite measure of non-financial sustainability performance between ECON and cost of financing.

Most of the prior research focused on individual sustainability dimension and its effect on cost of financing. This study focuses on individual and overall sustainability performance dimensions whether (ECON) and (TESG) and capturing their relationship with cost of financing and also studying the moderating effect of TESG on ECON-COC, ECON-COE and ECON-COD relationship individually and in aggregate.

This study complements the past research in a way that we have tested the integrated and interactive effects of financial (ECON) and non-financial (TESG) sustainability performance on cost of financing in order to check the difference in impact of sustainability performance on cost of financing. Moreover, this study examined that whether ECON is linked with cost of financing differently by bifurcating ECON into operational efficiency (OP), growth opportunities (GR) and research effort (RES) factor and capturing their differential impact on cost of financing. Afterwards, this study examined that whether TESG is linked with cost of financing differently by bifurcating TESG into environmental (ENV), social (SOC) and governance (GOV) sustainability performance and capturing their differential impact on cost of financing. The moderating impact of TESG on ECON-Cost of financing relationship is also captured individually and in aggregate.

1.8 Significance of the Study

The literature checks that business sustainability mainly focusing on CSR and moving from opportunistic and isolated efforts towards more holistic, integrated and strategic approach fetching diverse stakeholders and incorporating all dimensions of sustainability performance (Kiron et al., 2013). Companies, investors and regulators are showing interest in information pertaining to ECON and TESG sustainability performance. Financial statements contain information related to ECON which allow investors to ascertain the return and the risk related with investments. Jain et al. (2016) and Barth et al. (2008) argued that financial information is vital for ECON in the way of shareholder's value creation and its link with stock prices. However, the social goals are translated with practices for social

performance. This explains the degree of fulfillment of CSR by company by transforming its social mission into reality and aligning it with interest of the society. This includes the well-being of employees with the provision of health and well-being but are not detrimental part of product supply and high quality products that has the positive impact on sustainability of firms. They contribute towards society beyond complying with applicable standards, laws, common practices and regulations. Long term sustainable financial performance, enhanced reputation and improved corporate image is the result of social performance. Cheng et al. (2014); Watson (2015); Dhaliwal et al. (2011) advocated that value of the firm is enhanced and COC is reduced through CSR Performance.

The achievement of wealth maximization goal for shareholders is only possible once we consider risks related to ESG (Staub-Bisang, 2012). Secondly, Kiron et al. (2013) pointed out that by concentrating on distinct components of ESG dimension of sustainability performance allows them to address sustainability risks that could influence financial sustainability and ultimately COC. Firms having superior sustainability performance have motivation to signal it through disclosures according to signaling theory (Lys et al., 2015). United Nations (2013) pointed out that non-financial dimension of sustainability performance is as significant as financial dimension because it exposes investors with new opportunities and risk in evaluating the portfolio investment valuation. The better interaction and communication with all the stakeholder's associates both financial and non-financial sustainable performance (Eccles et al., 2014).

The financial and non-financial components of sustainability performance are not only differently related to COE but also with COD and COC. Both financial and non-financial components are helpful for the firms to reduce the COE (Dhaliwal et al., 2011). The social sustainability performance marginally explains the COC of firms. The strong TESG (non-financial) sustainability performance contributions significantly enhances the financial indicators of firms which helps them to reduce the COC. ECON takes into account long term along-with short term profitability while considering investment for future growth (Ng and Rezaee, 2015).

There are two attributes of business sustainability which are sustainability disclosure and sustainability performance and both are essential to investors while

evaluating risk premium and return (Ng and Rezaee, 2015). Previous research also points out that sustainability disclosure and sustainability performance are correlated (Jain et al., 2013). Jain et al. (2013) and Clarkson et al. (2011) find a positive association between sustainability disclosure and sustainability performance. The role of TESG (non-financial) sustainability disclosures and performance in affecting the relationship between firm value and financial performance is not clear and therefore, the authors don't differentiate between sustainability disclosures and performance and explore their combined effects on COE (Ng and Rezaee, 2015). Following Ng and Rezaee (2015), this study explore the integrated effects of sustainability disclosures and performance on COC, COE and COD.

1.9 Scheme of the Study

This study comprises of five chapters. Section one examines the background, variables introduction, research questions and objectives, contribution and significance of the study. Section two covers literature review, theoretical framework and hypothesis development. Section three contains the sample, data collection and methodology. Data analysis and empirical results are shared in section four. Section five discusses findings, conclusions and directions for future research.

Chapter 2

Literature Review

There exists rich literature that discusses sustainability. Carter and Easton (2011) examined theories of signaling, stakeholder, shareholder, legitimacy, stewardship and institutional to analyze the relationship between managerial processes and sustainability performance. Agle et al. (2008) focused on theoretical structure for business sustainability and its repercussions for management, financial reporting and supply chain management. Seuring and Müller (2008); Bansal and Hunter (2003); Potoski and Prakash (2005) suggested that various ISO standards can promote compliance with social standards and environmental regulations. Barnett (2014); Dhaliwal et al. (2011); Wu and Shen (2013); Fawcett and Waller (2011) reported a U-shaped relation between economic sustainability performance and social responsibility sustainability performance dimensions.

Foerstl et al. (2015) identified five interdependent contextual sustainability drivers grouped into process, stakeholder and product related drivers. Bouslah et al. (2013); Dhaliwal et al. (2011); Cheng et al. (2014) studied the relation between sustainability performance dimensions and cost of capital (COC) in an insulated manner. Their findings suggest that all EESG sustainability performance dimensions experience a decrease in information asymmetry risk and therefore lower COC. There is contradictory evidence regarding impact of TESG sustainability performance beyond earnings on value of the company (Bertoneche and van der Lugt, 2013; Hamann et al., 2013; Kiron et al., 2013; Dhaliwal et al., 2011). Fellow (2013); Ioannou and Serafeim (2012); Einhorn (2005) addresses the integration between ECON and TESG sustainability performance dimensions.

CSR is a subject which includes the concepts of corporate governance, business sustainability, corporate and social performance and corporate citizenship. All of these concepts have an underlying aim of addressing firm's obligations other than financial consideration (Parmar et al., 2010). Starks (2009) pointed out that ESG concept has emerged recently, which captures activities related to sustainability a company might pursue. Madime and Gonçalves (2022) argue that firms are facing pressure from stakeholders and shareholders to reform their operations sustainably. Sharfman and Fernando (2008) were the first ones who have studied the relationship between sustainability and COC. They were of the view that COE and COD should be lowered by improved environmental risk management as per risk management theory. However, they have found mixed results. With better environmental risk management, COE decreases and COD increases. The possible explanation provided by them was that debt markets consider it as a waste of company's resources. The authors further infer that there may be lack of control for the effect of improved environmental risk management and increased leverage on COD.

Most of previous academic literature has focused on CSR and its performance, drivers, and impact on earnings and financial operations. Rehbein (2014) pointed out that role of management in determining CSR drivers and investment as a subset of sustainability needs more inquiry. Rezaee (2017a) argued that CSR is an integral part of business sustainability sustainability which is confirmed by other researchers (Khan et al., 2016; Rezaee, 2017b; Ng and Rezaee, 2015).

2.1 Sustainability Theories

Sustainability theories discuss the business (corporate) organizations role in society and their relation with suppliers, creditors, employees, government, customers and society. The foremost aim of these theories is to discuss the connections among sustainability performance dimensions, possible strains, the integration and various constraints set on shareholders' value creation goals. These compatible and interrelated theories focus on individual and on collective basis regarding different components (financial and non-financial) of performance related to sustainability

in an attempt to generate value for stakeholders.

2.1.1 Stakeholder Theory

Stakeholder theory consists of external as well as internal stakeholders. There is a reciprocal relationship between firm and stakeholders in a sense that firm's performance affects their wellbeing and they contribute towards the value creation of the firm. The two theories i.e. Stakeholder Theory (Friedman, 1984) and Enlightened Value Maximization Theory (Jensen, 2001) identify enhancement of firm performance and firm long term value as the condition for matching all stakeholders' interests. Denis and McConnell (2003) emphasized that maximization of wealth of shareholders is not the only goal of board of directors in most of the European countries. Maximization of stakeholder's welfare means protecting the interests of customers, employees and community. In Germany, there are equal seats of employees and shareholders on the company's supervisory board in order to protect all stakeholder's interests and companies are legally bound to do it (Schmidt, 2003).

When we talk about the context of Stakeholder's maximization of welfare and shareholder's maximization of wealth, synergies and conflicts are created by non-financial sustainability activities. However, these activities call for substantial resource allocation in order to battle with shareholder's objectives of maximization of wealth and compel management to invest in initiatives that are purely related to sustainability resulting in long-term sustainability. In order to achieve overall objectives of sustainability performance, integration and synergy amongst all components of business model and its processes are vital (Freeman et al., 2010).

Stakeholder theory suggests that long term firm's value is enhanced through sustainability activities and performance by satisfying company's social responsibilities (Campbell, 2007), reputation improvement (Weber, 2008) and complying with their environmental obligations (Clarkson et al., 2011). The key element of focus on environmental and social sustainability performance is the management reflection of interest of stakeholders (Cormier et al., 2005). Therefore, as per Stakeholder Theory, financial and non-financial components of dimensions of sustainability

performance are regarded as value added actions by stakeholders which generate stakeholder's value. This theory has failed to report the possible strains in attaining all economic, environmental, social and governance (EESG) sustainability performance dimensions and their probable impact on conflicts of interest amongst external and internal stakeholders.

2.1.2 Agency Theory

Jenson and Meckling (1976) explored that agents (executives) and their principals (owners) interest contradict each other. Fama and Jensen (1983) pointed out that agency theory focus on agency problems between management and shareholders and risk sharing and related agency costs that shareholders assumes. Information asymmetry leads towards moral hazards because management (agent) knows more about its intensions and / or actions than the principal (owner). Agency theory implications related to sustainability performance exists because management compensation and incentives are linked with short term incomes targets and this detract them from attaining long term and sustainable shareholder's performance. It is better that companies should leave the decision regarding social responsibility to shareholders and focus on creating value for shareholders.

As per Agency theory, management should engage in positive NPV projects which create shareholders value and maximize interest of shareholders. Shleifer and Vishny (1997) pointed out that there is fiduciary duty of management to maximize shareholder's wealth because they are owners of firm. Furthermore, CSR activities create value for other stakeholders, however, it is not in shareholders' best interest. Therefore, the decision regarding social responsibility may be left for shareholders. It is pertinent to mention that there is asymmetry of information between shareholders and management, the management may have withheld bad news intentionally. Therefore, to resolve the problem of information asymmetry, the voluntarily disclosure of TESG, a non-financial components of sustainability performance information by management is helpful.

To conclude, this theory argue to create value for shareholders, management is accountable only to shareholders and their interest may deviate from shareholders.

This theory is considered the prominent theory of governance research, management and corporate finance (Jenson and Meckling, 1976). Furthermore, it addresses an insular and narrow facet of sustainability by mainly focusing on information which is related to financial sustainability performance and information disclosure is principally for shareholder purpose. It is traditionally used for explaining the principal-agent relationship and is related to utility maximization of individuals, we may say that it is undesirable and irrelevant under evolving sustainability performance reporting.

2.1.3 Signaling Theory

In this theory, incentives are explained and communicated to management for the attainment of all financial as well as non-financial components (EESG) of sustainability performance and reaction of investors to information disclosure related to performance attributed to sustainability (Grinblatt and Hwang, 1989). This theory explains that companies by using optional reporting of sustainability performance (non-financial) and using mandatory financial reports attempt to hint about good news. However, the expected relationship between using financial reports (mandatory) and optional reporting of sustainability performance (non-financial) is vague. Companies voluntary reporting may signal regarding company's future financial performance (Healy and Palepu, 2001). Grinblatt and Hwang (1989) pointed out that there exists a negative association between prospect of optional disclosures and using these signals. Firms having superior sustainability performance have motivation to signal it through disclosures according to this theory (Lys et al., 2015). This theory also highlights that companies having superior performance are more prone to reveal their sustainability achievement by issuing sustainability reports along with mandatory financial statements.

Dainelli et al. (2013); Connelly et al. (2011) explained that Signaling theory mentions the competence of the company regarding communication of financial and non-financial dimensions of sustainability performance with all the stakeholders. Therefore, companies indicate their superior sustainability performance in agreement with this theory (Thorne et al., 2014; Hummel and Schlick, 2016). Companies with good sustainability performance classified as good companies distinguish

themselves from bad companies meaning companies with good sustainability performance signal as respectable corporate citizens which is compliant with signaling theory. This theory aids in explaining incentives to management for attaining financial and non-financial sustainability information. This theory also tells the management the benefit of disclosing sustainability (both financial and non-financial) information and less related to sustainability performance as compared to sustainability disclosure.

2.1.4 Legitimacy Theory

In an attempt to sustain and obtain legitimacy and to accomplish the social contract, companies disclose their information related to financial sustainability performance and also participate in sustainability activities related to non-financial sustainability performance (Tilling, 2004; Guthrie and Parker, 1989). As per this theory, company's financial sustainability and organizational legitimacy can be affected due to noncompliance with environmental requirements and social norms and to satisfy society's demand, organizations use social and environmental disclosures (Tilling, 2004; Guthrie and Parker, 1989). This is important to achieve financial and non-financial dimensions of sustainability performance because it creates positive attitude about the company's product and services and it is believed that its product and services are not damaging to environment and society rather are beneficial to all the stakeholders and reputation of the company also enhances in this regard (Suchman, 1995).

In case of conflict between social goals of achieving CSR and corporate goals of maximizing financial performance, sustainability is regarded as a vital management strategies component. The resolution of such encounters require companies to launch a "suitable tone at the top", endorsing attainment of EESG sustainability performance in helping all stakeholders and in taking social interest and sustainability seriously, and demanding their suppliers to observe environmental and social requirement and product quality. This theory proposes that environmental and social sustainability performance is desired by all stakeholders which include customers without giving any solutions for creation of shared value among various stakeholders (Rezaee, 2017a).

2.1.5 Institutional Theory

This theory was intended for political process initially, is related to sustainability because it considers company as institutional method of varied stakeholders who are chasing common goals. The underpinning of this theory's application to personal politics was laid by (Meyer and Rowan, 1977). Strang (1990) elaborated its use in domestic and international governmental policies. It emphasis on social aspects of decision making, the likely conditions under which environmental initiatives or investment decisions are made on CSR and their likely effects on society and environment. Roberts (2007) argued that to protect relevant interests and to serve human needs, a company must be viewed as an institution in order to promote sustainability as per institutional theory. If the company promote synergies and crafts value for all stakeholder's value, it will be sustainable as an institution as per institutional theory.

This theory opines a company as an institutional arrangement of various groups and individuals with integrated interests, values, transaction governance, practices and directions that can become institutionalized. This theory further helps us to understand how practices or concepts related with sustainability are dispersed and developed among organizations and how consensus is erected around sustainability's meanings (Jennings and Zandbergen, 1995). Further, this theory advocates that internal corporate governance mechanism, corporate culture and institutional environment can be more efficacious than regulations, laws (external measures) and external mechanisms of corporate governance in attaining EESG sustainability performance dimensions. Moreover, institutional theory fails to report the probable tensions in attaining possibly contradicting sustainability performance dimensions.

2.1.6 Stewardship Theory

This theory has its routes from psychology and sociology and argues that rather than focusing on opportunistic behavior in short term (agency theory) and own self-serving, management should consider various stakeholders' interests in long term. Hernandez (2012) elaborates stewardship as "the extent to which an

individual (management) willingly subjugates his or her personal interests to act in protection of others (stakeholders) long term welfare" and it seems that this is accurately related to sustainability.

It has two main drivers i.e. stakeholder's interest's protection and long term orientation. This theory considers actions and strategic decisions of management as stewardship behaviors that are considered to be served as shared value end. Stewardship theory encourages group's long term interests as compared with individual's personal goals (Hernandez, 2008). Although this theory wants usage of due diligence by management and management is answerable in improving financial and non-financial KPIs in order to protect all stakeholder's interests, it does not propose any propositions to management as to how manage possibly conflicting (EESG) sustainability performance dimensions.

Taken together, there are implications for business sustainability by the above theories in the sense that companies main objective is to create value for shareholders which is in compliance with agency theory while guarding other stakeholders and shareholders' interests under stakeholders theory, centering on the long term benefits of variety of stakeholders under stewardship theory, paying attention towards the human needs and society under institutional theory, safeguarding their legitimacy in accordance with legitimacy theory, and segregating themselves from low economic, social, governance / CSR companies under signaling theory. The above-mentioned theories are appropriate to business sustainability and business should employ one or several theories to institutionalize their strategies, mission, reporting processes and business model.

To sum up, we may say that since 1984, stakeholder theory has been and still the dominant business sustainability theory (Friedman, 1984). When we talk about business sustainability, multiple stakeholders are involved. Stakeholders means those who have interest in the company in the shape of financial capital commonly known as shareholders, reputational capital commonly known as customers and suppliers, human capital known as employees, environment is included under environmental capital, social capital includes society and government is placed under regulatory capital.

2.2 Sustainability Performance

Measures of sustainability performance should be derived from external factors of technology, CSR, reputation, globalization, utilization of natural resources and competition as well as internal factors of risk profile, corporate culture, strategy, strengths and weaknesses. Integration of ECON (financial) and TESG (non-financial) sustainability performance dimensions into business model, corporate infrastructure, and management processes enable firms to optimize production processes, achieve cost effectiveness and efficiency, conserve scarce resources, increase productivity, identify product innovations, and promote corporate reputation. Business activities are classified as essential or non-essential and value adding or non-value adding (Agrawal et al., 2006). The achievement of ECON (financial) and TESG (non-financial) sustainability performance dimensions and facets of continuous improvements allows companies to move toward addressing the principal objectives of sustainability in shared value creation.

The non-financial sustainability performance dimensions include environmental, social and governance with ethics integrated into other (TESG) components. Overall, TESG(non-financial) sustainability performance may be viewed as vital activity that may or may not help in creating shareholder value. Companies that focus on their ECON (financial) and their disclosure consistently and significantly outperform those companies with no commitment to TESG (non-financial) sustainability performance (Eccles et al., 2014). The negative relationship between ECON and COE is moderated through TESG (non-financial) sustainability performance and thus help in improving firm value (Ng and Rezaee, 2015).

This discussion elaborates ECON (financial) and TESG (non-financial) sustainability performance dimensions and their key performance indicators (KPI). The objective function in this context is to maximize value of the firm by attaining financial sustainable performance while keeping in view the attainment of TESG (non-financial) sustainability as a constraint levied on objective function. Financial and non-financial (EESG) sustainability performance dimensions' integration into corporate infrastructure, management processes and business models permit firms to detect product innovations, improve production processes, to conserve

scarce resources, increase productivity, achieve cost effectiveness and efficiency and promote corporate reputation.

Sustainability emphases on the activities that create ECON (financial) and TESG (non-financial) sustainability performance through enhancing business opportunity and corporate governance effectiveness and reducing social and environmental harms and above all acquiring success in long term in creating value for stakeholders. The Global Reporting Initiative (GRI) in its sustainability guidelines (G4) endorses an integrated reporting on five economic, environmental, social, governance and ethical (EESGE) sustainability performance dimensions with ethical dimension being incorporated into other dimensions (Global Reporting Initiative, 2013).

2.2.1 Economic Performance

ECON reflects the financial sustainability and long term profitability of firms as measured in terms of productivity, return on investment, long term operational effectiveness, earnings, efficiency and market value. ECON is termed as an essential and value adding activity, which measures the financial sustainability and long term profitability of a firm as required by shareholders under agency theory. This can be achieved by optimizing supply chains, by continuously enhancing capital productivity, cost re-engineering, focus on decreasing production, operating and compliance costs, improving efficiency and employee productivity and focusing on activities that generate enduring, long term and sustainable financial performance. An emphasis on ECON can also generate opportunities for business growth and innovation by endorsing sustainable products and services, new markets through environmentally friendly and products and services that are socially acceptable.

ECON is calculated in terms of market-based measures (market to book value, stock returns), long term accounting-based measures (sales, return on equity) and long-term investments (research and development), revealed through financial statements disseminated to shareholders and used in gauging the return and risk associated with their investments. Previous research suggests that ECON is essential in shareholder value creation by investigating the value relevance of

financial information and its link to COC and stock prices (Jain et al., 2016; Barth et al., 2008; Ng and Rezaee, 2015). It was further argued that companies with better ECON exhibit better market and financial performance and lower COE.

Long term profitability and financial sustainability of a company is measured in terms of long-term effectiveness, operational efficiency, productivity, earnings, return on investment and market value is reflected by ECON. Financial statements contain ECON which enables investors to ascertain the risk and return associated with their investments. Jain et al. (2016); Barth et al. (2008) argued that for creating value for shareholders, ECON is vital by probing the financial information and its link with stock prices.

2.2.2 Environmental Performance

A company which leaves a better environment for future generations and addresses its challenges related to environment effectively is reflected in environmental performance. How well the environmental challenges are addressed by a company in creating better environment for future generation under environmental performance. The disasters related to environment i.e. Union Carbide, Exxon and BP Deep-water Horizon in oil and chemical sectors produced bad reputation for businesses and thus brought their attention towards initiatives related to environment. Economic performance is affected through environmental performance because there is a likelihood of law violations related to environment which may have damaging financial consequences for companies. It is measured in terms of carbon footprint reduction, better work environment creation, property's water quality, improvement in air and surrounding community. Clarkson et al. (2011) and Al-Tuwaijri et al. (2004) both explored significant association between financial performance and environmental performance.

2.2.3 Social Performance

How well the social goals are translated into practice is measured through social performance. It explains the degree of fulfillment of CSR by company by transforming its social mission into reality and aligning it with interest of the society.

This includes improvement in wellbeing of employees, supplying high quality products and services not detrimental to society and ensuring global sustainability. It measures activities that contribute towards society besides complying with applicable standards, laws, common practices and regulations. Long term sustainable financial performance, enhanced reputation and improved corporate image is the result of social performance. Cheng et al. (2014); Watson (2015); Dhaliwal et al. (2011) advocated that value of the firm is enhanced and COC is reduced through CSR Performance.

2.2.4 Governance Performance

The measures which are related to governance are aimed at achieving firm's objectives in order to protect stakeholder's interests and ultimately create value for shareholders. The mechanisms related to corporate governance are established by policymakers, regulators and corporations in order to gain confidence of investors, to promote economic stability and public trust in capital markets and in public financial information. It can be achieved through aligning interests of management with shareholder's interest, linking compensation schemes of executives, director's elections, board oversight of management and practices to long term sustainable performance. Dodd-Frank Act of 2010 (DOF, 2010) and Sarbanes-Oxley Act of 2002 (SOX, 2002) considered as regulatory reforms proposed to support measures of corporate governance by defining corporate gatekeepers roles and responsibility, including the management, board of directors and auditors. Bebchuk et al. (2013); Gompers et al. (2003) found the mixed results by examining the relationship between governance and firm performance. Ng and Rezaee (2015) found the significant negative relationship between governance sustainability performance and COE.

2.2.5 Ethical Performance

Company's culture of competency and integrity is reflected through ethical performance. Ethical attributes related to corporate culture are code of conduct for senior executives, directors and employees, accountability, honesty, mutual respect,

fairness, transparency and freedom to raise concerns. Financial reporting quality and long term economic sustainability and integrity is affected through appropriate ethical workplace procedures and policies. Brockett and Rezaee (2012) explained that ethical performance and economic performance are linked primarily because companies which are conducting their business ethically are least vulnerable to financial irregularities and scandals and therefore these companies are considered as sustainable in long run.

Previous research predicts two views of the link between ECON (financial) and TESG (non-financial) sustainability performance. First view tells us that ECON and TESG dimensions of sustainability performance are complementary. The reason explained for this view is that because a company that is governed effectively, which adheres to ethical principles and committed to obligations related to environment and also fulfills its CSR is sustainable in generating financial performance in the long run. The other view explains that to be able to do well in terms of environmental activities and CSR, a company must perform well financially in long run. Therefore, ECON and TESG sustainability performance are considered interrelated and needs to be integrated to generate revenue (premiums for environmentally and socially friendly goods and services and customer sales) and to achieve cost effectiveness (safe, organic and high quality products, cheaper and cleaner energy, recycling and waste reduction) and management of sustainability risk.

This study examined the differential effect of disaggregated sustainability performance dimensions (financial and non-financial) and their integrated impact on cost of financing (Cost of Capital (COC), Cost of Equity (COE) and Cost of Debt (COD), and thus complements and differs from previous research in several ways: Firstly, This study uses both ECON and TESG dimensions of sustainability performance measure and captured their integrated and individual impact on cost of financing. This study has tried to inspect whether cost of financing is related with ECON or TESG sustainability performance dimension or both. Secondly, we have examined the different ECON components and their impact on cost of financing individually and in aggregate. Thirdly, we have inspected whether different TESG

sustainability performance components impact cost of financing and lead towards value creation individually and in aggregate.

Fourthly, we have inspected whether the relationship between ECON and cost of financing is also affected by TESG sustainability performance and to what extent TESG sustainability performance interacts with ECON when determining cost of financing. Finally, integrated ECON and TESG sustainability performance data we employ provides for more tests of integrated and interactive impacts of sustainability performance on cost of financing and whether and how TESG sustainability performance moderates the relationship between ECON and cost of financing individually and in aggregate.

ECON and TESG dimensions of sustainability performance supplement each other and are not mutually exclusive. Firms that are effectively governed, environmentally, socially and ethically responsible, these are expected to create value for shareholders, produce sustainable performance and gain public trust and investor confidence.

Business organization's role started from maximization of profit and then evolved to create shareholders value. Business sustainability takes into account the protection of all stakeholder's interests. Financial information must be disclosed by public companies to regulators and shareholders and may voluntarily choose to disclose non-financial information. Financial reporting is considered mandatory and includes audit reports, financial statements and associated internal control over financial reporting (ICFR). The useful, transparent, reliable and relevant financial information is provided to investors and shareholders through these mandatory financial reports. The purpose in this regard is to make sound and informed decisions.

Mandatory financial statements by standard setters and regulators include information which needs to be reported. However, there are voluntary sustainability reports which are used for disclosing non-financial along-with financial information which is not mandatory by standard setters and regulators and companies report at their own free will. Many countries have adopted these sustainability reports which includes Denmark, Germany, Austria, Canada, Australia, France,

TABLE 2.1: Economic Sustainability Performance (ECON) (financial) and Environmental, Social and Governance (TESG) (non-financial) Sustainability Key Performance Indicators

Economic	**Environmental**	**Social**	**Governance**	**Ethical**
1. Economic value Generated	1. Continuous replacement of non-renewable of scarce resources	1. Percent of employees who consider that their business acts responsibly	1. Number of board Committees	1. Existence of business codes of conduct
2. Revenues earned	2. Disclosure of ecosystem changes	2. Number of full- time employees (FTE) dedicated to social investment Project	2. Percentage of Board Independence	2. Description of social and ethical activities
3. Resources consumed	3. Disclosure of gigajoules of total energy consumed	3. Funds raised per FTE for non- profit and humanitarian organizations	3. Full Independence of board committees	and projects
4. Costs recognized	4. Disclosure of metric tons of total CO2 emitted	4. Philanthropy as a percent of (pretax) profit	4. Board diversity in terms of ethnic, sex, expertise, minority	3. Diversity and equal Opportunities
5. Resources obtained (assets)	5. Disclosure of risk exposure and opportunities	5. Percentage of operating Income dedicated to social contribution	5. Staggered board	4. Fair wages, contracts, and benefits
6. Capital raised			6. Separation of the position of the chair of the board and chied executive officer	5. Employee diversity based on age, specialization gender, and ethnicity
7. Liabilities assumed	of climate changes			
8. Expenses incurred	6. Disclosure of toxic chemical use and disposal	6. Percent of suppliers that suppliers that affirmed business code of conduct	7. Board accountability and liability	6. Number of employeed, turnover, and hiring/firing procedures
9. Earnings retained			8. Number of board meetings	7. Whistleblowing policies, programs, and procedures
10. Earnings distributed	7. Efficiency utilization of unconventional and renewable and non-renewable natural resources	7. Social contributions spent per employee	9. Number of members in the board	8. Employee Productivity
11. Compensations paid		8. policy	10. Percentage of insider directors on the board	9. Employee satusfaction
12. Financial risk Assessed	8. Efficient use of recycled materials	9. Number of initiatives to promote greater environment responsibility	11. Number of members in the audit committee and their financial experts	competence, and commitment
13. Taxes paid	9. Environmental profitability analysis and assessment	10. Total investment in the community		10. Customer satisfaction retention, and loyalty
14. Research and development invested		11. Donations and other social expenses		11. Fair competition
15. New products Discovered	10. Measurement of resource depletion	12. Fair competition		12. Percent of eligible employees who signed the Code of conduct Ethics
16. Forecast, projection and other technical and quantitative market information	11. Greenhouse gas emissions in total and intensity	13 Truthful advertising		
17. Financial statements		14. Community engagments		13. Resolution of conflicts of interest
18. Note Disclosures	12 Total waste emission data			
19. Accounting Policies				
20. Segment information				
21. Business combination, discontinued operation				
22. Earnings Releases				
23. Non-GAAP Financial (Financial cash flow, Owners equity)				

Source: Rezaee (2016): Business Sustainability Research: A theoretical and integrated perspective.

Netherlands, Malaysia, Sweden, United Kingdom and Hong Kong. It is expected that regulators in remaining other countries will move towards mandatory sustainability reporting.

As regulators and investors demand sustainability information and sustainability reporting becomes more standardized, management needs to integrate sustainability reporting into corporate reporting. Moreover, worldwide as more firms issue sustainability reports on their financial (ECON) and non-financial (TESG) sustainability performance, these reports need to be reviewed or audited by assurance service providers. By giving assurance on sustainability reports, objectivity, reliability and credibility of these sustainability reports can be improved substantially.

2.3 Sustainability and Cost of Equity (COE)

COE of company is reduced by high quality accounting information and financial performance by impacting assessments of investor's insecurity about cash flows which will be generated in the future (Lambert et al., 2012; Hou et al., 2012). Easley and O'hara (2004) argued that Cross sectional differences are produced by the quality and quantity of information in required return of company as a proxy for its COE. Furthermore, Leuz and Verrecchia (2005) pointed out that returns of shareholders are affected by information risk and therefore coordination between investors and firms is improved by better financial information, the result of which is revealed in COE. Ng and Rezaee (2015) pointed out that by focusing on ECON and TESG sustainability performance makes chances to detect and correct inefficiencies (operational). They further elaborated that financial sustainability performance information expands its investor base, and makes investor's aware of firm's sustainability, which ultimately expands sharing of risk and therefore, lowers COE.

COE can be affected through information on financial / economic sustainability through risk estimation of firm (Leuz and Wysocki, 2008). Ng and Rezaee (2015) pointed out that companies with history of good financial / economic sustainable performance may display lower betas as compared with companies having poor sustainability performance. They further elaborated that information on better financial / economic sustainability performance makes the investors confident about future cash flows predictions and then decreases the risk premium required by investors. They further elaborated that non-financial sustainability performance lowers the COE. The main reason described by researchers in this regard would be reduction of information asymmetry (Matthiesen and Salzmann, 2017; Ferris et al., 2017). Price waterhouse Coopers (2014) pointed out the positive facet while using ESG performance criteria is it's prospective to reduce and mitigate risk through the reduction of COE. Furthermore, the negative relationship between COE and sustainable business practices is confirmed by previous research which means that COE decreases by socially responsible actions (Crifo et al., 2015; Borghesi et al., 2014).

There are two stream of research in this area. One stream tries to find out the link between COE and non-financial sustainability performance dimension. The relationship between COE and social and financial disclosure is explored by taking the sample of Canadian companies and have found an inverse relationship between COE and financial disclosure (Richardson and Welker, 2001). Mackey et al. (2007) pointed out that firm's PV of cash flows which will be generated in the future are not maximized by having involvement in CSR activities, however firm's market value does maximize by having involvement in these activities. Ng and Rezaee (2015) found negative relation between governance and environmental performance and COE. However, found no relationship between social performance and COE. Hmaittane et al. (2022) explored that sustainability can be linked directly the COE. There are two competing views regarding impact of sustainability on COE namely risk mitigation view and overinvestment view.

As per risk mitigation view, there exists a negative relationship between sustainability and COE. There are two arguments in this regard. Firstly, perceived risk of investor is reduced through sustainable activities. Companies having high sustainability behave in responsible manner and are least likely to be involved in environmental and / or social misconducts. Due to this, probability of negative cash flows in future is reduced which ultimately decreases firm's risk exposure (El Ghoul et al., 2011; Godfrey, 2005). Due to this risk reduction, COE is decreased (Hmaittane et al., 2022). Secondly, the argument which supports the risk mitigation concept is company's investor base. If size of company's investor base is impacted through sustainability, then it may effect risk sharing opportunities and ultimately the COE. Merton (1987) pointed out that companies have different investor base. Those companies with smaller investor base tend to have lower risk sharing opportunities which ultimately lead to greater expected returns. Heinkel et al. (2001) explored that higher premium is required by investors for having polluting company's shares to compensate for other lower risk sharing opportunities. Hong and Kacperczyk (2009) found the companies operating in controversial industries have smaller base leading to lower risk sharing opportunities and ultimately having higher COE.

Hmaittane et al. (2022) explained that as per risk mitigation concept, there exists

negative impact of sustainability on COE either through broader base of shareholders and /or investor's perceived risk reduction. There exists a negative relationship between environmental and corporate responsibility and COE driven by an investor base perspective and risk mitigation theory (El Ghoul et al., 2011). Risk mitigation argument states that companies present lower risk profiles in investor's eyes and benefit from lower cost of capital. There is much lower probability of happening of adverse events to those responsible companies and in case any adverse event happens, sustainability can act as a cushion to mitigate such effects. Risk mitigation depends on the framework of stakeholder theory; in which it is seen as net of relationships between various stakeholders. Parmar et al. (2010) argue that executives handle these relationships in order to distribute and maximize value of stakeholders.

As per overinvestment view, there exists a positive relationship between sustainability and COE. The reason for such direction is the consideration of sustainability investments as a waste of company's resources. This concept is lying on Agency Theory. As per Agency theory, there exists asymmetric information between shareholders and managers leading towards managerial entrenchment. Resultantly, managers pursue their self-interest at shareholders expense. Barnea and Rubin (2010) pointed out that there is over investment by managers in sustainability activities in order to enhance their own reputation and gain benefits privately particularly at that point where the company generates slack resources. Renneboog et al. (2008) pointed out that these investments are unnecessary and discretionary as per shareholder's perspective and will enhance monetary costs in order to align decision of managers to shareholder's interest. Cost is increased because of overinvestment in activities related to sustainability and put the company at an economic disadvantage (Friedman, 1970). Hmaittane et al. (2022) explored the diversion of company's resources will be negatively perceived by investors and investors require high premium to hold company's stock.

Sustainability is further understood as a mode to improve these relationships by decreasing the probability of negative events such as unsafe product recalls, costly lawsuits, strikes from dissatisfied employees and reputation and brand erosion comes from different scandals (Godfrey, 2005). Hong and Kacperczyk (2009)

further point out that previous research shows that companies in the business of gambling, tobacco and alcohol face higher litigation risks and future claims as compared with other industries. Chen and Silva Gao (2012); Bauer and Hann (2010) explain that companies which are exposed to carbon risk are more prone towards increased uncertainty around physical, business and regulatory hazards. Krüger (2015); Kim et al. (2014) were of the view that company's perceived image is impacted greatly by such events and it can worsen their overall risk profile and ultimately profitability. Since sustainability is viewed as insurance cover against negative events, companies display lesser idiosyncratic risk with high scores of sustainability. To sum up, we may say that findings needs not to be generalized and be viewed keeping in view each industry (Gonçalves et al., 2022).

A theoretical framework was introduced in order to explore the relationship between sustainability performance and cost of capital, in which risk averse investors are categorized as neutral and green and companies were categorized as polluting, green and reformed. The findings show that neutral investors are indifferent to company's ethical behavior, whereas green investors only invest in those companies which meet their ethical criteria. Further, there is smaller investor base for those polluting companies and lower demand for their stocks as well (Heinkel et al., 2001). Better sustainability performers show lower COE and companies in tobacco and nuclear power industry show a higher COE among US sin stocks (El Ghoul et al., 2011). Investors require higher returns on those stocks which are excluded by environmental screens related to chemical emissions, hazards and climate change concerns while comparing with companies which don't have such concerns. Further sin stocks are less demanded by institutional investors and in their loan syndicate, there is lower participation by the banks.

Companies that are involved in higher CSR enjoy a reduced financial distress risk, which is directly embedded into their social area of the ESG score (Boubaker et al., 2020). Boubaker et al. (2022) explained that sustainable corporate practices benefits are also beneficial in uncertain times in improving resilience i.e. during Covid-19 pendamic. Jo and Na (2012) were of the view that in controversial industry sectors, risk reduction may be of greater magnitude. El Ghoul et al. (2011) explored those companies having better scores related to CSR display low COE.

Furthermore, companies that starts disclosure programs on CSR show that analyst coverage increases in following year along-with COE decline (Dhaliwal et al., 2011). Borgers et al. (2013) pointed out that stock mispricing is also eliminated by increased attention for stakeholder issues. Ng and Rezaee (2015) are of the view that while evaluating corporate risk, the benefits of all stakeholders must be taken into account.

Gupta (2018) examined the relationship between environmental practices and COE. This study has used 23,301 observations of 43 countries. He found that environmental practices improvement decreases COE. The author further established stronger results in countries where governance is weak. Matthiesen and Salzmann (2017) explored the relationship between CSR and cost of equity in the context of 42 countries. They have studied the relationship in terms of cultural differences and cross country variations. Companies engaged in CSR enjoy reduction in COE. Further, cultural differences also influences society's social performances.

Other stream of research points out that companies having strong mechanisms related to corporate governance are linked with reduction of information asymmetry of firm, decrease in perceived risk which ultimately reduces COE (Pham et al., 2012). Another research found the negative association between COE and company level corporate governance (Chen et al., 2009). Financial transparency and good governance also reduces COE (Cheng et al., 2006). Furthermore, COE is also reduced through better environmental risk management (Sharfman and Fernando, 2008).Girerd-Potin et al. (2014) pointed out that there are three independent socially responsible dimensions namely societal stakeholders (society and environment), business stakeholders (customers, employees and suppliers) and financial stakeholders (debt holders and stockholders).

Their research pointed out that investors who are holding low CSR stocks ask for additional risk premium which is associated with low COE for high CSR companies. Harjoto and Jo (2015) explained that the overall CSR score reduces stock return volatility, information assymmetry, implicit COE which in turn enhances firm value. Li et al. (2014) found no significant relationship between emission intensity and COE in Australia whereas Suto and Takehara (2017) found a negative relationship between CSR and COE in Japan.

Some researchers found little to no evidence regarding relationship of business sustainability performance and COE. An economically meaningless association between environmental performance and systematic financial risk is explored in UK context (Salama et al., 2011). There is also no impact of different business sustainability performance levels on risk adjusted performance (Humphrey et al., 2012). Here, there exists one interesting point that managers may over invest beyond optimal level in philanthropy for their self-interests, at the expense of shareholders as per overinvestment theory (Bartkus et al., 2002). While reviewing this relationship, one must keep in mind that business cycle might play a part which is confirmed by various studies. A study pointed out that during 2008 financial crisis, the financial bankruptcy and distress costs had a greater priority than reducing the probability of such events, while during non-crisis periods, environmental responsibility help in reducing the probability and costs of such adverse events (El Ghoul et al., 2018). These finding are consistent with another study which also shows that during 2008-2009 financial crisis, high sustainability companies showed higher stock returns as compared with low sustainability companies (Lins et al., 2015).

It is evident from the past research that researchers focus in an isolated fashion between individual sustainability performance dimensions and COE (Ng and Rezaee, 2015). They further elaborated that sustainable performance can be generated by firms when the firms are profitable in the long run. However, financial (ECON) and non-financial (TESG) components of sustainability performance dimension are considered supplementary rather than considering as mutually exclusive and occurring of tradeoffs must exist among them. Ng and Rezaee (2015) focuses on individual and overall sustainability performance dimensions by examining the relationship between ECON and COE and to what extent this relationship is moderated by TESG sustainability performance dimension.

There are multiple studies which provide a negative relationship between sustainability and COE (Ng and Rezaee, 2015; Hmaittane et al., 2022; Gupta, 2018; Matthiesen and Salzmann, 2017). There are studies which provide a positive relationship between sustainability and COE (Dahiya and Singh, 2020; Yeh et al., 2020). Chava (2014) studied the impact of environmental strengths and concerns

on COE. He explored that there exists no significant relation between environmental strengths and COE whereas COE is increased in the presence of environmental concerns.

To sum up, we may say that vast amount of literature supports a negative relationship between business sustainability performance and COE. Yet there are studies which have found the positive relation between business sustainability performance and COE. Inconsistent results of prior related studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON (financial component) and TESG (non-financial component) of sustainability performance with COE. Gianfrate et al. (2018) discussed this issue and pointed out that this inconsistency may be due to other variables that play a significant role in this relationship, such as industry membership, type of measure used, other institutional and cultural factors and choice of sample.

2.4 Sustainability and Cost of Debt (COD)

Ng and Rezaee (2015) pointed out that companies having superior financial (ECON) and non-financial (TESG) sustainability performance hint the market about their good performance. There are many reasons why the companies go for superior sustainability performance i.e. crafting a reputation with other stakeholders, employees and customers, moral obligation to be a good citizen by paying attention towards society and environment that are vital for all stakeholders (Porter and Kramer, 2006). Companies with superior quality disclosures are assumed to have lower probability of covering-up unfavorable information which is valuable in decision making and therefore enjoys lower COD (Sengupta, 1998). There is another study in the previous literature which shows positive linkage between financial disclosures and lower COD (Zhang and Ding, 2006).

ECON (financial) dimension of sustainability performance which is reflected through quality financial information permits investors to better gauge the return and risk connected with their investments with the help of complete and accurate financial information. The financial dimension of sustainability (ECON) should affect both

COD and COE in an unambiguous way. When a company discloses more information with respect to financial / economic sustainability, both stock and bond investors have better access to information with respect to corporate profitability. Since investors can make better investment decisions when they have more relevant information about corporate profitability, COD should therefore be lower (Ng and Rezaee, 2012).

There are two stream of research in this area. First stream focuses the examination on corporate bond's cost and bond issue (Menz, 2010; Chen et al., 2012; Ge and Liu, 2015). The second stream explores the loans extended by banks and private debt (Cooper and Uzun, 2015; Hoepner et al., 2016; Goss and Roberts, 2011; Anis and Utama, 2016). The findings of the above-mentioned studies are heterogeneous and due to disparate results, there is no consensus yet.

Contrary risk metrics arise in debt markets as compared with equity markets. The reason for this can be attributed to the fact that with the increase in environmental risk management actions, COD also enhances at same time and this is possible by allowing companies to raise their debt financing (Sharfman and Fernando, 2008). Other researcher points out that lower yield spreads are related with greater CSR score in better credit ratings and new bond issue (Ge and Liu, 2015). However, the other researcher in the context of Europe explored the association between bond spreads and CSR and pointed out that greater CSR commitments require greater risk premium (Menz, 2010). Zeidan et al. (2015) explored that the sustainability credit scoring system helps the company to show their sustainability commitment and with the help of this tool, bank can get the higher quantity of information. Other studies pointed out that credit ratings are considered one of the channels through which COD of company is lowered by corporate social performance (La Rosa et al., 2018; Ge and Liu, 2015).

Kanda (1992) pointed out that debt holders are considered among the company's most important stakeholders. As per Stakeholder theory, companies need to explicitly and directly uphold all stakeholders' interests by assuming relevant practices (Theodoulidis et al., 2017). Companies are considered creditworthy because of addressing sustainability concerns of debt holders and are rewarded with lower COD. Fernando and Lawrence (2014) pointed out that companies are inclined by

organizational fields or institutional settings in which they operate to implement sustainability practices. Bhuiyan and Nguyen (2019) explored that sustainability practices reduces the asymmetry of information which exists between debt holders and companies. Sustainability practices gives insights of company's initiatives related to sustainability and are considered crucial while evaluating company's creditworthiness (Martínez-Ferrero and García-Sánchez, 2017). Derrien et al. (2016) explained that the concerned company would be considered as creditworthy and is rewarded with lower COD by debt holders. Henceforth, it is argued that companies which address stakeholder's sustainability concerns by instigating sustainability practices obtain lower COD as compared to companies which don't implement these practices.

Companies with higher CSR / ESG concern have to pay higher interest on bank loans (Goss and Roberts, 2011). There are different results of studies which check the impact of green bonds on company's COD (Gillan et al., 2021). Zerbib (2019) explored that green bonds are provided at negative premium. This suggests that issuing bonds in order to find the projects with environmental benefits decreases the COC. However, Flammer (2021) found no difference in terms of yields between other bonds and green bonds which shows no decrease on green bond's COC. Hoepner et al. (2016) enhanced the literature in a sense that their study is not only concentrated on company's CSR performance measure but also have taken into account a country level analysis along with focusing on each dimension of environmental, social and governance concerns. Their results show that environmental and social activities have an impact on loan financing and environmental activities have more cost reduction than the social activities. Another study pointed out in the Chinese context that debt financing costs reduced through improved CSR when the investment related to CSR is lower than the optimal level and these costs will increase when the investment related to CSR is higher than the optimal level (Ye and Zhang, 2011).

Goss and Roberts (2011) pointed out that borrowers CSR investments are not rewarded by lenders and are not included in pricing spread as risk mitigation element. They have investigated the impact of corporate social responsibility on cost of bank loan and established that socially responsible companies pay seven

to eighteen basis points less than companies having social responsible concerns. Furthermore, lenders and borrowers both gain benefit from ESG disclosure alongwith CSR disclosure (Anis and Utama, 2016). Gong et al. (2018) found the negative relationship between corporate bond's cost and quality of CSR reports. Li et al. (2014) found a positive relationship between emission intensity and COD in Australia. Du et al. (2017) found a negative relationship between corporate environmental performance and interest rate on debt. Magnanelli and Izzo (2017) found a positive relationship between corporate social performance and COD.

Eliwa et al. (2021) studied the impact of ESG disclosure and performance on COD in fifteen European Union countries. They found that lending institutions integrate information related to ESG while making credit decisions and value ESG disclosure and performance. Further, the respective study fails to distinguish between ESG disclosure and performance. Previous research either examined the relationship between ESG and COD in a single country (Hasan et al., 2017; Erragragui, 2018) or employed a small sample size (Jung et al., 2018; Hoepner et al., 2016). The measures of ESG disclosure and performance are used interchangeably. ESG performance is used to measure what the company actually do whereas ESG disclosure is the announcement of that company's ESG performance to its stakeholders (Deegan, 2017).

Chava (2014) studied the impact of environmental sustainability on COD in the context of US for the period 1992-2007 by using bank loan data as proxy for COD and found that loan spreads are increased by environmental concerns. However, there exists no relationship between environmental strengths and COD. Gracia and Siregar (2021) explored the relationship between environmental sustainability and COD in the context of ASEAN countries for the period 2004-2019. Their findings suggest that there exists no significant relationship between environmental sustainability and COD. Devalle et al. (2017) are of the view that environmental and social awareness in evaluation of credit scoring not only allocate resources efficiently but also lead to superior ranking by the financial institutions and firms gain advantage from this objective score evaluation. Ostrom (2010) pointed out that it is evident that firms act for their individual benefits i.e. for their self-interest rather than focusing on collective interests. Bonini and Emerson (2005) pointed

out that investors (market side) and lenders (debt side) do not recognize the real concerns arising from their own investments. Therefore, the implementation of risk adjusted measures where scores related to ESG are added and credit score system could nurture sustainable development for all stakeholders. Several studies pointed out that there is indirect link between risk profile of firm and ESG sustainability due to the direct connection between ESG and overall capital structure in terms of debt and equity (Albuquerque et al., 2019; Cai et al., 2016)

One suggestion in this regard is to investigate the triggers that aide the relationship between ESG sustainability and default probability. If there is negative relationship exists, this means that a decrease in default probability may occur due to rise in ESG concerns. If it is true, lenders and bankers while evaluating creditworthiness process might include ESG factors. Moreover, due to the enhancement of ESG practices by firms, the society's wellbeing is enhanced and firms are also repaid correctly. With the help of this approach, both community and firm gain advantages from business and this ultimately generates sustainable wealth (Devalle et al., 2017). There is also an evidence of using individual ESG performance dimension while examining the impact of ESG performance on COD. Lending institutions also value individual ESG performance dimensions along with comprehensive measure (Mattingly, 2017). He further explored that environmental performance has the largest impact on company's COD. Ge and Liu (2015) studied the impact of environmental sustainability on COD in the context of US for the period 1992-2009 by using bond spreads as proxy for COD and found that loan spreads are decreased by environmental strengths. However, environmental concerns and COD have no significant relationship.

Country's cultural system and legal framework has significant impact on company's ESG performance (Baldini et al., 2018). Likewise, country's labor and education system, political and financial system also impact company's environmental and social performance (Ioannou and Serafeim, 2012). Companies located in Continental Europe provide lower CSR disclosure as compared with Anglo-Saxon countries (Jackson and Apostolakou, 2010). Eliwa et al. (2021) established that lending institutions while making lending decisions incorporate company's ESG information in order to evaluate two risk types i.e. reputational risk and

default risk (Weber et al., 2014). Therefore, when information is integrated on a company's ESG practices, the risks may be mitigated which ultimately decreases the COD charged by lending institutions to that respective company.

Those who are in favor of sustainability, defend a negative relationship between business sustainability and COD. The major argument comes in this regard is that sustainable firms are considered less risky by lenders and thus in a position to obtain better financing conditions. Those who are against the sustainability argue that it is a waste of finite and limited resources, and companies that pursue those activities destroy value, therefore, suggesting a positive relationship between business sustainability and COD. Company's default risk is considered main driver of COD. A parallel argument relates to bad social and corporate behavior, as creditors bear reputational risk which is derived from their client's actions and may oblige borrowers to lessen such risks (Gonçalves et al., 2022).

Lenders are incentivized to incorporate measures of sustainability into their risk assessment models as specialized risk appraisers. Weber (2012) and Thompson and Cowton (2004) reports that lenders incorporate carbon and environmental issues into their lending decisions. More socially responsible companies are less risky therefore, these companies display higher credit ratings (Attig et al., 2013). Soppe (2004) pointed out that companies with better credit quality should get better borrowing conditions and also obtain lower loan spread. Jiraporn et al. (2014); Ge and Liu (2015); Erragragui (2018) explained that public debt markets and private lenders of US also endorse this relationship and findings show that geography has a larger impact as compared with industry effect on this relationship. There exists a negative relationship between sustainability performance and COD in the context of European companies. The sample taken from S&P Europe 350 index for the period 2005 to 2012. It is further concluded that improved sustainability performance is related with higher credit ratings (La Rosa et al., 2018). It is further argued that lower COD is rewarded to those companies having good sustainability performance and bad performance penalizes it.

Based on risk mitigation theory, there is support available in the previous literature for the negative association between sustainability performance and COD. Australian companies with lower risk awareness and higher carbon risk paid

thirty-eight to sixty-two points more on their loans as compared with those companies which are more aware (Jung et al., 2018). Another study found that US companies showing sustainability concerns are penalized with seven to eighteen basis points increase on their bank loans. They further found that although engaging in sustainable activities, lenders penalize low quality borrowers and are indifferent to high quality borrowers, engaging in similar sustainable activities (Goss and Roberts, 2011). Bénabou and Tirole (2010) pointed out that customers, employees and investors are willing to give up their personal benefits (purchasing power) to enhance social wellbeing demanding companies to adopt more sustainable practices and by paying higher prices for more sustainable products. Jo and Harjoto (2012) pointed out that alternative to risk mitigation theory is overinvestment theory, draws its support from agency theory. Leins (2020) and Goss and Roberts (2011) explained that investments in environmentally and socially responsible activities pose a deviation from optimal use of scarce resources.

Barnea and Rubin (2010) pointed out that overinvestment in sustainability and philanthropy by managers in order to improve their image at the shareholders cost. Accordingly, company's sustainability engagement is considered a diversion of corporate resources and therefore makes the companies more vulnerable to credit screening by lenders, results in higher COD as per overinvestment hypothesis. Menz (2010) is considered one of the first studies which solely focused on the relationship between sustainability performance and COD. This study explored the relationship between 498 Euro bond spreads and RobecoSAM CSR scores over 38 months' period. This study also hypothesized a negative relationship between company's sustainability scores and credit spreads. However, found a weak positive relationship between company's sustainability scores and credit spreads. It is concluded that credit ratings employed already account for sustainability issues and that an additional sustainability rating does not enhance the sustainability explanatory power to bondholders.

Suto and Takehara (2017) studied the relationship between sustainability performance and cost of debt for the period 2008 to 2013 and found positive relationship between these variables for the period 2008 to 2010. The reason for this relationship during financial crisis was explained that lenders consider sustainability

spending as a risk to company's future, and therefore pricing the risk through COD. Keeping in view the previous research, most of the studies studied the linear relationship between sustainability performance and COD. The research which examined the nonlinear relationship between sustainability performance and COD, found U-Shaped relationship between these variables that points to an optimal sustainability performance level (Bae et al., 2018; Ye and Zhang, 2011).

Ye and Zhang (2011) are the first ones who have studied the U-shaped relationship between sustainability performance and COD. Their study was based on risk mitigation theory, exploring whether better sustainability performance decreases COD in the context of Chinese companies. There is another study with a sample of 5810 syndicated bank loans issued by US companies for the period 1991-2008. This study also found the same type of relationship. The authors concluded that sustainability strengths reduce loan spreads at decreasing rate, whereas sustainability concerns increase COD at a decreasing rate. The authors further found that during global financial crisis (2008) and technology crisis (2000-2002) companies with sustainability strengths enjoyed lower spreads on their loans. The nonlinear relationship tells us that lenders perceive sustainability performance as form of risk reduction up to a certain level. After reaching optimal point, sustainability investments are considered as ineffective by lenders and considered costly uses of a company's resources.

There are multiple studies which provide a negative relationship between sustainability and COD (Hasan et al., 2017; Ge and Liu, 2015; Fonseka et al., 2019). On the other hand, there are studies which provide a positive relationship between sustainability and COD (Hoepner et al., 2016; Erragragui, 2018). There are studies which provides inconclusive results and urges the researches to further examine the relationship (Fonseka et al., 2019; Eliwa et al., 2021). Fonseka et al. (2019) argued that this relationship also yet to be investigated in emerging markets.

To sum up, we may say that vast amount of literature supports a negative relationship between business sustainability performance and COD. Yet there are studies which have found the positive relation between business sustainability performance and COD. Moreover, there are studies which are inconclusive regarding relationship between sustainability and COD. Inconsistent results of prior related

studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON (financial component) and TESG (non-financial component) of sustainability performance with COD in the context of emerging economies as recommended by Fonseka et al. (2019) in their study.

2.5 Sustainability and Cost of Capital (COC)

COC is negatively related with disclosure quality in two ways; Stewardship effect, where through disclosure, improvement is made in managerial alignment with shareholders, or an information effect, which reduces cash flow's assessed covariance (Lambert et al., 2007). Previous research points out that uncertainty of investors about sustainable profitability of companies is reduced by higher financial quality, while ultimately cuts COC (Leuz and Wysocki, 2008).

Finance and accounting theoretical research points out that financial information's quality reduces COC by reducing investor's information risk (Leuz and Verrecchia, 2005). Diamond and Verrecchia (1991) argued that COC is reduced by enhancing market liquidity. Previous empirical research found a negative relationship between earnings transparency or also called disclosure quality and COC (Francis et al., 2004; Bhattacharya et al., 2003). Leuz and Wysocki (2008) argues that investor's uncertainty regarding company's sustainable profitability is reduced through higher financial quality, which ultimately decreases COC. COC is negatively related with disclosure quality in two ways: a stewardship effect, where with the help of disclosure, managerial alignment is improved with shareholders, or an information effect, decreasing the cash flow's assessed covariance (Lambert et al., 2007).

Ng and Rezaee (2015) pointed out that primary and foremost objective of the firm is to increase value of shareholders through ECON, however, the effective dealing of firms with TESG sustainability performance must be ensured in order to add value for other stakeholders. Moreover, the linkage between firm value and TESG sustainability performance may not be considered straightforward. Cajias et al. (2014) checked the effect of CSR on COC and found that automobile and

telecommunication companies commonly known as customer oriented companies outperform the chemical and real estate companies known as asset driven sectors. Companies with superior TESG sustainability performance can hint commitments to increase productivity, retain talented employees and enhance customer loyalty. Such TESG improvements and initiatives can affect positively financial performance and also enhances access to capital and ultimately reduces COC. Furthermore, these TESG initiatives could be expensive to implement (Ng and Rezaee, 2015).

Nazir et al. (2022) explored the relationship between ESG performance and COC. The relationship was studied by considering 512 firm year observations for global technology companies. By employing GMM, they have found that there exists positive relationship between ESG performance and COC in the context of global technology companies. They further elaborated that impact of ESG differs from one sector to another. Johnson (2020) studied the relationship between ESG disclosures and COC by employing panel data regression in the context of South African firms for the period 2011-2018. He has studied sector wise relationship and found inverse relationship between ESG disclosure and COC for consumer goods and services sector and positive relationship for industrial sector.

Gillan et al. (2021) explored that high CSR / ESG companies are considered as green companies and low CSR / ESG companies are known as brown companies which is in line the theoretical models. Majority of these models conclude that green companies enjoy lower COC. These results are in line with the previous empirical evidence (El Ghoul et al., 2011; Hong and Kacperczyk, 2009). Pástor et al. (2021) also found lower COC for greener companies. Pedersen et al. (2021) argued that there are three types of investors namely those who are interested in green stocks, those interested in brown stocks and those who are unaware whether stocks are brown or green. They found that COC of green stocks depends upon unaware investor's wealth. Breuer et al. (2018) findings depend upon investor protection laws of a country in which the company operates. They argued that the COC is reduced in countries where there is strong investor protection and weak investor protection increases the COC.

Wong et al. (2021) finds the inverse relationship between ESG score and COC in

the context of Malaysian companies for the period 2005-2018. They have found that ESG rating reduces COC. Ould Daoud Ellili (2020) studied the relationship of ownership structure, ESG disclosure and COC in the context of Dubai for the year 2010-2019. The results show that COC is reduced through ESG disclosure. The reason for such relationship is information asymmetry reduction and enhanced transparency. The results further show that COD and COE is also decreased through ESG disclosure. The reason for such relationship that creditors and shareholders give weightage to non-financial information. Atan et al. (2018) studied the impact of ESG on firm value, profitability and COC in the context of Malaysian firms. They have employed panel data regression to check the impact of overall as well as each of the ESG pillars on COC. There exists no relationship among the pillars and COC. However, positive relationship is observed between overall ESG and COC. Another study explored the relationship between ESG disclosure and COC in the context of SMEs in Italy. This study found ESG disclosure lead towards higher COC (Gjergji et al., 2021).

There are multiple studies which provide a negative relationship between sustainability and COC (Gillan et al., 2021; El Ghoul et al., 2011; Hong and Kacperczyk, 2009; Pástor et al., 2021; Wong et al., 2021; Ould Daoud Ellili, 2020). On the other hand, there are also studies which provide a positive relationship between sustainability and COC (Nazir et al., 2022; Atan et al., 2018; Gjergji et al., 2021). Johnson (2020) studies sector wise relation between ESG disclosures and COC and found inverse relationship between ESG disclosure and cost of capital for consumer goods and services sector and positive relationship for industrial sector.

Liquidity is employed as a control for liquidity risk shows the significant positive relation with cost of financing complementing the results of previous studies (Gonçalves et al., 2022; La Rosa et al., 2018; Gholami et al., 2022; Sassen et al., 2016; Bouslah et al., 2013). Modigliani and Miller (1958) pointed out that cost of financing increases due to higher leverage ratio, assuming no transaction costs or no taxes. Fama and French (1993) pointed out that higher levered firms provide higher stock returns. Dahiya and Singh (2020) pointed out that higher leverage ratio tells us that there is solvency issue in the long run, which means investors are exposed to greater risk. To get compensation for greater risk, higher rate of return

is demanded by investors. Therefore, positive relation between leverage and cost of financing is expected complementing the result of previous studies (Gonçalves et al., 2022; Gode and Mohanram, 2003; Hail and Leuz, 2006; El Ghoul et al., 2011).

Fama and Jensen (1983) proved that there exists negative relationship between firm's size and cost of financing. Dahiya and Singh (2020) explained that due to more analyst coverage available for larger firms, more information is available with the investors. Bowen et al. (2008) also pointed out that information asymmetry problem is addressed, due to increase attention, therefore, risk is decreased and cost of financing also reduces for large firms. Breuer et al. (2018) employed Z-Score as a proxy of default risk. Negative relation is expected between Z-Score and cost of financing because Z-Score is the measure of firm's financial strength. The higher the Z-Score, the lower is the financial distress / default risk. However, there are studies which found the opposite relationship between Z-Score and COE Ng and Rezaee (2015) or inconclusive about the relationship (Breuer et al., 2018).

Bouslah et al. (2013); Breuer et al. (2018) explained Z-Score as distress risk or default risk. There is lower probability of default of firms which are having higher Z-Score value. Z-Score a measure for probability of bankruptcy score used as a proxy for financial distress in this study. Ge and Liu (2015); Fonseka et al. (2019) explored that higher the Z-Score, the lower the financial distress. It is employed to check the financial distress and it decreases the default risk. Moreover, it captures the firm's financial strength.

Hou et al. (2012); Ng and Rezaee (2015) found an inverse relation between beta and COE. As per CAPM, there exists positive relation between beta and COE. Prior research also complements the positive relation between beta and COE (Gonçalves et al., 2022; El Ghoul et al., 2011; Hail and Leuz, 2006; Dahiya and Singh, 2020). The reason for such a relationship is provided as firms with higher level of systematic risk are charged with higher COC.

Prior research employed GDP per capita and GDP growth rate to control for economic development of a respective country (Breuer et al., 2018). The possible reason for GDP and cost of financing relationship is that GDP growth is connected with demand of funds. High growth rate implies high demand of finds which

resultantly increase the cost of financing. The reason for inflation and cost of financing relationship is provided as increase in inflation will cause increase in rate of return and inflation will be added in real rate of return which ultimately increase cost of financing. This study also explored that Money supply and cost of financing is positively related be-cause money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the cost of financing.

To sum up, we may say that vast amount of literature supports a negative relationship between business sustainability performance and COC. Yet there are studies which have found the positive relation between business sustainability performance and COC. Inconsistent results of prior related studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON (financial component) and TESG (non-financial component) of sustainability performance with COC in the context of emerging economies.

2.6 Measures of Sustainability

The first and foremost question comes to our mind is how to measure TESG sustainability performance of a company. TESG means to assess firms on how innovative these are in terms of sustainability and their societal impact on stakeholders. Environmental factors include firm's contribution to climate change through water consumption, greenhouse gas emissions, energy efficiency and waste management. Social factors tell us that how firms manage its relationship with external and internal stakeholders. These aspects include labor standards in the supply chain, human rights, exposure to illegal child labor, respect for safety and health in the workplace and employee education and training. Governance factors refers to the set of principles, rules and controls that define responsibilities, rights and expectations among different stakeholders. The common areas are board structure, functions and committees, corruption and bribery and compensation policy (Escrig-Olmedo et al., 2019).

2.6.1 Environmental, Social and Governance (ESG) Indexes

Sustainability is believed to cover everything these days and this new way of understanding the economy is also adapted by financial institutions. Sustainability criteria is incorporated by companies in their management gradually. Resultantly, Institutional and private investors are calling for global sustainable investment indexes that are solid, reliable and rational in order to permit them to display the growing profitability of their sustainable investments. Sustainability Indexes are the instruments in order to measure the company's responsibility in environmental and social areas. Companies while developing their businesses need to take these aspects into account in order to get higher score in terms of sustainability.

Fernández, a professor at Higher Institute of the Environments explained that these indexes are built and designed with the aim of giving information to retail and institutional investors that value the significance of firm's social and environmental responsibility and corporate governance in their everyday management, in addition to economic results while deciding to purchase shares of the company (BBVA, 2019).

There are independent firms that are dedicated in designing the assessment methodology and selecting companies that become part of analysis process. Viñuales explained that these assessment processes, repeated at different times, determine best firms based on their environmental, social and economic results. He further added that there exists one problem which is to find out firms with internal communication problems and making sure that these problems are not known to rest of the company. Decisions are based on the information available with the decision maker. If the investor only sees the firm from outside and not obtain the details of the company, this could lead towards financial chaos. It is also important to find out that whether there are social, environmental or ethical controversies. Fernández emphasis that companies which are socially responsible are considered attractive because their objectives are enhancing long term shareholders value (BBVA, 2019).

He explained that the risks from new economic, social and environmental

TABLE 2.2: Sustainability Indexes

Name	Abbreviation	Launch YEAR	Country	Evaluation THEME	Geographical Scope and Sector Approach	Type of Eligible Companies
S&P Dow, Jones Indices. RobecoSAM.	DJSI World	1999	USA, Switzerland	ESG	International and Multi-sector	Listed Companies
ECPI Group	ECPI World ESG Equity Index	2007	Italy, France, Belgium	ESG, Socially responsible and sustainability	International and Multi-sector	Listed Companies of developed markets
Vigeo Eiris. Forum Ethibel. Euronext.	ESI Excellence Global	2013	France	Sustainability	International and Multi-sector	Companies listed on the stock exchange
Vigeo Eiris. Euronext.	Euronext Vigeo Eiris World 120	2013	France	Sustainability and Corporate Responsibility	International and Multi-sector	The largest fee-float market capitalization in North America, Asia-Pacific and Europe
FTSE, Russel	FTSE 4 Good Developed Index	2001	UK	ESG, aligned with SDCs	International and Multi-sector	Companies that are in developed and emerging markets
Börse Hannover	GCX	2007	Germany	Sustainability	International and Multi-sector	Large corporations (large caps) and small and medium sized companies
Sustainalytics. Solactive. UBS	GSLI	2012	Netherlands Germany, Switzerland	ESG	International and Multi-sector	Listed companies
MSCI	MSCI World ESG Leaders Index	2007	USA	Sustainability	International and Multi-sector	Large and mid-cap companies in developed markets
STOXX	STOXX Global ESG Leaders Index	2011	Switzerland	ESG	International and Multi-sector	Companies listed on the stock exchange
Sustainalytics.	Sustainalytics' ESG Risk Rating	2018	Netherlands	ESG	International and Multi-sector	Companies that are in the major global and regional equity and fixed incomes indices

Source: Diez-Cañamero et al. (2020): Measurement of corporate social responsibility: A review of business sustainability indexes, rankings and rating

developments can be quantified and used in order to find and select leading firms attractive for investment. There is possibility to quantify economic sustainability, shareholders have recognized the idea as a new discriminating portion in their investments (BBVA, 2019).

2.6.2 Environmental, Social and Governance (ESG) Rankings

Rate the Raters, Sustainability report (2020) explains that ESG rankings means that lists which classify firms based on their performance and put them in certain grouping or order based on specified grading system. The most relevant ESG rankings are Global CR Rep Trak 100, The Sustainability Yearbook and World's Most Sustainable Corporations – Global 100. Global CR Rep Trak 100 is the ranking of corporate reputation for the world's leading firms. It shows how people think, feel and act towards firms globally. It has been a decade that Global RepTrak® 100 has ranked the top 100 most reputable firms to celebrate global reputation leaders. A firm's corporate reputation is measured through Rep Trak's Reputation Score. A score between 0 to 100 measures how people feel, think and act towards a particular firm. Scores are determined by a combination of factors to provide a complete view of reputation, including the elements of corporate reputation: ESG, leadership, branding, work place fairness and innovation.
The Sustainability Yearbook, (2022) reflects the developments of past year and giving an outlook on upcoming ESG issues. This book tells us that research on sustainability is underpinned by S&P Global business sustainability assessment, a process that is evolved from 1999 in order to capture ESG metrics and data on complex topics related to sustainability. The key focus areas in this report include topics like ESG that will continue to drive sustainability strategies in this year and afterwards. World most sustainable corporations – Global 100 provided by Corporate Knights in 2022 is based on assessment of 7000 public companies with revenue over US$ 1 billion. The foremost aim of Global 100 is to raise, reinforce awareness and showcase, world leaders in sustainability, annually, including those that have been able to balance environmental, social and economic performance while providing superior returns to investors.

TABLE 2.3: Sustainability Rankings

Name	Abbreviation	Launch Year	Country	Evaluation Theme	Geographical Scope and Sector Approach	Type of Eligible Companies
Global CR RepTrak® 100	Reputation Institute (RI)	2012	USA	Sustainability	International and Multi-sector	Not Specified
The Sustainability Yearbook	RobecoSAM	2004	Switzerland	ESG	International and Multi-sector	Most important companies in terms of market capitalization
World's Most Sustainable	Corporate Knights (CK)	2005	Canada	Sustainability	International and Multi-sector	Publicly listed companies
Corporations – Global 100	Thomson Reuter		USA			

Source: Diez-Cañamero et al. (2020):
Measurement of corporate social responsibility:
A review of business sustainability indexes, rankings and ratings.

2.6.3 Environmental, Social and Governance (ESG) Ratings

The firm's evaluations based on comparative assessment of their standard, quality or performance on ESG issues. These ratings are provided by different rating agencies and rating score is assigned to each and every company based on the strengths in the area of ESG. ESG scores tells us that we are investing in firms which are using best ESG practices. ESG rating agencies are those organizations that examine firm's ESG policies in order to determine its sustainability. These rating agencies provide variety of services like providing research on specific industries or sectors, screening stocks and conducting due diligence.

Those ESG rating providers are considered trustworthy who provide accurate and fair assessment of the ESG risks and opportunities linked with that investment. ESG scores are used to identify firms with strong ESG performance as compared with their peers. There are seven key areas which are addressed by rating agencies which include materials management, community relations, energy production, customer relations, working conditions, firm's governance and waste management. Thousands of platforms using corporate statements to generate ESG ratings in US. The obvious reason is the lack of regulatory oversight. Every rating agency employs its algorithms and analysts in order to evaluate ESG metrics in the shape of disclosures. In Europe, there is an increase in regulatory oversight. Due to this, these ESG ratings are becoming more useful and reliable over time.

There are eight best ESG rating agencies including Sustainalytics is an ESG rating agency that provides ratings on 20,000 firms and 172 countries. Around 40,000 firms are rated worldwide. Suntainalytics is subsidiary of one of largest stock market data providers i.e. Morningstar in the world. It measures corporate ESG performance of firms on global scale. Around 13,000 international equities all over the world are covered by Sustainalytics. Sustainalytics ratings are based on both qualitative and quantitative ESG data. ESG scores cover different areas of environmental impact, financial performance, social contribution and governance in order to give a holistic view of the ESG profile of firms. Due to the level of

consistency of the information shared by Sustainalytics, it is considered one of the top companies in data and reporting for ESG (Impact Investor, 2022).

MSCI ESG Ratings are created by MSCI ESG research is also considered one of the largest rating agencies. Around 14,000 different fixed income and equity issuers, these ESG ratings are released. MSCI ESG Ratings is considered one of the industry leaders in providing ratings and scores for ESG firms. Bloomberg ESG Disclosure Scores is a data set which provides ESG information for over 11,800 firms in more than 100 countries. The topics included in their ESG data are human capital, climate change and shareholder's rights. The companies are ranked on their ESG disclosure level and span key sustainability topics (Impact Investor, 2022).

FTSE Russell's ESG Ratings provide an ESG based assessment system of a firm's ESG performance. More than 7,200 securities from 47 different countries are included in this database and based on methodical analysis of company performance. The purpose of ratings is to analyze and compare the ESG performance of companies. There are six categories of these ratings including social policy, supply chain policy, corporate governance, labor practices, environmental policy and economic development. The companies which are listed on FTSE Global Equity Index Series and other liquid and large stocks are focused under these ratings. Therefore, as opposed to micro-cap or small-cap securities, these ESG ratings provide a better insight into mid to large-cap issuers (Impact Investor, 2022).

Institutional Shareholder Services (ISS) which is majority owned by Deutsche Bourse Group, gives country, company and fund ratings along with data and analysis of issues of sustainable investment including labor standards, climate change, corruption, controversial weapons and human rights. ISS help investors in determining compliance with ESGs and also addresses risks faced by firms related to ESG. These rankings and risks are available for firms across various industries and geographies with ESG being assessed based on KPIs of company. These key performance indicators (KPIs) include human rights risk assessment, supply chain management, pollution prevention and reduction and climate change (Impact Investor, 2022).

S&P Global ESG Scores is one of the largest firms that provide data reporting and analytics to the firms around the world. ESG scorecards take a top-down approach means that higher entity decides ESG scores. S&P Global ESG Scores uses bottom-up approach and therefore, different from other ESG rating systems. This takes more analytical look meaning how well firms perform in areas such as employee relations and environmental practices. S&P Global ESG Scores provides scores of over 11,500 company based on S&P Global questionnaire and / or publicly available data. This questionnaire has more than 450 questions. The ESG scores are assigned at sector level and ratings can be found on S&P Global ESG (Impact Investor, 2022).

CDP Climate, Water and Forest Scores called CDP which is a not-for-profit organization, provides research, environmental data and tools to investors and helps in identifying funds to investors that they can invest in firms that are successful at addressing material concerns like water security, climate change and deforestation. Cliometrics rates almost 20,000 funds and ratings are publicly available. It is a unique rating which identifies best ESG integrated investment funds based on their ESG performance. It includes EFTs, mutual funds and separate account portfolios and can be used for identifying the ESG best in class funds in their portfolios by investors (Impact Investor, 2022).

Moody's ESG Solutions Group, a Moody's Corporation business unit. Moody's is well-known and regarded as one of the largest credit rating agencies in the world. Moody's provide ESG analytics, ratings, and sustainable finance and sustainability ratings using Moody's data. Moody's ratings are designed for those investors who require ESG related information on companies across all industries, countries or regions in the world. Moody's have more than 13,000 ESG assessments (Impact Investor, 2022).

2.7 Theoretical Framework

A company needs to extend its emphasis from maximizing short term shareholder's profit by considering the effect of its operations on the benefits of all stakeholders including society, community and the environment. Stakeholder and Shareholder

theory explain the valuation implications and economic function of sustainability performance in minimizing negative externalities and maximizing positive externalities of sustainability activities. As per stakeholder theory, sustainability performance and activities increase the long term value of the company by meeting their environmental obligations, fulfilling the company's social responsibilities, and improving their reputation. Management generates value for shareholders by engaging in positive NPV projects that enhance shareholder wealth as per shareholder theory. It is argued that management has a fiduciary duty to act in best interests of shareholders in order to maximize their wealth because shareholders are considered as the owners of the company. These sustainability efforts may require significant resource allocation that could conflict with shareholder's objective of wealth maximization. Therefore, in order to check the impact of sustainability performance on cost of financing is considered an empirical question.

Sustainability efforts can produce both synergies and conflicts in the context of stakeholder welfare maximization and shareholder wealth maximization. If a company ignores all stakeholder's interests, it cannot maximize its value. Theory of enlightened value maximization for stakeholders identifies long run value maximization of company as the benchmark for making requisite tradeoffs among its stakeholders. Sustainability reporting forces companies to gauge the tradeoffs among conflicting, competing or complementing long term and short term interests of society, employees, shareholders, creditors and environment. Under shareholder theory, the objective function of management is defined as creating value for shareholders, whereas such an objective function is not defined under stakeholder theory in balancing conflicting all stakeholder's interests. An optimal investment in TESG initiatives can minimize company's negative externalities and maximize its positive externalities by balancing the costs of sustainability efforts along with their benefits.

Sustainability expected benefits are environmental liability reduction, reduction of litigation costs, sustainable earnings generation, sustainable supply chains which provides cost savings, customer satisfaction, improved product quality, improved employee loyalty, enhanced regulatory approvals, enhanced reputation and productivity. Disclosing and implementing sustainability initiatives also have

several costs. These include opportunity cost resulting from managerial efforts and time spent on sustainability along with capital expenditures. If the company discloses valuable information such as profitable customer's information, markets and trade secrets or organizational, operating or reporting weaknesses to regulators, customers, unions, suppliers, competitors or investors, the proprietary costs of voluntary disclosures of TESG strengths and concerns can be significant. When companies reveal voluntary information, the probability of litigation can be higher.

There are two attributes of TESG sustainability which are sustainability disclosure and sustainability performance and both are vital in assessing risk premium and return of investors. TESG (non-financial) sustainability disclosure and sustainability performance play a role in affecting the relation between firm value and financial performance is not clear. Previous research doesn't differentiate between sustainability disclosure and sustainability performance and investigate the integrated effect of sustainability disclosure and sustainability performance on cost of equity. We have also investigated that integrated effect of sustainability disclosure and sustainability performance on COC, COE and COD in the context of emerging economies in this study.

It is argued that each of the TESG (non-financial) sustainability performance component provides a cost benefit trade off that has certain implications for shareholders and may affect COE. For example, an initiative related to environment pertaining to energy costs saving or pollution levels reduction may require huge capital expenditures, and in the long run will also lessen actual and contingent environmental liabilities. TESG (Non-financial) sustainability information proper disclosure can generate opportunities for shareholders to identify risks such as radiation, oil spills, product recalls, accounting fraud, litigation and mining accidents. They further argued that current profits may be reduced by CSR activities. However, these activities generate much higher profits in the long run by creating goodwill and forming better work environment and reputation with society and consumers. TESG performance information affects investor's assessment of uncertainty and risks about the company's future cash flows. The effects of company sustainability disclosures are important only if the net benefits at company level are ignored or not full internalized by all investors.

To sum up, we may say that our theoretical framework suggests that ECON and TESG dimensions of sustainability performance are interrelated and needs to be investigated together when examining their impact on COC, COE and COD and shareholder wealth. Business sustainability emphasis that the objective function of any organization is to create value for shareholders under shareholder theory while protecting other shareholders and other stakeholder's interests under stakeholder theory. There are other theories which are relevant to business sustainability. These include signaling theory, which helps in explaining management incentives for attaining both ECON and TESG sustainability performance and investor's reaction to sustainability performance information disclosure. Legitimacy theory tells us that companies face political and social pressure to reserve their legitimacy by satisfying their social contract by engaging in TESG activities. Stakeholder theory is considered to be the prevailing theory of business sustainability and therefore is the underpinning theory of this study because it takes into account the interests of all the stakeholders. The benefits associated with sustainability performance under this theory are the performance enhancement, risk reduction and reduced information asymmetry which reduces the COE and COD through which COC ultimately reduces and value of the firm is enhanced.

Both financial and non-financial sustainability performance dimensions affect cost of financing and this is consistent with the past research. Moreover, the moderating effect of TESG on ECON-Cost of financing relationship suggests that researchers should take both ECON and TESG sustainability performance simultaneously to get a true picture regarding the relation between sustainability performance and cost of financing.

These theories don't identify the directions of any relationship between TESG and cost of financing as different sustainability performance dimensions could also battle and tradeoffs could occur between investing in TESG initiatives or business activities that maximize economic profits. The main objective is to maximize value of the firm. In this regard, there is direct link between ECON (financial) and TESG (non-financial) components of sustainability performance dimension. Financial component (ECON) takes into account Agency theory with the main objective to create value for shareholders whereas non-financial components (TESG)

takes into account Stakeholder theory with the main objective to protect stakeholder's interest. These possibilities present tension to our question of whether the relationship between ECON and cost of financing is influenced by TESG sustainability performance. Therefore, examination to whether and to what extent various sustainability performance dimensions ECON and TESG are interrelated, and whether and how shareholder wealth is affected when companies consider other stakeholder's interests is also addressed in this study.

2.8 Hypothesis Development

This study explored the impact of ECON (financial) and TESG (non-financial) sustainability performance on COE. Ng and Rezaee (2015) pointed out that companies with history of good financial / economic sustainability performance may display lower betas as compared with companies having poor financial / economic sustainability performance. They further elaborated that information on better financial / economic sustainability performance makes the investors confident about future cash flows predictions and then decreases the risk premium required by investors. There are numerous studies which confirms the negative relationship between sustainability and COE (Ng and Rezaee, 2015; Hmaittane et al., 2022; Gupta, 2018; Matthiesen and Salzmann, 2017).

This study complements the past research in a way that we have checked integrated and interactive effects of financial (ECON) and non-financial (TESG) measure of sustainability performance on COE. Moreover, we have examined that whether ECON is associated with COE individually by bifurcating ECON into growth opportunities (GR), operational efficiency (OP), and research effort (RES) and their impact on COE in the context of emerging economies. The main reason is capital flows from developed economies to emerging and developing economies. Developed economies have more formal setups and achieved maximum experiences on different aspects. Emerging markets still try to adapt developed economies practices and as mentioned earlier that capital flows from developed economies to emerging economies so these experiences also fowl in the same way. It is not necessary that whatever relationship has been proved for developed economies

would be same for emerging economies as well. Emerging market firms may not have the same capability as developed market firms in diverting resources from their main business activities to sustainability activities and thus the findings of developed markets may or may not hold in the emerging markets context. These arguments create a room for contextual research.

Secondly, there is vast amount of literature which supports a negative relationship between business sustainability performance and COE. Yet there are studies which have found the positive relation between business sustainability performance and COE. Inconsistent results of prior related studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON (financial component) and TESG (non-financial component) of sustainability performance with COE. Gianfrate et al. (2018) discussed this issue and pointed out that this inconsistency may be due to other variables that play a significant role in this relationship, such as industry membership, type of measure used, other institutional and cultural factors and choice of sample. Thirdly, the possible reason for the reduction of funding costs is firms that operate more efficiently and invest more in research are associated with lower cost of financing. Based on the previous research, we hypothesize that:

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

Furthermore, COE may be influenced differently by different elements of ECON. These are classified as Growth opportunities (GR), operation efficiency (OP) and research effort (RES). Growth opportunities (GR) and Research effort (RES) are associated to risk attributing future growth whereas operation efficiency (OP) is linked to risk which is connected to current operation. Therefore, it is evident that COE is impacted differently by these elements (Ng and Rezaee, 2015).

Hypothesis 1a: There is inverse relationship between growth opportunities (GR) and cost of equity (COE).

Hypothesis 1b: There is inverse relationship between operational efficiency (OP) and cost of equity (COE).

Hypothesis 1c: There is inverse relationship between research (RES) and cost of equity (COE).

Girerd-Potin et al. (2014) pointed out that there are three independent socially responsible dimensions namely societal stakeholders (society and environment), business stakeholders (customers, employees and suppliers) and financial stakeholders (debt holders and stockholders). Their research pointed out that investors who are holding low CSR stocks ask for additional risk premium which is associated with low COE for high CSR companies. Harjoto and Jo (2015) explained that the overall CSR score reduces stock return volatility, information asymmetry, implicit COE which in turn enhances firm value. Li et al. (2014) found no significant relationship between emission intensity and COE in Australia whereas Suto and Takehara (2017) found a negative relationship between CSR and COE in Japan. TESG improvements and initiatives can affect positively financial performance and also enhances access to capital and ultimately reduces COE. Previous research confirms the negative relation between sustainability and COE (Gupta, 2018; Hmaittane et al., 2022; Matthiesen and Salzmann, 2017). Based on the discussion, we safely hypothesize that:

Hypothesis 2: There is inverse relationship between Environmental, Social and Governance (TESG) sustainability performance and cost of equity (COE).

Hypothesis 2a: There is inverse relationship between Environmental (ENV) sustainability performance and cost of equity (COE).

Hypothesis 2b: There is inverse relationship between Social (SOC) sustainability performance and cost of equity (COE).

Hypothesis 2c: There is inverse relationship between Governance (GOV) sustainability performance and cost of equity (COE).

Kiron et al. (2012) pointed out that by focusing on individual components of TESG (non-financial) dimension of sustainability performance allows them to address sustainability risks that could influence financial sustainability performance and ultimately COC. Clarkson et al. (2011) found a link between sustainability performance individual dimensions and COE. Furthermore, different TESG dimensions of sustainability performance have different impacts both on (ROE)

financial performance and stock returns (market) performance (Jain et al., 2013). Ng and Rezaee (2015) TESG have different impact on COE. Moreover, they have studied and established that TESG moderates the relationship between ECON and COE. Based on the discussion, we hypothesize that:

Hypothesis 3: Environmental, social and governance (TESG) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of equity (COE).

Hypothesis 3a: Environmental (ENV) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of equity (COE).

Hypothesis 3b: Social (SOC) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of equity (COE).

Hypothesis 3c: Governance (GOV) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of equity (COE).

ECON, a financial / economic dimension of sustainability performance which is reflected through quality financial information permits investors to better gauge the return and risk connected with their investments with the help of complete and accurate financial information. The financial / economic dimension of sustainability should affect both COD and COE in an unambiguous way. When a company discloses more information with respect to financial / economic sustainability, both stock and bond investors have better access to information with respect to corporate profitability. Since investors can make better investment decisions when they have more relevant information about corporate profitability, COD should therefore be lower (Ng and Rezaee, 2012). There are multiple studies which provide a negative relationship between sustainability and COD Hasan et al. (2017); Ge and Liu (2015); Eliwa et al. (2021); Fonseka et al. (2019). Fonseka et al. (2019) argued that this relationship also yet to be investigated in emerging markets. Based on the discussion, we safely hypothesize that:

Hypothesis 4: There is inverse relationship between economic sustainability

performance (ECON) and cost of debt (COD).

Furthermore, cost of debt may be impacted differently by different elements of ECON. These are classified as Growth opportunities (GR), operation efficiency (OP) and research effort (RES). Growth opportunities (GR) and Research effort (RES) are associated to risk attributing future growth whereas operation efficiency (OP) is linked to risk which is connected to current operation. To check this effect, we hypothesize:

Hypothesis 4a: There is inverse relationship between growth opportunities (GR) and cost of debt (COD).

Hypothesis 4b: There is inverse relationship between operational efficiency (OP) and cost of debt (COD).

Hypothesis 4c: There is inverse relationship between research (RES) and cost of debt (COD).

It is established that there is positive relationship between environmental risk management and COD (Sharfman and Fernando, 2008). Goss and Roberts (2011) found no significant relationship between CSR and COD. The study used a US sample of firms for the period 1991-2006 and COD is measured as reduced loan spreads. The another study examined the relationship between CSR and COD and used a sample of Chinese companies and found that companies with extremely high or low CSR experience a higher COD (Ye and Zhang, 2011). Chava (2014) pointed out that firms having environmental concerns have to pay higher spreads on their loans. Some researchers found the positive relationship between financial disclosures and external capital raising activities (Healy and Palepu, 2001; Lang and Lundholm, 2000; Frankel et al., 1995). Zhang and Ding (2006) found the positive association between financial disclosures and COD. Companies with superior TESG (non-financial) sustainability performance can hint commitments to increase productivity, retain talented employees and enhance customer loyalty.

There exists a negative relationship between sustainability and COD in the prior literature (Ge and Liu, 2015; Hasan et al., 2017; Fonseka et al., 2019; Eliwa et al., 2021). Fonseka et al. (2019) provided guidelines that this relationship yet to be investigated in emerging markets. Based on the discussion, we hypothesize that:

Hypothesis 5: There is inverse relationship between environmental, social and governance (TESG) sustainability performance and cost of debt (COD).

Hypothesis 5a: There is inverse relationship between Environmental (ENV) sustainability performance and cost of debt (COD).

Hypothesis 5b: There is inverse relationship between Social (SOC) sustainability performance and cost of debt (COD).

Hypothesis 5c: There is inverse relationship between Governance (GOV) sustainability performance and cost of debt (COD).

Ng and Rezaee (2015) established that the individual components of TESG have different impact on cost of equity. To confirm these results in emerging economies, this study investigates the impact of ECON, a financial measure and TESG, a composite non-financial measure of sustainability performance on cost of debt (COD) individually and in aggregate. Moreover, this study also check the moderating effect of TESG on the ECON and COD relationship. Based on the discussion, we hypothesize that:

Hypothesis 6: Environmental, social and governance (TESG) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of debt.

Hypothesis 6a: Environmental (ENV) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of debt.

Hypothesis 6b: Social (SOC) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of debt.

Hypothesis 6c: Governance (GOV) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of debt.

COC includes COE and COD. Previous research confirms that investors' uncertainty about company's sustainable profitability is reduced through higher disclosure quality, which ultimately decreases the COC (Leuz and Wysocki, 2008). In an analytical setting, Gao (2010) tried to explain the relation between financial

disclosures and COC and provided evidence that in many instances, investor welfare is improved through disclosure quality and as a result COC is reduced. Clark et al. (2015) pointed out that with the help of good governance, there will be reduction in information asymmetry which ultimately lowers the COC. Prior research has addressed the relationship between quality of financial disclosure and COC. Moreover, the theoretical research further clarifies that investors' uncertainty about company's sustainable profitability is reduced through higher disclosure quality, which in turns reduces the COC, and this is basically the investor's expected risk premium (Healy and Palepu, 2001). Prior studies confirm the negative relationship between sustainability and COC (Ould Daoud Ellili, 2020; Gillan et al., 2021; Hong and Kacperczyk, 2009; Pástor et al., 2021; El Ghoul et al., 2018; Wong et al., 2021). Based on the discussion, we safely hypothesize that:

Hypothesis 7: There is inverse relationship between economic sustainability performance (ECON) and cost of capital.

Furthermore, COC may be impacted differently by different elements of ECON. These are classified as Growth opportunities (GR), operation efficiency (OP) and research effort (RES). Growth opportunities (GR) and Research effort (RES) are associated to risk attributing future growth whereas operation efficiency is linked to risk which is connected to current operation. Based on the discussion, we hypothesize that:

Hypothesis 7a: There is inverse relationship between growth opportunities (GR) and cost of capital (COC).

Hypothesis 7b: There is inverse relationship operational efficiency (OP) and cost of capital (COC).

Hypothesis 7c: There is inverse relationship between research (RES) and cost of capital (COC).

Prior research has addressed the relationship between quality of financial disclosure and COC. Moreover, the theoretical research further clarifies that investors' uncertainty about company's sustainable profitability is reduced through higher disclosure quality, which in turns reduces the COC, and this is basically the investor's expected risk premium (Healy and Palepu, 2001). Negative relation

between sustainability and COC is established in the prior literature (Wong et al., 2021; Pástor et al., 2021; El Ghoul et al., 2018; Hong and Kacperczyk, 2009; Gillan et al., 2021; Ould Daoud Ellili, 2020). Inconsistent results of prior related studies along with the fact that these studies only address a single dimension of sustainability performance motivate us to examine the possible relation between ECON, a financial sustainability performance measure and TESG, a non-financial sustainability performance measure with COC. We hypothesize that:

Hypothesis 8: There is inverse relationship between environmental, social and governance (TESG) sustainability performance and cost of capital (COC).

Hypothesis 8a: There is inverse relationship between Environmental (ENV) sustainability performance and cost of capital (COC).

Hypothesis 8b: There is inverse relationship between Social (SOC) sustainability performance and cost of capital (COC).

Hypothesis 8c: There is inverse relationship between Governance (GOV) sustainability performance and cost of capital (COC).

Ng and Rezaee (2015) established that the individual components of TESG (non-financial) sustainability performance have different impact on COE. To confirm these results in emerging economies, this study investigates the impact of ECON, a financial measure and TESG, a composite non-financial measure of sustainability performance on COC individually and in aggregate. Moreover, this study also check the moderating effect of TESG on the ECON and COC relationship. Based on the discussion, we hypothesize that:

Hypothesis 9: Environmental, social and governance (TESG) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of capital (COC).

Hypothesis 9a: Environmental (ENV) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of capital (COC).

Hypothesis 9b: Social (SOC) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of capital (COC).

Hypothesis 9c: Governance (GOV) sustainability performance strengthens the negative relationship between economic sustainability performance (ECON) and cost of capital (COC).

Sustainability relationship is with uncertainty. When there is high uncertainty, there is high risk and vice versa. Sustainability reduces uncertainty and ultimately risk is reduced which reduces the cost of financing. Firms are more vigilant which are concerned about sustainability and their sustainability risks ultimately reduces with their commitment.

It is pertinent to mention that sustainability performance and sustainability disclosure are two facet of sustainability and are correlated (Jain et al., 2013). Fatemi et al. (2018) pointed out that qualitative information on TESG performance and TESG disclosure jointly affect the value of the firm. Furthermore, Ng and Rezaee (2015) pointed out that the extent to which the sustainability disclosures and sustainability performance play a role in determining the relationship between firm value and financial performance is not clear in the previous literature. Therefore, they have not differentiated between sustainability disclosures and sustainability performance and investigated their integrated effects on COE. In this study, we have followed Ng and Rezaee (2015) and checked their integrated effects on COE, COD and COC.

Chapter 3

Research Methodology

3.1 Data and Sample

The aim of this study is to check the impact of sustainability performance on cost of capital (COC) and its components namely cost of equity (COE) and cost of debt (COD) in the context of emerging economies. This chapter deals with the sampling process, sources of data, sampling period of data, measurement of explanatory and explained variables and statistical models used for analysis.

3.1.1 Sampling

Population consists of non-financial companies of sample countries. Non-financial firms are immensely different from the financial one in terms of their business activities. The primary objectives of the non-financial firm are the production of goods and services and are considered an important, considerable and stable segment of any economy. Sample for this study consists of 3000 observations of 300 non-financial firms from six different countries, fifty firms from each country. Due to non-availability of some data, few observations are eliminated and finally 2918 observations are used for data analysis. The specific process used for sampling of countries and firms is described in section 3.1.2.

TABLE 3.1: Sampling

Country	Companies
Pakistan	50
India	50
Russia	50
South Africa	50
Brazil	50
China	50
Total	300

3.1.2 Sample from Emerging Economies

Selected countries have been categorized as Emerging Economies. Emerging economies are defined by S&P DJI as: "Countries which show relatively less accessibility but have some degree of openness for foreign investors are termed as 'Emerging economy". The growing significance of emerging economies is signaling in numerous respects i.e. in economic terms – both at microeconomic and macroeconomic level, in demographic terms and in scientific and cultural terms. The emerging economies which played a relatively modest role in the global economy twenty years ago, occupy a far more important place today.

Emerging economies include Russia, Oman, Qatar, Iran, China, United Arab Emirates, Bahrain, Brazil, India, Kuwait, Turkey, Saudi Arabia, Latvia, Romania, Bulgaria, Czech Republic, Hungary, South Africa, Morocco, Argentina, Chile, and Colombia etc. This study employs BRICS countries from this list including Pakistan. BRICS is the acronym coined to associate five key emerging economies (Brazil, Russia, India, China and South Africa).

3.1.3 Sampling of Firms

This study selects fifty firms with respect to highest market capitalization for a specific country included in the sample.

3.2 Data Collection

Company's financial Data have been collected from Orbis company focus, Fitch

connect Database, DataStream Database, World Bank website and company's financial statements for the period of ten years (2009-2018). Data related to sustainability has been collected from the sustainability reports and in the absence of sustainability reports, data is extracted from financial reports and company's website is used to extract data.

3.3 Variable Description

This section defines dependent, independent, and control variables. The study analyses the impact of sustainability performance on cost of capital (COC), cost of equity (COE) and cost of debt (COD). The analysis in this study is done across firm level.

3.3.1 Cost of Capital (COC)

Weighted average cost of capital (COC) is the combined cost of debt (COD) and cost of equity (COE) and can be calculated as the after tax weighted average cost (Sharfman and Fernando, 2008; Modigliani and Miller, 1958) and is denoted by COC.

COC is defined as (Modigliani and Miller, 1958):

$$WACC = \frac{E}{D+E}Ke + \frac{D}{D+E}(1-\tau)Kd$$

Where E, D, Kd, Ke and τ denote equity capital, total debt, the cost of debt (before tax), cost of equity and effective corporate tax rate, respectively.

3.3.2 Cost of Equity (COE)

Following Francis et al. (2005); Liu et al. (2002); Ng and Rezaee (2015), this study uses the industry adjusted earnings to price ratio (IndEP), a variation of price multiple, as a proxy for COE. In order to calculate the industry adjusted earnings to price ratio (IndEP), we need to first calculate the median earnings to price ratio for all companies with positive earnings in year t in each of the Fama-French

industry groups. Industry adjusted earnings to price ratio (IndEP) in year t is then calculated as the difference between company's earnings to price ratio and the median industry earnings to price ratio in year t.

COE = Industry adjusted EP (IndEP) ratio in percent — Difference between firm's EP and the median industry EP ratio in year t, according to the FF 49 industry classification;

3.3.3 Cost of Debt (COD)

The cost of debt (COD) is second component for cost of capital (COC) and is measured as company's ratio of interest expense in year t+1 to average interest bearing debt outstanding in year t and t+1 in this study (Magnanelli and Izzo, 2017).

$$COD = \frac{Interest\ expense\ in\ year_{t+1}}{Average\ interest\ bearing\ debt\ outstanding\ in\ year_{(t,t+1)}}$$

3.3.4 Construction of Economic Sustainability Performance (ECON)

The economic sustainability performance (ECON) takes into account long term along-with short term profitability while considering investment for future growth (Ng and Rezaee, 2015). It is the financial sustainability of firms. We have taken seven variables i.e. Tobin's Q (TOBINSQ), Return on equity (ROE), Sales scaled by total assets (SALES), Sales growth (SALESGR), Market Value to Book Value (MVBV), Research & Development expenses scaled by total assets (RD), Dummy variable representing omission of dividends (DIVIDOMS).

3.3.4.1 Tobin's Q

The Q ratio is calculated as the total market value of the firm divided by total replacement value of asset of the firm. A low Tobin's Q ratio (between 0 and 1) means that the cost to replace a company's assets is greater than the value of its stock. This means that the stock is undervalued. Conversely, a high

Tobin's Q (greater than 1) implies that a company's stock is more expensive than the replacement cost of its assets, which implies that the stock is overvalued. Wolfe and Sauaia (2005) further explained that companies having high Tobin's Q (greater than 1) have higher growth potential, better investment opportunities and are showing indication of firm's successes. Orlitzky et al. (2003) explained that Tobin's Q is a market based measure of performance and these measures provides indications of firm's effectiveness from investment perspective and represent the market response to internal organizational decisions. This measure widely accepted and an important corporate performance measure in many scholarly studies (Ang and Ding, 2006; Dogan and Smyth, 2002). The following ratio is used in this study to measure Tobin's Q:

$$TobinsQ = \frac{Total\ Market\ Value\ of\ Firm}{Replacement\ Value\ of\ assets}$$

3.3.4.2 Return on Equity

Return on equity (ROE) is a ratio that provides investors with insight into how efficiently a company is handling the money that shareholders have contributed to it. Griffin and Mahon (1997) explained that this is an accounting based measure and is one of the most popular methods for measurement of financial performance. Scott (2003) pointed out that it is the single most important indicator for investors in order to measure company's management performance. Jha and Rangarajan (2020) explained that ROE measures how firms manage their capital to generate profit. ROE is calculated using the following formula:

$$Return\ on\ Equity\ (ROE) = \frac{Net\ Income}{Shareholders\ Equity}$$

3.3.4.3 Sales and Sales Growth

Sales are activities related to selling or the number of goods sold in a given targeted time period. Sales growth rate measures company's ability to generate revenue through sales over a fixed period of time. This rate is not only used by company to look at internal successes and problems, it is also analyzed by investors to see

if company is on the rise or a company starting to stagnate. Mass (2005); Nohria et al. (2014); Höbarth (2006) explained that long term growth is considered as a notion of market competition and business success. This study employs sales scaled by total assets and sales growth calculated using the following formula:

$$Sales\ Growth = \frac{Sales_t - Sales_{t-1}}{Sales_{t-1}} \times 100$$

3.3.4.4 Dividend Omission

It is a dummy proxy which represents dividend omission. We have followed Ng and Rezaee (2015), and employed dividend omission in the exploratory factor analysis (EFA) in order to generate factors which are used for the construction of ECON.

$$DIVIDENDOMS = Dummy\ variable\ that\ represents\ omission\ of\ dividend:$$
$$1\ if\ dividend\ payment\ is\ zero\ \ 0\ otherwise$$

3.3.4.5 Market Value to Book Value (MVBV)

This ratio is used to denote how much equity investors are paying for each dollar in net assets. The MVBV ratio is calculated by dividing the current closing price of the stock by the most current quarter's book value per share. Oikonomou et al. (2014) pointed out that market to book ratio signals if a company is in financial distress. Nezlobin et al. (2016) explained that this ratio determines whether a firm is under or overvalued. Mazzotta and Veltri (2014) are of the view that firms which face increased growth opportunities and higher earnings, investors tend to associate higher market to book ratio with that firms. This study employs this ratio by using the following formula:

$$Market\ Value\ to\ Book\ Value\ (MVBV) = \frac{Market\ value\ of\ Equity}{Book\ value\ of\ Equity}$$

3.3.4.6 Research and Development (R&D)

These are the expenses of companies in a given year. This study uses research and development expenditure variable in the EFA in order to generate factors which are used for the construction of ECON in line with (Ng and Rezaee, 2015). It is measured by research and development expenditure scaled by total assets.

$$R\&D = \frac{Research\ and\ Development\ Expense}{Assets_t}$$

By employing these variables, we capture measures of profitability (ROE and SALES), Growth measurement (TOBINSQ, SALESGR and MVBV) and long term profitability's investment (RD and Dividend Omissions). This study employs exploratory factor analysis (EFA) to these seven variables in order to construct ECON in terms of composite factors (Kanagaretnam et al., 2007; Ng and Rezaee, 2015; Larcker et al., 2007). Three factors are retained which explains the bulk of variances in the data and grouped Market value to Book value (MVBV) and Tobin's Q (TOBINSQ) as growth factor (GR), return on equity (ROE), sales scaled by total assets (SALES) and sales growth (SALESGR) is grouped as Operation efficiency (OP) and research and development (RD) and omission of dividend (DIVIDENDOMS) is grouped as research effort factor (RES). These variables are a results of EFA on these above mentioned seven variables which are used to capture ECON.

These above mentioned three factors have eigenvalues greater than 1 and explain more than 62% variance. This study not only explains the relationship of these individual factors with cost of financing but also captures the relationship of ECON with cost of financing. ECON is the equally weighted average of these above mentioned three factors.

3.3.5 Economic sustainability performance (ECON)

This study has used Exploratory Factor Analysis (EFA) in order to employ small constructs used to capture ECON elements which is consistent with prior studies (Kanagaretnam et al., 2007; Larcker et al., 2007; Ng and Rezaee, 2015). We

have retained components with loadings higher than 0.40 which is consistent with previous research (Larcker et al., 2007). Only three factors are retained which have greater than one eigenvalues. These factors describe majority of the variance (over 62%). We have further used varimax orthogonal rotation in order to reduce number of variables and assigned indicators which are related to each factor and grouped Market value to Book value (MVBV) and Tobin's Q (TOBINSQ) as GR at time t (Growth Factor), and return on equity (ROE), sales scaled by total assets (SALES) and sales growth (SALESGR) is grouped as OP at time t (Operation efficiency) and research and development (RD) and omission of dividend (DIVIDENDOMS) is grouped as RES at time t (Research effort). These factors are used as proxies for ECON.

GR_t = Growth factor – Economic sustainability performance dimension

OP_t = Operation efficiency factor – Economic sustainability performance dimension

RES_t = Research factor – Economic sustainability performance dimension

$ECON_t$ = Summary of Economic sustainability performance dimension – Equally Weighted Average of Growth, Operation efficiency and research factor.

3.3.6 Environmental, Social and Governance (TESG) Sustainability Performance

This study has followed Ng and Rezaee (2015); Kim et al. (2012); Dhaliwal et al. (2011) and developed total environmental, social and governance (TESG) index which is used for measuring ESG sustainability performance measures. The data is collected on the strengths and concerns normally referred to as positive and negative signs, using approximately eighty signs in seven areas. The main areas are, community, corporate governance, diversity, environment, employee relations, human rights, and products quality. Firstly, by using all the strengths and concerns which represent TESG sustainability performance, we have developed an Index called TESG. Secondly, we have mapped attributes to TESG dimensions to check the effect of various measures of sustainability performance on COC, COE and

COD. Moreover, we also check the overall impact of sustainability performance as well by following past studies (Kim et al., 2012; Dhaliwal et al., 2011).

TESG = Composite score obtained by subtracting number of concerns from number of Strengths for each dimension i.e. Environmental, Social and Governance.

Firstly, environmental dimension includes four strengths namely beneficial products and services, recycling, clean energy, pollution prevention and six concerns namely hazardous waste, substantial emissions, climate change, regulatory problems, agricultural chemicals and ozone depleting chemicals. Secondly, social dimension includes seven strengths namely charitable giving, support for housing, innovative giving, support for education, employment of the disabled, work / life benefits and women & minority contracting and four concerns namely tax disputes, investment controversies, negative economic impact and controversies. Governance dimension include three strengths namely limited compensation, transparency strength and ownership strength and two concerns namely high compensation and ownership concern.

3.3.6.1 Environmental (ENV) Sustainability Performance

This sustainability performance dimension is calculated by subtracting number of firm's concerns from number of firm's strengths related to environment. Data is extracted from sustainability reports, company's websites and financial statements. SOC denotes social sustainability performance: ENV denotes environmental sustainability performance:

ENV = Number of environmental strengths minus number of environmental concerns.

Environmental strengths include beneficial products and services, recycling, clean energy, pollution prevention whereas environmental concerns include hazardous waste, substantial emissions, climate change, regulatory problems, agricultural chemicals and ozone depleting chemicals.

3.3.6.2 Social (SOC) Sustainability Performance

This sustainability performance dimension is calculated by subtracting number of firm's concerns from number of firm's strengths related to social activities of firms. The areas come under this dimension includes diversity, community, employee relations and human rights. Data is extracted from sustainability reports,Company's websites and financial statements. SOC denotes social sustainability performance:

$$\text{SOC} = \text{Number of social strengths less number of social concerns}$$

Social strengths include charitable giving, support for housing, innovative giving, support for education, employment of the disabled, work / life benefits and women & minority contracting whereas social concerns include tax disputes, investment controversies, negative economic impact and controversies.

3.3.6.3 Governance (GOV) Sustainability Performance

This sustainability performance dimension is calculated by subtracting number of firm's concerns from number of firm's strengths related to governance. The areas come under this dimension include governance and product quality. Data is extracted from sustainability reports, company's websites and financial statements. GOV denotes governance sustainability performance:

$$\text{GOV} = \text{Number of governance strengths minus number of governance concerns}$$

Governance strengths include limited compensation, transparency strength and ownership strength whereas governance concerns include high compensation and ownership concern.

Rezaee (2017b) pointed out that Global Reporting Initiative (GRI) in its G4 guidelines related to sustainability supports an integrated reporting on five EESGE sustainability performance dimensions with ethical dimension being incorporated into other dimensions (Global Reporting Initiative, 2013). These five EESGE sustainability performance dimensions are categorized into broad category of ECON (financial) and TESG (non-financial) sustainability performance. As per Global

Reporting Initiative (2013), ethical performance is integrated into both ECON (financial) and TESG (non-financial) sustainability performance in compliance with G4 of the Global Reporting Initiative.

3.3.7 Control Variables

Control variables are also included in this study. This study has checked the impact of sustainability performance on cost of capital (COC), cost of equity (COE) and cost of debt (COD) in the context of emerging economies. This study not only uses company level control variables namely Liquidity, Leverage, Size, Z-Score, Beta, DLoss and Accrual but also macroeconomic control variables including Money Supply, GDP, Inflation and Population.

3.3.7.1 Liquidity

Trading liquidity of stock market is used in this study. This measure is placed to control liquidity risk. Ng and Rezaee (2015); Gonçalves et al. (2022); La Rosa et al. (2018) used this variable in their respective studies. Liquidity is employed as a control for liquidity risk shows the significant positive relation with cost of financing complementing the results of previous studies (Gonçalves et al., 2022; La Rosa et al., 2018; Gholami et al., 2022; Sassen et al., 2016; Bouslah et al., 2013). Liquidity is measured as common shares traded during the fiscal year divided by the number of total shares outstanding:

$$LIQU = \frac{Common\ Shares\ Traded}{Total\ number\ of\ shares\ outstanding}$$

3.3.7.2 Leverage

A leverage ratio is any one of several financial measurements that look at how much capital comes in the form of debt to meet its financial obligations. It is important because companies rely on a mixture of equity and debt to finance their operations and knowing the amount of debt held by a company is useful in evaluating whether it can pay off its debts as they come due. This measure

is included to check the risk associated with (high) leverage. Goss and Roberts (2011) argue that default risk rise with leverage. Harrison and Coombs (2006) argue that firms with high leverage neglect both product and employee areas linked with social performance and have low environmental, social and governance (ESG) scores. Harris and Raviv (1991) pointed out that high leverage shrinks cash available for investment, reducing firm's ability to invest in different projects. Modigliani and Miller (1958) explored that debt financing is cheaper as compared to equity financing because interest is a tax-deductible expense. When there is increase in leverage, COC tends to fall, thereby creating value for shareholders. Modigliani and Miller (1958) pointed out that cost of financing increases due to higher leverage ratio, assuming no transaction costs or no taxes. Fama and French (1993) pointed out that higher levered firms provide higher stock returns. Dahiya and Singh (2020) pointed out that higher leverage ratio tells us that there is solvency issue in the long run, which means investors are exposed to greater risk. To get compensation for greater risk, higher rate of return is demanded by investors. Therefore, positive relation between leverage and cost of financing is expected complementing the result of previous studies (Gong et al., 2018; Gode and Mohanram, 2003; Hail and Leuz, 2006; El Ghoul et al., 2011). Leverage is denoted as LEV and calculated as:

$$LEV = \frac{TotalDebt}{TotalAssets}$$

3.3.7.3 Size

Lenders view larger companies less risky because these companies can offer more collateral as compared with small companies (Goss and Roberts, 2011). In ESG context, firm size is also considered relevant (Drempetic et al., 2020). Margolis and Walsh (2003) explained that firm's ability to exercise sustainable investments can be affected through size because larger firms have large number of resources to invest. Rettab et al. (2009) were of the view that larger firms are more pressured by stakeholders to take sustainable actions. Galbreath and Shum (2012) pointed out that smaller firms don't have the resources to properly address social responsibilities nor does report on sustainable initiatives. Comparatively, large

firms are more stressed towards financial goals and have higher responsibilities at the expense of sustainable goals, thereby negatively affecting sustainable performance. This study choose to include size as a control variable in our study because it is argued that size affects both financial and sustainable performance. Fama and French (1993) proved that there exists negative relationship between firm's size and cost of financing. Dahiya and Singh (2020) explained that due to more analyst coverage available for larger firms, more information is available with the investors. Bowen et al. (2008) also pointed out that information asymmetry problem is addressed, due to increase attention, therefore, risk is decreased and cost of financing also reduces for large firms. Size is measured as the natural log of market value of equity:

$$SIZE = Ln(Market\ Value\ of\ Equity)$$

3.3.7.4 Zmijewski's Z-Score

Zmijewski score is a bankruptcy model in order to predict a firm's bankruptcy in two years. Zmijewski (1984) employed probit analysis in order to develop a bankruptcy model. In this case, scores less than .5 represent a higher probability of default. Mulyati and Ilyasa (2020) studied the comparative examination of Altman Z-Score, Springate, Internal growth rate model and Zmijewski in predicting the financial distress in the context of Indonesian companies. The results show that Zmijewski ranks second in their research after Springate. Ng and Rezaee (2015) explained this variable as likelihood of bankruptcy score as financial distress proxy.

Breuer et al. (2018) employed Z-Score as a proxy of default risk. Negative relation is expected between Z-Score and cost of financing because Z-Score is the measure of firm's financial strength. The higher the Z-Score, the lower is the financial distress / default risk. However, there are studies which found the opposite relationship between Z-Score and COE Ng and Rezaee (2015) or inconclusive about the relationship (Breuer et al., 2018). Bouslah et al. (2013); Breuer et al. (2018) explained Z-Score as distress risk or default risk. There is lower probability of default of firms which are having higher Z-Score value. Z-Score a measure for probability of bankruptcy score used as a proxy for financial distress in this study.

Ge and Liu (2015); Fonseka et al. (2019) explored that higher the Z-Score, the lower the financial distress. It is employed to check the financial distress and it decreases the default risk. Moreover, it captures the firm's financial strength. Zmijewski's Z-Score is calculated below:

Zmijewski Score = -4.3 - [4.5 × (Net Income / Total Assets)] + [5.7 * (Total Liabilities / Total Assets)] + [0.004 × (Current Assets / Current Liabilities)]

3.3.7.5 Beta

Beta (β) is measure of volatility of a security or portfolio compared to the market as a whole. Stocks with betas higher than 1 can be interpreted as more volatile stocks. Attig et al. (2013) argued that company's systematic risk has an adverse effect on its default probability and creditworthiness. It measures the market risk displaying a relationship between market volatility and stock volatility. It is used to control the systematic risk along different dimensions. Dhaliwal et al. (2011); El Ghoul et al. (2011); Magnanelli and Izzo (2017) used beta in order to control for systematic risk in their respective research studies. Hou et al. (2012); Ng and Rezaee (2015) found an inverse relation between beta and COE. As per CAPM, there exists positive relation between beta and COE. Prior research also complements the positive relation between beta and COE (Gonçalves et al., 2022; El Ghoul et al., 2011; Hail and Leuz, 2006; Dahiya and Singh, 2020). The reason for such a relationship is provided as firms with higher level of systematic risk are charged with higher COC. Beta is calculated by dividing the covariance of security and market returns to variance of market returns over a specified period and is denoted by BETA.

$$BETA = \frac{Covariance\ (Re, Rm)}{Variance\ (Rm)}$$

3.3.7.6 Accrual

Following Francis et al. (2005), this study uses this variable as determinant of cost of capital (COC). It is measured as the difference between net income and

operating cash flows. Ng and Rezaee (2015) and Francis et al. (2005) used accrual in their respective studies. Following prior studies, we have also employed accrual as a company specific variable.

ACCL = Difference between Net Income and Operating Cash flows, scaled by average asset of year t and t-1

3.3.7.7 GDP Growth

Breuer et al. (2018); Bui et al. (2020); Kling et al. (2021); El Ghoul et al. (2018) used gross domestic product (GDP) growth as a straight forward measure of economic growth. There are two widely used measures namely per capita GDP growth, denoted by CGR and annual GDP growth, denoted by AGR. Prior research employed GDP per capita and GDP growth rate to control for economic development of a respective country Breuer et al. (2018). The possible reason for GDP and cost of financing relationship is that GDP growth is connected with demand of funds. High growth rate implies high demand of finds which resultantly increase the cost of financing. GDP per capita is calculated below:

$$GDP\ per\ capita = \frac{Gross\ Domestic\ Product}{Midyear\ Population}$$

3.3.7.8 Inflation

Following Breuer et al. (2018); Hail and Leuz (2006); El Ghoul et al. (2018) this study employs GDP deflator as a proxy of inflation and is denoted by INF. Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The reason for inflation and cost of financing relationship is provided as increase in inflation will cause increase in rate of return and inflation will be added in real rate of return which ultimately increase cost of financing. This study uses the ratio of GDP in current local currency to GDP in constant local currency as a proxy for inflation:

$$INF = \frac{GDP\ current}{GDP\ constant}$$

3.3.7.9 Money Supply

Money and the financial accounts that record the supply of money lie at the heart of a country's financial system. There are several commonly used definitions of the money supply. The narrow money, M1, encompasses currency held by the public and demand deposits with banks. M2 includes M1 plus time and saving deposits with banks that require prior notice for withdrawal. M3 includes M2 as well as various money market instruments, such as certificates of deposit issued by banks, bank deposits denominated in foreign currency and deposits with financial institutions other than banks. Mokhova and Zinecker (2019) declared Money Supply as an external determinant of COE. This study also explored that Money supply and cost of financing is positively related be-cause money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the cost of financing. It is denoted by MSP and proxied by broad money growth.

$$Money\ Supply = M_1 + M_2 + M_3$$

M_1 = currency held by the public and demand deposits with banks
M_2 = M_1 plus time and saving deposits with banks that require prior notice for withdrawal.
M_3 = M_2 as well as various money market instruments, such as certificates of deposit issued by banks, bank deposits denominated in foreign currency and deposits with financial institutions other than banks.

3.3.7.10 Population

Following Kling et al. (2021), population is employed as macro-economic control variable and includes all residents having citizenship and legal status. It excludes those who are not settled permanently (refugees) taken asylum. Those are considered population of their origin countries. Total area of a country is considered land area and excludes area which comes under national claims to continental shelf, inland water bodies and exclusive economic zones. Inland water bodies comprise

major lakes and rivers. Population density is midyear population divided by land area in square kilometers and is denoted by POP:

$$POP = \frac{Midyear\ Population}{Land\ area\ in\ sq.\ km}$$

3.4 Methodology

The subject study has employed Panel Data Analysis and System Generalized Method of Moments (System GMM).

3.4.1 Panel Data Analysis

The data used in this study comes from six emerging countries and three hundred companies (fifty from each country) for the period 2009-2018. This is Panel data as it has cross sectional as well as time series dimensions. Hsiao (2007) described the following advantages of panel data over time series or cross sectional data:

1. Hsiao et al. (1995) pointed out that panel data has more sample variability and degree of freedom as compared with cross-sectional data. Therefore, it improves the efficiency of econometric estimates.

2. Panel data has greater capacity in order to capture complexity of data as compared with time series or cross section.

3. Panel data contains information on entities individuality and inter-temporal dynamics which may allow to control the effects of unobserved or missing variables.

3.4.2 System Generalized Method of Moment (System GMM)

This study has employed System Generalized Method of Moments (System GMM) developed by the Arellano and Bover (1995) and Blundell and Bond (1998) for the

estimation of equations. This method has enabled us to avoid endogeneity of regressors, to control omitted variable problems, as well as time invariant and firm specific heterogeneity. As lagged dependent variable is used, it can lead toward some statistical problems. Firstly, it can lead to the problem of serial correlation and secondly dependent variable as lagged is stochastic as dependent variable. So it is the violation of assumption of linear regression. Maeshiro (1996) intimated that use of pooled regression as dynamic model is not right as it will provide biased and inconsistent estimates. So use of GMM is better choice as dynamic panel model.

System GMM is proposed as dynamic panel estimation when there are small periods of time and large number of individuals. System GMM is based on the two equations; first difference equations and level equations. By adding the original equation into the system will increase the efficiency and precision of estimated dramatically as compare to first difference GMM estimator. Blundell and Bond (1998); Blundell et al. (2001) reported that when number of periods are relatively small but regressors are persistent over time, then GMM estimator may have poor performance and large finite sample bias. But system GMM decrease the large finite sample bias and is more efficient. Lagged values of dependent variable is used to control for possible endogeneity of regressors (Bond et al., 2001).

3.4.2.1 Endogeneity Issues

An Endogeneity problem occurs when an explanatory variable is correlated with the error term. The results may be influenced by reverse causality. This means choice of company to engage in social activities may not be independent of COC. When there exists relationship between error term and independent variable, then there exists biasness in results. To resolve this issue, we use instrument variables and lagged dependent variable. This study has addressed this issue by employing system generalized method of moments (Dahiya and Singh, 2020). Following El Ghoul et al. (2011) and Dahiya and Singh (2020), this study estimated the dynamic panel model by employing system GMM. The Blundell-Bond / Arellano-Bover estimator helps in obtaining unbiased and efficient estimates in case of short dynamic panels, which have lagged endogenous variables as an explanatory variable.

To conclude, we may say that appropriateness test was conducted and on the basis of F stats, we have chosen fixed effect estimation. Fixed effects tell us that there is no dynamic relationship exists between variables. When there exists dynamic relationship between variables, we have to go for GMM. It helps in resolving the problem of endogeneity.

3.5 Econometric Model

This research has examined the impact of economic sustainability performance (ECON) and environmental, social and governance (TESG) sustainability performance on cost of capital (COC), cost of equity (COE) and cost of debt (COD). The moderating effect of TESG on the ECON-COC, ECON-COE and ECON-COD relationship is also explored in this study by using fixed effects following the study objectives. Pooled OLS estimation in order to capture fixed effects under panel data is used. These simulations are chosen carefully as these are considered more appropriate for panel data in order to determine the relationship among the selected variables. Ng and Rezaee (2015) explored the impact of sustainability performance on COE in the US market by using fixed effects. Gonçalves et al. (2022) employed pooled ordinary least squares for European firm and regressed the impact of sustainability performance on COC.

The commonly used form of the relationship between these factors (financial and non-financial sustainability performance) and COC, COE and COD is as under:

COC = f (Economic sustainability performance (ECON), Environmental, Social, Governance (TESG) sustainability performance, Control Variables)

COE = f (Economic sustainability performance (ECON), Environmental, Social, Governance (TESG) sustainability performance, Control Variables)

COD = f (Economic sustainability performance (ECON), Environmental, Social, Governance (TESG) sustainability performance, Control Variables)

ECON includes Growth factor (GR), Operation Efficiency factor (OP) and Research factor (RES). ECON is the equally weighted average of these above mentioned factors (GR, OP and RES). TESG, a composite non-financial sustainability

performance measure. This study uses company level control variables namely Liquidity, Leverage, Size, Z-Score, Beta, DLoss, Accrual and macroeconomic control variables including Money Supply, GDP, Inflation and Population.

3.5.1 Impact of Economic Sustainability Performance (ECON) on Cost of Capital (COC)

Basic model used to check the impact of ECON on COC by controlling for year and industry effects. Three different components of ECON including growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) used to check the differential impact on COC. The overall impact of ECON on COC is explored in this study as well.

$$\begin{aligned} COC_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} \\ + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} \\ + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \end{aligned} \tag{3.1}$$

$$\begin{aligned} COC_{j,i,t} = \beta_0 + \beta_1 OP_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} \\ + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} \\ + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \end{aligned} \tag{3.2}$$

$$\begin{aligned} COC_{j,i,t} = \beta_0 + \beta_1 RES_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} \\ + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} \\ + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \end{aligned} \tag{3.3}$$

$$\begin{aligned} COC_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 OPj, i, t-1 + \beta_3 RES_{j,i,t-1} + \beta_4 LIQ_{j,i,t_{-1}} \\ + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} \\ + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} \\ + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \end{aligned} \tag{3.4}$$

$$\begin{aligned} COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} \\ + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} \\ + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \end{aligned} \tag{3.5}$$

Where

$COC_{j,i,t}$ Weighted Average cost of capital

$GR_{j,i,t}$ Economic dimension of sustainability performance — Growth factor

$OP_{j,i,t}$ Economic dimension of sustainability performance — Operation factor

$RES_{j,i,t}$ Economic dimension of sustainability performance — Research factor

$ECON_{j,i,t}$ Summary of economic dimension of sustainability performance - Equally Weighted Average of GRt, OPt, and RESt.

$LIQ_{j,i,t}$ Liquidity measure, equals to common shares traded during fiscal year divided by number of total shares outstanding;

$LEV_{j,i,t}$ Ratio of total debt to total assets

$SIZE_{j,i,t}$ Natural logarithm of market value of equity

$ZMIJ_{j,i,t}$ Probability of bankruptcy proxied by Zmijewski's Z-score = -4.3 to 4.5 × net income/total assets 5.7 × total debt/total assets -0.004 × current assets/current liabilities

$BETA_{j,i,t}$ Beta calculated using the market model

$DLOSS_{j,i,t}$ Dummy variable; equals 1 when net income is less than 0 and 0 otherwise;

$ACCL_{j,i,t}$ Scaled total accruals, calculated as the difference between net income and operating cash flows, scaled by the average asset of year t and t-1 .

$MSP_{j,t}$ MSP is the measure of money supply and is proxied by broad money growth

$GDP_{j,t}$ GDP is the per capita GDP growth rate

$INF_{j,t}$ INF is an indicator of inflation measured with GDP deflator

$POP_{j,t}$ POP is the measure of population. Population density is midyear population divided by land area in square kilometers

3.5.2 Impact of Economic Sustainability Performance (ECON) on Cost of Equity (COE)

Basic model used to check the impact of ECON on COE by controlling for year and industry effects. Three different components of ECON including growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) used to check the differential impact on COE. The overall impact of ECON on COE is

explored in this study as well.

$$COE_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.6}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 OP_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.7}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 RES_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.8}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 OPj, i, t-1 + \beta_3 RES_{j,i,t-1} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.9}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.10}$$

Where

$COE_{j,i,t}$ Industry adjusted EP (IndEP) ratio in percent - Difference between firm's EP and the median industry EP ratio in year t, according to the FF 49 industry classification;

3.5.3 Impact of Economic Sustainability Performance (ECON) on Cost of Debt (COD)

Basic model used to check the impact of ECON on COD by controlling for year and industry effects. Three different components of ECON including growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) used to

check the differential impact on COD. The overall impact of ECON on COD is explored in this study as well.

$$COD_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.11}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 OP_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.12}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 RES_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.13}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 OPj, i, t-1 + \beta_3 RES_{j,i,t-1} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.14}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.15}$$

Where

$COD_{j,i,t}$ Realized Cost of Debt – ratio of firm's interest expense in year t+1 to average interest-bearing debt Outstanding in year t and t+1

3.5.4 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Capital (COC)

TESG sustainability performance is termed as (TESG) index measure used in this study and we have explored TESG impact on COC. It is pertinent to mention

that the impact of ECON is controlled here. TESG is employed as a composite measure by subtracting number of concerns from number of strengths for each dimension of sustainability performance i.e. Environmental (ENV), Social (SOC) and Governance (GOV). By including individual scores of TESG sustainability performance, the individual impact of these elements (ENV, SOC and GOV) on COC is also explored in this study.

$$COC_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.16}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 SOC_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.17}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 GOV_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.18}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 SOC_{j,i,t-1} + \beta_3 GOV_{j,i,t-1} + \beta_4 ECON_{j,i,t-1} + \beta_5 LIQ_{j,i,t_{-1}} + \beta_6 LEV_{j,i,t_{-1}} + \beta_7 SIZE_{j,i,t-1} + \beta_8 ZMIG_{j,i,t-1} + \beta_9 DLOSS_{j,i,t-1} + \beta_{10} ACC_{j,i,t-1} + \beta_{11} BETA_{j,i,t-1} + \beta_{12} MSP_{j,t-1} + \beta_{13} GDP_{j,t-1} + \beta_{14} INF_{j,t-1} + \beta_{15} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.19}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 TESG_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.20}$$

Where

$ENV_{j,i,t}$ Environmental dimension of sustainability performance: Number of environmental strengths minus number of environmental concerns;

$SOC_{j,i,t}$ Social dimension of sustainability performance: Number of social strengths minus number of social concerns;

$GOV_{j,i,t}$ Governance dimension of sustainability performance: Number of governance strengths minus number of governance concerns;

$TESG_{j,i,t}$ Composite score obtained by subtracting number of concerns from number of strengths for each dimension i.e. environmental, social and governance.

3.5.5 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Equity (COE)

TESG sustainability performance is termed as (TESG) index measure used in this study and we have explored TESG impact on COE. It is pertinent to mention that the impact of ECON is controlled here. TESG is employed as a composite measure by subtracting number of concerns from number of strengths for each dimension of sustainability performance i.e. Environmental (ENV), Social (SOC) and Governance (GOV). By including individual scores of TESG sustainability performance, the individual impact of these elements (ENV, SOC and GOV) on COE is also explored in this study.

$$COE_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t-1} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t-1} + \beta_4 LEV_{j,i,t-1} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.21}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 SOC_{j,i,t-1} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t-1} + \beta_4 LEV_{j,i,t-1} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.22}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 GOV_{j,i,t-1} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t-1} + \beta_4 LEV_{j,i,t-1} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.23}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 SOC_{j,i,t-1} + \beta_3 GOV_{j,i,t-1} + \beta_4 ECON_{j,i,t-1} + \beta_5 LIQ_{j,i,t_{-1}} + \beta_6 LEV_{j,i,t_{-1}} + \beta_7 SIZE_{j,i,t-1} + \beta_8 ZMIG_{j,i,t-1} + \beta_9 DLOSS_{j,i,t-1} + \beta_{10} ACC_{j,i,t-1} + \beta_{11} BETA_{j,i,t-1} + \beta_{12} MSP_{j,t-1} + \beta_{13} GDP_{j,t-1} + \beta_{14} INF_{j,t-1} + \beta_{15} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.24}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 TESG_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.25}$$

3.5.6 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Debt (COD)

TESG sustainability performance is termed as (TESG) index measure used in this study and we have explored TESG impact on COD. It is pertinent to mention that the impact of ECON is controlled here. TESG is employed as a composite measure by subtracting number of concerns from number of strengths for each dimension of sustainability performance i.e. Environmental (ENV), Social (SOC) and Governance (GOV). By including individual scores of TESG sustainability performance, the individual impact of these elements (ENV, SOC and GOV) on COD is also explored in this study.

$$COD_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.26}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 SOC_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.27}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 GOV_{j,i,t_{-1}} + \beta_2 ECONj,i,t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \quad (3.28)$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 SOC_{j,i,t-1} + \beta_3 GOV_{j,i,t-1} + \beta_4 ECON_{j,i,t-1} + \beta_5 LIQ_{j,i,t_{-1}} + \beta_6 LEV_{j,i,t_{-1}} + \beta_7 SIZE_{j,i,t-1} + \beta_8 ZMIG_{j,i,t-1} + \beta_9 DLOSS_{j,i,t-1} + \beta_{10} ACC_{j,i,t-1} + \beta_{11} BETA_{j,i,t-1} + \beta_{12} MSP_{j,t-1} + \beta_{13} GDP_{j,t-1} + \beta_{14} INF_{j,t-1} + \beta_{15} POP_{j,t-1} + \varepsilon_{j,i,t} \quad (3.29)$$

$$COD_{j,i,t} = \beta_0 + \beta_1 TESG_{j,i,t_{-1}} + \beta_2 ECONj,i,t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t} \quad (3.30)$$

3.5.7 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance (ECON) – Cost of Capital (COC) Relationship

This study has not only checked the overall impact of ECON on COC but also explored that differential impact of different elements of ECON i.e. growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COC in the first step by controlling industry and year effects. Then, this study also not only explored the overall relationship between TESG and COC but also checked the differential impact of different elements of TESG i.e. environmental (ENV), social (SOC) and governance (GOV) on COC in the next step by controlling industry and year effects.

The impact of ECON is also controlled while testing the TESG and COC relationship individually and in aggregate. Moving forward, this study has also explored the moderating effect of TESG on ECON-COC relationship individually and collectively.

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.31}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 SOC_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.32}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 GOV_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.33}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 SOC_{j,i,t_{-1}} + \beta_4 GOV_{j,i,t_{-1}} + \beta_5 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_6 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_7 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_8 LIQ_{j,i,t_{-1}} + \beta_9 LEV_{j,i,t_{-1}} + \beta_{10} SIZE_{j,i,t-1} + \beta_{11} ZMIG_{j,i,t-1} + \beta_{12} DLOSS_{j,i,t-1} + \beta_{13} ACC_{j,i,t-1} + \beta_{14} BETA_{j,i,t-1} + \beta_{15} MSP_{j,t-1} + \beta_{16} GDP_{j,t-1} + \beta_{17} INF_{j,t-1} + \beta_{18} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.34}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 TESG_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times TESG_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.35}$$

Where

$ECON_{j,i,t} \times ENV_{j,i,t}$ Interaction Term between environmental and economic sustainability performance.

$ECON_{j,i,t} \times SOC_{j,i,t}$ Interaction Term between social and economic sustainability performance.

$ECON_{j,i,t} \times GOV_{j,i,t}$ Interaction Term between governance and economic sustainability performance.

$ECON_{j,i,t} \times TESG_{j,i,t}$ Interaction Term between composite score of sustainability performance and economic sustainability performance

3.5.8 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance (ECON) – Cost of Equity (COE) Relationship

This study has not only checked the overall impact of ECON on COE but also explored that differential impact of different elements of ECON i.e. growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COE in the first step by controlling industry and year effects. Then, this study not only explored the overall relationship between TESG and COE but also checked the differential impact of different elements of TESG i.e. environmental (ENV), social (SOC) and governance (GOV) on COE in the next step by controlling industry and year effects. The impact of ECON is controlled while testing the TESG and COE relationship individually and in aggregate. Moving forward, this study has explored the moderating effect of TESG on ECON-COE relationship individually and collectively.

$$\begin{aligned} COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} \\ +\beta_4 LIQ_{j,i,t_{-1}} + \ \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} \\ + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} \\ +\beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \end{aligned} \tag{3.36}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 SOC_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \quad (3.37)$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 GOV_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \quad (3.38)$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 SOC_{j,i,t_{-1}} + \beta_4 GOV_{j,i,t_{-1}} + \beta_5 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_6 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_7 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_8 LIQ_{j,i,t_{-1}} + \beta_9 LEV_{j,i,t_{-1}} + \beta_{10} SIZE_{j,i,t-1} + \beta_{11} ZMIG_{j,i,t-1} + \beta_{12} DLOSS_{j,i,t-1} + \beta_{13} ACC_{j,i,t-1} + \beta_{14} BETA_{j,i,t-1} + \beta_{15} MSP_{j,t-1} + \beta_{16} GDP_{j,t-1} + \beta_{17} INF_{j,t-1} + \beta_{18} POP_{j,t-1} + \varepsilon_{j,i,t} \quad (3.39)$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 TESG_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times TESG_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \quad (3.40)$$

3.5.9 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance (ECON) – Cost of Debt (COD) Relationship

This study has not only checked the overall impact of ECON on COD but also explored that differential impact of different elements of ECON i.e. growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COD in the first step by controlling industry and year effects. Then, this study not only explored the overall relationship between TESG and COD but checked the differential impact of different elements of TESG i.e. environmental (ENV), social

(SOC) and governance (GOV) on COD in the next step by controlling industry and year effects. The impact of ECON is controlled while testing the TESG and COD relationship individually and in aggregate. Moving forward, this study has also explored the moderating effect of TESG on ECON-COD relationship individually and collectively.

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.41}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 SOC_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.42}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 GOV_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.43}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 SOC_{j,i,t_{-1}} + \beta_4 GOV_{j,i,t_{-1}} + \beta_5 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_6 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_7 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_8 LIQ_{j,i,t_{-1}} + \beta_9 LEV_{j,i,t_{-1}} + \beta_{10} SIZE_{j,i,t-1} + \beta_{11} ZMIG_{j,i,t-1} + \beta_{12} DLOSS_{j,i,t-1} + \beta_{13} ACC_{j,i,t-1} + \beta_{14} BETA_{j,i,t-1} + \beta_{15} MSP_{j,t-1} + \beta_{16} GDP_{j,t-1} + \beta_{17} INF_{j,t-1} + \beta_{18} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.44}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 TESG_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times TESG_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t} \tag{3.45}$$

3.6 Impact of Sustainability Performance on Cost of Capital(COC), Cost of Equity(COE) and Cost of Debt(COD) By Employing System Generalized Method of Moments(GMM)

This research further studied the impact of ECON and TESG sustainability performance on COC, COE and COD. The moderating effect of TESG sustainability performance on ECON-COC, ECON-COE and ECON-COD relationship is also explored in this study by using system GMM following the study objectives and to check the robustness of results. Most of the studies in the current era are using GMM. Dahiya and Singh (2020) employed system GMM in order to check the linkage between corporate social responsibility (CSR) and cost of equity in Indian context. Jiménez and Zorio-Grima (2021) also used GMM to explore the effects of carbon emissions, environmental disclosures and corporate social responsibility (CSR) assurance on cost of equity in emerging markets.

The commonly used form of the relationship between these factors (financial and non-financial sustainability performance) and COC, COE and COD is as under:

COC	f(Cost of Capital (t-1), Economic sustainability performance (ECON), Environmental, Social, Governance (TESG) sustainability performance, Control Variables)
COE	f (Cost of Equity (t-1), Economic sustainability performance (ECON), Environmental, Social, Governance (TESG) sustainability performance, Control Variables)
COD	f (Cost of Debt (t-1), Economic sustainability performance (ECON), Environmental, Social, Governance (TESG) sustainability performance, Control Variables)

3.6.1 Impact of Economic Sustainability Performance (ECON) on Cost of Capital(COC) by Employing System GMM

This study not only explore the overall impact of ECON on COC but also check the differential impact of different factors of ECON i.e. growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COC as well by employing system GMM.

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 GR_{j,i,t} + \beta_3 OP_{j,i,t} + \beta_4 RES_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t} + \beta_9 DLOSS_{j,i,t} + \beta_1 0 ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t} + \beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t} \quad (3.46)$$

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 LIQ_{j,i,t} + \beta_4 LEV_{j,i,t} + \beta_5 SIZE_{j,i,t} + \beta_6 ZMIG_{j,i,t} + \beta_7 DLOSS_{j,i,t} + \beta_8 ACC_{j,i,t} + \beta_9 BETA_{j,i,t} + \beta_{10} MSP_{j,t} + \beta_{11} GDP_{j,t} + \beta_{12} INF_{j,t} + \beta_{13} POP_{j,t} + \varepsilon_{j,i,t} \quad (3.47)$$

3.6.2 Impact of Economic Sustainability Performance (ECON) on Cost of Equity (COE) by Employing System GMM

This study not only explore the overall impact of ECON on COE but also check the differential impact of different factors of ECON i.e. growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COE as well by employing system GMM.

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 GR_{j,i,t} + \beta_3 OP_{j,i,t} + \beta_4 RES_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t} + \beta_9 DLOSS_{j,i,t} + \beta_1 0 ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t} + \beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t} \quad (3.48)$$

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 LIQ_{j,i,t} + \beta_4 LEV_{j,i,t} + \beta_5 SIZE_{j,i,t} + \beta_6 ZMIG_{j,i,t} + \beta_7 DLOSS_{j,i,t} + \beta_8 ACC_{j,i,t} + \beta_9 BETA_{j,i,t} + \beta_{10} MSP_{j,t} + \beta_{11} GDP_{j,t} + \beta_{12} INF_{j,t} + \beta_{13} POP_{j,t} + \varepsilon_{j,i,t} \quad (3.49)$$

3.6.3 Impact of Economic Sustainability Performance (ECON) on Cost of Debt (COD) by Employing System GMM

This study not only explore the overall impact of ECON on COD but also check the differential impact of different factors of ECON i.e. growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COD as well by employing system GMM.

$$\begin{aligned} COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 GR_{j,i,t} + \beta_3 OP_{j,i,t} + \beta_4 RES_{j,i,t} + \beta_5 LIQ_{j,i,t} \\ + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t} + \beta_9 DLOSS_{j,i,t} + \beta_1 0 ACC_{j,i,t} \\ + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t} + \beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t} \end{aligned} \tag{3.50}$$

$$\begin{aligned} COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 LIQ_{j,i,t} + \beta_4 LEV_{j,i,t} \\ + \beta_5 SIZE_{j,i,t} + \beta_6 ZMIG_{j,i,t} + \beta_7 DLOSS_{j,i,t} + \beta_8 ACC_{j,i,t} + \beta_9 BETA_{j,i,t} \\ + \beta_{10} MSP_{j,t} + \beta_{11} GDP_{j,t} + \beta_{12} INF_{j,t} + \beta_{13} POP_{j,t} + \varepsilon_{j,i,t} \end{aligned} \tag{3.51}$$

3.6.4 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Capital (COC) by Employing System GMM

This study not only explore the overall impact of TESG, a composite non-financial measure of sustainability performance on COC but also check the differential impact of different elements of TESG i.e. environmental (ENV), social (SOC) and governance (GOV) on COC by using system GMM.

$$\begin{aligned} COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 ENV_{j,i,t} + \beta_3 SOC_{j,i,t} + \beta_4 GOV_{j,i,t} + \\ \beta_5 ECON_{j,i,t-1} + \beta_6 LIQ_{j,i,t} + \beta_7 LEV_{j,i,t} + \beta_8 SIZE_{j,i,t} + \beta_9 ZMIG_{j,i,t} \\ + \beta_{10} DLOSS_{j,i,t} + \beta_{11} ACC_{j,i,t} + \beta_{12} BETA_{j,i,t} + \beta_{13} MSP_{j,t} + \beta_{14} GDP_{j,t} \\ + \beta_{15} INF_{j,t} + \beta_{16} POP_{j,t} + \varepsilon_{j,i,t} \end{aligned} \tag{3.52}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 TESG_{j,i,t} + \beta_3 ECON_{j,i,t-1} + \beta_4 LIQ_{j,i,t} + \beta_5 LEV_{j,i,t} + \beta_6 SIZE_{j,i,t} + \beta_7 ZMIG_{j,i,t} + \beta_8 DLOSS_{j,i,t} + \beta_9 ACC_{j,i,t} + \beta_{10} BETA_{j,i,t} + \beta_{11} MSP_{j,t} + \beta_{12} GDP_{j,t} + \beta_{13} INF_{j,t} + \beta_{14} POP_{j,t} + \varepsilon_{j,i,t} \quad (3.53)$$

3.6.5 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Equity (COE) by Employing System GMM

This study not only explore the overall impact of TESG, a composite non-financial measure of sustainability performance on COE but also check the differential impact of different elements of TESG i.e. environmental (ENV), social (SOC) and governance (GOV) on COE by using system GMM.

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 ENV_{j,i,t} + \beta_3 SOC_{j,i,t} + \beta_4 GOV_{j,i,t} + \beta_5 ECON_{j,i,t-1} + \beta_6 LIQ_{j,i,t} + \beta_7 LEV_{j,i,t} + \beta_8 SIZE_{j,i,t} + \beta_9 ZMIG_{j,i,t} + \beta_{10} DLOSS_{j,i,t} + \beta_{11} ACC_{j,i,t} + \beta_{12} BETA_{j,i,t} + \beta_{13} MSP_{j,t} + \beta_{14} GDP_{j,t} + \beta_{15} INF_{j,t} + \beta_{16} POP_{j,t} + \varepsilon_{j,i,t} \quad (3.54)$$

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 TESG_{j,i,t} + \beta_3 ECON_{j,i,t-1} + \beta_4 LIQ_{j,i,t} + \beta_5 LEV_{j,i,t} + \beta_6 SIZE_{j,i,t} + \beta_7 ZMIG_{j,i,t} + \beta_8 DLOSS_{j,i,t} + \beta_9 ACC_{j,i,t} + \beta_{10} BETA_{j,i,t} + \beta_{11} MSP_{j,t} + \beta_{12} GDP_{j,t} + \beta_{13} INF_{j,t} + \beta_{14} POP_{j,t} + \varepsilon_{j,i,t} \quad (3.55)$$

3.6.6 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Debt (COD) by Employing System GMM

This study not only explore the overall impact of TESG, a composite non-financial measure of sustainability performance on COD but also check the differential impact of different elements of TESG i.e. environmental (ENV), social (SOC) and governance (GOV) on COD by using system GMM.

$$COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 ENV_{j,i,t} + \beta_3 SOC_{j,i,t} + \beta_4 GOV_{j,i,t} + \beta_5 ECON_{j,i,t-1} + \beta_6 LIQ_{j,i,t} + \beta_7 LEV_{j,i,t} + \beta_8 SIZE_{j,i,t} + \beta_9 ZMIG_{j,i,t} + \beta_{10} DLOSS_{j,i,t} + \beta_{11} ACC_{j,i,t} + \beta_{12} BETA_{j,i,t} + \beta_{13} MSP_{j,t} + \beta_{14} GDP_{j,t} + \beta_{15} INF_{j,t} + \beta_{16} POP_{j,t} + \varepsilon_{j,i,t} \tag{3.56}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 TESG_{j,i,t} + \beta_3 ECON_{j,i,t-1} + \beta_4 LIQ_{j,i,t} + \beta_5 LEV_{j,i,t} + \beta_6 SIZE_{j,i,t} + \beta_7 ZMIG_{j,i,t} + \beta_8 DLOSS_{j,i,t} + \beta_9 ACC_{j,i,t} + \beta_{10} BETA_{j,i,t} + \beta_{11} MSP_{j,t} + \beta_{12} GDP_{j,t} + \beta_{13} INF_{j,t} + \beta_{14} POP_{j,t} + \varepsilon_{j,i,t} \tag{3.57}$$

3.6.7 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance (ECON) – Cost of Capital (COC) Relationship by Employing System GMM

This study has not only explored the overall relationship between ECON and COC but also studied the individual effect of different ECON factors namely growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COC by employing system GMM. Then, this study checked the overall impact of TESG on COC. The relationship between individual elements of TESG namely environmental (ENV), social (SOC) and governance (GOV) and COC is also explored in this study by controlling ECON. This study checked the moderating effect of TESG on ECON-COC relationship individually and in aggregate by employing system GMM.

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 ENV_{j,i,t} + \beta_4 SOC_{j,i,t} + \beta_5 GOV_{j,i,t} + \beta_6 ECON_{j,i,t} \times ENV_{j,i,t} + \beta_7 ECON_{j,i,t} \times SOC_{j,i,t} + \beta_8 ECON_{j,i,t} \times GOV_{j,i,t} + \beta_9 LIQ_{j,i,t} + \beta_{10} LEV_{j,i,t} + \beta_{11} SIZE_{j,i,t} + \beta_{12} ZMIG_{j,i,t} + \beta_{13} DLOSS_{j,i,t} + \beta_{14} ACC_{j,i,t} + \beta_{15} BETA_{j,i,t} + \beta_{16} MSP_{j,t} + \beta_{17} GDP_{j,t} + \beta_{18} INF_{j,t} + \beta_{19} POP_{j,t} + \varepsilon_{j,i,t} \tag{3.58}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 TESG_{j,i,t}$$
$$+\beta_4 ECON_{j,i,t} \times TESG_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t}$$
$$+\beta_9 DLOSS_{j,i,t} + \beta_{10} ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t}$$
$$+\beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t} \tag{3.59}$$

3.6.8 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance (ECON) – Cost of Equity (COE) Relationship by Employing System GMM

This study has not only explored the overall relationship between ECON and COE but also studied the individual effect of different ECON factors namely growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COE by employing system GMM. Then, this study checked the overall impact of TESG on COE. The relationship between individual elements of TESG namely environmental (ENV), social (SOC) and governance (GOV) and COE is explored in this study by controlling ECON. This study also checked the moderating effect of TESG on ECON-COE relationship individually and in aggregate by employing system GMM.

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 ENV_{j,i,t} + \beta_4 SOC_{j,i,t}$$
$$+\beta_5 GOV_{j,i,t} + \beta_6 ECON_{j,i,t} \times ENV_{j,i,t} + \beta_7 ECON_{j,i,t} \times SOC_{j,i,t}$$
$$+\beta_8 ECON_{j,i,t} \times GOV_{j,i,t} + \beta_9 LIQ_{j,i,t} + \beta_{10} LEV_{j,i,t} + \beta_{11} SIZE_{j,i,t} + \beta_{12} ZMIG_{j,i,t}$$
$$+\beta_{13} DLOSS_{j,i,t} + \beta_{14} ACC_{j,i,t} + \beta_{15} BETA_{j,i,t} + \beta_{16} MSP_{j,t} + \beta_{17} GDP_{j,t}$$
$$+\beta_{18} INF_{j,t} + \beta_{19} POP_{j,t} + \varepsilon_{j,i,t} \tag{3.60}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 TESG_{j,i,t}$$
$$+\beta_4 ECON_{j,i,t} \times TESG_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t}$$
$$+\beta_9 DLOSS_{j,i,t} + \beta_{10} ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t}$$
$$+\beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t} \tag{3.61}$$

3.6.9 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance (ECON)-Cost of Debt (COD) Relationship by Employing System GMM

This study has not only explored the overall relationship between ECON and COD but also studied the individual effect of different ECON factors namely growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COD by employing system GMM. Then, this study checked the overall impact of TESG on COD. The relationship between individual elements of TESG namely environmental (ENV), social (SOC) and governance (GOV) and COD is also explored in this study by controlling ECON. This study checked the moderating effect of TESG on ECON-COD relationship individually and in aggregate by employing system GMM.

$$\begin{aligned} COD_{j,i,t} &= \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 ENV_{j,i,t} + \beta_4 SOC_{j,i,t} \\ &+ \beta_5 GOV_{j,i,t} + \beta_6 ECON_{j,i,t} \times ENV_{j,i,t} + \beta_7 ECON_{j,i,t} \times SOC_{j,i,t} \\ &+ \beta_8 ECON_{j,i,t} \times GOV_{j,i,t} + \beta_9 LIQ_{j,i,t} + \beta_{10} LEV_{j,i,t} + \beta_{11} SIZE_{j,i,t} + \beta_{12} ZMIG_{j,i,t} \\ &+ \beta_{13} DLOSS_{j,i,t} + \beta_{14} ACC_{j,i,t} + \beta_{15} BETA_{j,i,t} + \beta_{16} MSP_{j,t} + \beta_{17} GDP_{j,t} \\ &+ \beta_{18} INF_{j,t} + \beta_{19} POP_{j,t} + \varepsilon_{j,i,t} \end{aligned} \tag{3.62}$$

$$\begin{aligned} COD_{j,i,t} &= \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 TESG_{j,i,t} \\ &+ \beta_4 ECON_{j,i,t} \times TESG_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t} \\ &+ \beta_9 DLOSS_{j,i,t} + \beta_{10} ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t} \\ &+ \beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t} \end{aligned} \tag{3.63}$$

Chapter 4

Results

4.1 Methodological Framework

This study is further processed to get comprehensive understanding about the impact of sustainability performance on cost of financing. Cost of financing means Cost of Capital (COC), Cost of Equity (COE) and Cost of Debt (COD). For this purpose, data is divided into different sections. We have reported ECON (financial) and cost of financing without using TESG (non-financial) sustainability performance. Then we report the effects of TESG sustainability performance on cost of financing. We have also explored that TESG (non-financial) sustainability performance strengthens the negative relationship between ECON and cost of financing.

4.2 Empirical Results

In this section, results of descriptive statistics, correlation and regression of six emerging economies for the period 2009-2018 are presented. These countries include Brazil, Russia, India, China, South Africa and Pakistan. Firstly, overall descriptive statistics are presented in sub section 4.2.1, which is followed by correlation in section 4.2.2, and country-wise descriptive statistics are presented in section 4.2.3.

4.2.1 Descriptive Analysis

Descriptive statistics tells us about the univariate summary statistic for different variables. Descriptive statistics includes basic details like maximum values, sample size, minimum values, standard deviation and mean values. Descriptive statistics of the current data are provided in Table 4.1. Table 4.1 tells us that sample size in this study is 3000 for all the dependent and independent variables.

Table 4.1: Descriptive Statistics of Emerging Economies Including Pakistan

Variable Name	**Mean**	**Std. Deviation**	**Mini**	**Max**
COC (percentage)	0.170	0.110	0.030	0.700
COD (percentage)	0.160	0.090	0.030	0.690
COE (percentage)	0.190	0.120	0.050	0.700
GR (number)	-0.020	1.020	-2.700	8.140
OP (number)	3.060	0.820	-3.320	8.150
RES (number)	0.030	1.070	-5.310	4.650
ECON (number)	1.030	0.620	-1.940	4.220
TESG (number)	8.180	1.370	4.000	11.000
ENV (number)	3.770	0.420	3.000	5.000
SOC (number)	2.120	0.990	0.000	4.000
GOV (number)	2.290	0.470	1.000	3.000
LIQU (ratio)	0.710	0.620	0.050	2.970
LEV (ratio)	0.240	0.140	0.040	0.898
SIZE (natural log)	12.420	2.340	3.880	21.240
Z-SCORE (number)	2.820	1.410	0.610	13.160
DLOSS (dummy variable)	0.880	0.320	0.000	1.000
ACCR (ratio)	-0.030	0.060	-0.180	0.190
BETA (ratio)	0.770	0.160	0.510	1.140
MSP (ratio)	12.120	5.230	-0.920	28.420
GDP (ratio)	2.720	3.600	-7.830	10.100
INF (ratio)	6.670	4.530	-0.210	24.460
POP (ratio)	151.090	152.710	8.720	454.950

This shows the overall descriptive statistics of BRICS countries including Pakistan. In this table, COC is the cost of capital, COD is the cost of debt, COE is the cost of equity, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance, TESG is the overall non-financial sustainability performance, ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governmental sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population.

Mean value explains about the average of each variable, whereas standard deviation represents how far the values are from the mean observed values. The results

reported in Table 4.1 show the mean values of COC, COD and COE are 17%, 16% and 19% respectively which are the cost of capital, cost of debt and cost of equity of the company. For company specific variables, mean value of operation efficiency (OP) and economic sustainability performance (ECON) are 3.06 and 1.03 respectively. These measures are used to capture the one dimension of sustainability performance i.e. ECON. Non-financial component of sustainability performance includes environmental sustainability performance (ENV), social sustainability performance (SOC), governance sustainability performance (GOV) and total sustainability performance (TESG).

The mean values of these variables are 3.77, 2.12, 2.29 and 8.18 respectively. Liquidity mean value is 0.71 which is low showing firms are in danger to meet their short term debt obligations. SIZE (natural log of Market value of equity), the proxy used to capture size of business. The mean value of size 12.42, the reason for such high value is the selection of firms. This study employed firms with higher market capitalization. The Standard deviation is 2.34 for this measure. The mean and standard deviation of Z-SCORE which is used as a bankruptcy measure (2.82, 1.41) respectively. The annual GDP per capita growth in emerging economies is reported with the mean and standard deviation value of 2.72 and 3.60 respectively. Inflation measure which is used to capture inflation in selected countries is 6.67 and 4.53 respectively.

4.2.2 Correlation Analysis

This section tells us about the correlation results between the variables used in this study. Correlation analysis defines the association between the independent variables of the study, it is also helpful in determining the multi-collinearity between the explanatory variables. Table 4.2 defines the outcomes of correlation analysis of the explanatory and control variables used in this study. The findings indicate the non-existence of multi-collinearity among the variables as the correlation coefficients of the variables lies below the threshold level of 0.70.

Table 4.2 displays the association between COC, COE, COD and Growth factor, Operation efficiency factor, Research effort factor, economic sustainability

disclosure, total environmental, social and governance sustainability, environmental sustainability, social sustainability, governance sustainability, liquidity, leverage, size, Z-score, Dloss, accruals, beta, money supply and GDP, inflation and population.

Correlation between Cost of Capital (COC) and Growth factor (GR), Operation efficiency factor (OP), Research effort factor (RES), economic sustainability performance (ECON), total environmental, social and governance sustainability (TESG), environmental sustainability (ENV), social sustainability (SOC), governance sustainability (GOV), liquidity (LIQU), leverage (LEV), size (SIZE), Z-score (ZSCORE), Dloss (DLOSS), accruals (ACCR), beta (BETA), money supply (MSP), GDP, inflation (INF) and population (POP) is -0.10, -0.09, -0.03, -0.02, -0.03, -0.01, -0.03, -0.02, 0.13, -0.14, 0.05, 0.02, -0.03, 0.02, 0.02, -0.10, 0.18, 0.05 and 0.08 respectively. It shows that COC has positive association with LIQU, SIZE, ACCR, BETA, MSP, GDP, INF, POP and negative association with GR, OP, RES, ECON, TESG, ENV, SOC, GOV, LEV, Z-SCORE and DLOSS.

Correlation between Cost of Debt (COD) and Growth factor (GR), Operation efficiency factor (OP), Research effort factor (RES), economic sustainability performance (ECON), total environmental, social and governance sustainability (TESG), environmental sustainability (ENV), social sustainability (SOC), governance sustainability (GOV), liquidity (LIQU), leverage (LEV), size (SIZE), Z-score (ZSCORE), Dloss (DLOSS), accruals (ACCR), beta (BETA), money supply (MSP), GDP, inflation (INF) and population (POP) is -0.15, -0.04, -0.02, -0.08, -0.04, -0.01, -0.03, -0.04, 0.21, -0.09, 0.17, -0.02, -0.07, 0.07, 0.01, 0.14, 0.19, 0.07 and -0.06 respectively. It shows that COD has positive association with LIQU, SIZE, ACCR, BETA, MSP, GDP, INF, POP and negative association with GR, OP, RES, ECON, TESG, ENV, SOC, GOV, LEV, Z-SCORE and DLOSS.

TABLE 4.2: Correlation matrix

	COC	COD	COE	GR	OP	RES	ECON	TESG	ENV	SOC	GOV	LIQU	LEV	SIZE	Z-SCORE	DLOSS	ACCR	BETA	MSP	GDP	INF
COC(t-1)																					
COD(t-1)	0.91**																				
COE(t-1)	0.98**	0.89**																			
GR	-0.10**	-0.15**	-0.02																		
OP	-0.09**	-0.04*	-0.10**	0.31**																	
RES	-0.03	-0.02	-0.03	-0.05	-0.04**																
ECON	-0.02	-0.08**	-0.04*	0.71**	0.59**	0.54**															
TESG	-0.03	-0.04	-0.01	0.03	0.04	0.03	.04*														
ENV	-0.01	-0.01	-0.02	-0.03	-0.01	0.02	-0.01	0.25**													
SOC	-0.03	-0.03	-0.03	0.05*	0.04*	0.01	0.05**	0.85**	-0.24**												
GOV	-0.02	-0.04	-0.02	0.09	0.07	-0.03	0.02	0.88**	0.36**	0.59**											
LIQU	0.13**	0.21**	0.08**	0.57**	0.42**	-0.07**	0.49**	0.03	-0.02	0.05**	0.01										
LEV	-0.14**	-0.09**	-0.03	-0.06**	0.01	-0.02	-0.04*	0.02	0.01	0.02	0.01	-.043*									
SIZE	0.05**	0.17**	-0.01	0.46**	.23**	0.12**	0.44**	-0.01	0.01	-0.02	-0.01	.345**	-0.05**								
Z-SCORE	-0.02	-0.02	-0.02	0.06**	0.02	0.06**	0.08**	0.02	0.04*	0.01	0.02	-0.02	0.08**	.108**							
DLOSS	-0.03	-0.07**	-0.01	0.05**	0.01	0.06**	0.02	0.03	0.02	0.02	0.02	-0.03	-0.05**	.141**	.049**						
ACCR	0.02	0.07**	0.02	0.05*	0.02	0.04*	0.06**	0.02	0.04	0.01	0.02	0.01	0.04*	.064**	.928**	.040*					
BETA	0.02	0.01	0.06**	0.44**	0.69**	-0.05**	0.48**	0.06**	0.01	0.07**	0.02	0.49**	0.01	.328**	0.03	0.02	0.03				
MSP	0.10**	0.14**	0.03	-0.34**	-0.14**	-0.03	-0.25**	-0.02	-0.01	-0.02	-0.02	-0.38**	0.07**	-.287**	-0.01	-0.01	-0.01	-0.25**			
GDP	0.18**	0.19**	0.23**	-0.18**	0.06**	0.06**	-0.05**	-0.01	0.01	-0.02	0.01	-0.39**	-0.05*	.063**	0.01	0.01	0.01	0.14**	0.28**		
INF	0.05**	0.07**	0.08**	-0.09**	-0.15**	-0.06**	-0.11**	-0.02	-0.01	-0.01	-0.02	0.01	0.02	-.193**	0.01	-0.03*	0.01	-0.39**	0.31**	-0.17**	
POP	0.08**	0.06**	0.16**	-0.16**	-0.34**	0.10**	-0.17**	-0.07**	0.01	-0.09**	-0.01	-0.43**	-0.13**	.123**	-0.01	-0.01	-0.01	-0.42**	0.11**	0.49**	-0.08**

Notes: n = 3000. COC, cost of capital; COD, cost of debt; COE, cost of equity; GR, growth factor, OP, operation efficiency factor, RES, research effort factor ;ECON, economic sustainability performance; TESG, total environmental, social and governance sustainability performance; ENV, environmental sustainability performance, SOC, social sustainability performance; GOV, governance sustainability performance; LIQU, liquidity; LEV, leverage; SIZE, size; Z-SCORE, zmijewski's z-score; DLOSS, dummy variable ; ACCR, Accruals; BETA, beta; MSP, money supply; GDP, gross domestic product ; INF, inflation; POP, population. The table presents the Pearson correlation coefficients between the cost of capital, cost of equity, cost of debt and the independent variables. $*p < 0.05, **p < 0.01; ***p < 0.001$.

Correlation between Cost of Equity (COE) and Growth factor (GR), Operation efficiency factor (OP), Research effort factor (RES), economic sustainability performance (ECON), total environmental, social and governance sustainability (TESG), environmental sustainability (ENV), social sustainability (SOC), governance sustainability (GOV), liquidity (LIQU), leverage (LEV), size (SIZE), Z-score (ZSCORE), Dloss (DLOSS), accruals (ACCR), beta (BETA), money supply (MSP), GDP, inflation (INF) and population (POP) is -0.02, -0.10, -0.03, -0.04, -0.01, -0.02, -0.03, -0.02, 0.08, -0.03, -0.01, -0.02, -0.01, 0.02, 0.06, 0.03, -0.23, 0.08 and 0.16 respectively. It shows that COE has positive association with LIQU, ACCR, BETA, MSP, GDP, INF, POP and negative association with GR, OP, RES, ECON, TESG, ENV, SOC, GOV, LEV, SIZE, Z-SCORE and DLOSS. These values are too low to create any problem of multi-collinearity as the correlation coefficients of the variables lies below the threshold level of 0.70.

4.2.3 Country-wise Descriptive Statistics

Mean, standard deviation, minimum and maximum values of variables used in each country are presented in Table 4.3 and 4.4 (Panel A & Panel B) with the sample size of 500 for each country for all dependent, independent and control variables. Mean value explains about the average of each variable, whereas standard deviation represents how far the values are from the mean observed values. Table 4.3 (Panel A) shows that the average cost of capital (COC) is highest for Pakistan (21%) as compared with Russia (16%) and India (12%) whereas average cost of debt (COD) in Pakistan and Russia is (16% and 15% respectively) which is higher than India (11%). Pakistan has the highest average cost of equity (23%) as compared with Russia (16%) and India (13%). The reason for higher cost of equity than cost of debt is the risk associated with funds. In case of liquidation, debt holders are preferred as compared with equity holders, therefore, they require risk premium for their supply of funds to the company. Standard deviation values of COC, COD and COE for Pakistan, India and Russia are (0.14, 0.05, and 0.02), (0.11, 0.04 and 0.01), (0.15, 0.05 and 0.01) respectively.

Highest average economic sustainability performance (ECON) is observed for India (1.14), followed by Russia (0.96) and Pakistan (0.83). Composite measure of

TABLE 4.3: Country Wise Descriptive Statistics of Emerging Economies Including Pakistan(Panel A)

Variable	Pakistan		India		Russia	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
COC (percentage)	0.210	0.140	0.120	0.050	0.160	0.020
COD (percentage)	0.160	0.110	0.110	0.040	0.150	0.010
COE (percentage)	0.230	0.150	0.130	0.050	0.160	0.010
GR (number)	-0.320	0.090	-0.290	0.320	-0.050	0.380
OP (number)	2.600	1.200	3.790	0.330	2.570	0.240
RES (number)	0.210	0.530	-0.070	1.030	0.370	0.840
ECON (number)	0.830	0.460	1.140	0.400	0.960	0.290
TESG (number)	8.260	1.330	8.280	1.330	8.020	1.450
ENV (number)	3.790	0.420	3.780	0.412	3.780	0.410
SOC (number)	2.170	1.010	2.190	1.010	1.950	0.920
GOV (number)	2.310	0.460	2.310	0.460	2.280	0.470
LIQU (ratio)	0.580	0.450	0.950	0.710	0.480	0.450
LEV (ratio)	0.280	0.110	0.250	0.140	0.200	0.120
SIZE (ratio)	11.770	1.780	11.780	2.130	14.150	1.400
Z-SCORE (number)	2.400	0.770	2.530	1.250	3.380	1.420
DLOSS (dummy)	0.870	0.340	0.870	0.330	0.990	0.080
ACCR (ratio)	-0.050	0.050	-0.050	0.050	-0.010	0.040
BETA (ratio)	0.960	0.090	0.860	0.090	0.810	0.180
MSP (ratio)	13.260	2.690	12.680	3.750	14.380	7.130
GDP (ratio)	1.880	1.400	5.760	1.130	0.750	3.750
INF (ratio)	9.650	6.290	5.710	2.770	8.770	6.540
POP (ratio)	251.050	15.980	432.890	15.210	8.770	0.040
N (Number)	500.000	500.000	500.000	500.000	500.000	500.000

This table shows the country-wise descriptive statistics of Pakistan, India and Russia. In this table, COC is the cost of capital, COD is the cost of debt, COE is the cost of equity, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance, TESG is the overall non-financial sustainability performance, ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governmental sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population.

environmental, social and governance (TESG) sustainability performance is highest for India (8.28) compared with Pakistan (8.26) and Russia (8.02). When we check the average value of individual components of non-financial sustainability performance, Pakistan has the highest environmental (ENV) and governance (GOV) sustainability performance (3.79 & 2.31) respectively whereas India has the highest social sustainability performance (2.19). The mean and standard deviation value of Z-Score which is the bankruptcy measure for Pakistan (Mean = 2.40, S.D = 0.77), India ((Mean = 2.53, S.D = 1.25), Russia (Mean = 3.38, S.D = 1.42).

Average leverage position of firms also shows that firms in Pakistan are most levered (0.28) as compared with India (0.25) and Russia (0.20). This means debt component is highest for Pakistani firms followed by Indian and Russian firms. Size (natural log of market value of equity) is highest for Russia (14.15), followed by India (11.78) and Pakistan (11.77). The higher values of size shows that firms are selected based on highest market capitalization. The mean and standard deviation value of money supply (a macro-economic variable) for Pakistan (Mean = 13.26, S.D = 2.69), India (Mean = 12.68, S.D = 3.75), Russia (Mean = 14.38, S.D = 7.13). Average GDP growth is highest for India (5.76) compared with Pakistan (1.88) and Russia (0.75). Inflation rate is highest in Pakistan (9.65), followed by Russia (8.77) and India (5.71).

Table 4.4 (Panel B) shows that the average cost of capital (COC) is highest for China (19%) as compared with South Africa (18%) and Brazil (14%) whereas average cost of debt (COD) in China is (18%) followed by South Africa (16%) and Brazil (8%). Brazil has the highest average cost of equity (21%) as compared with China (21%) and South Africa (19%). The reason for higher cost of equity than cost of debt is the risk associated with funds. In case of liquidation, debt holders are preferred as compared with equity holders, therefore, they require risk premium for their supply of funds to the company. Standard deviation values of COC, COD and COE for South Africa, Brazil and China are (0.13, 0.10, and 0.11), (0.12, 0.02 and 0.10), (0.13, 0.14 and 0.14) respectively.

Highest average economic sustainability performance (ECON) is observed for China (1.71), followed by Brazil (0.92) and South Africa (0.63). Composite measure of

environmental, social and governance sustainability performance (TESG) is highest for China (8.25) compared with Brazil (8.21) and South Africa (8.06). When we check the average value of individual components of non-financial sustainability performance, China has the highest environmental (ENV), social (SOC) and governance (GOV) sustainability performance (3.77, 2.18 & 2.29) respectively. The mean and standard deviation value of Z-Score which is the bankruptcy measure for South Africa (Mean = 3.12, S.D = 1.60), Brazil (Mean = 2.60, S.D = 1.54), China (Mean = 2.87, S.D = 1.44).

TABLE 4.4: Country Wise Descriptive Statistics of Emerging Economies Including Pakistan (Panel B)

Variable	**South Africa**		**Brazil**		**China**	
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
COC (percentage)	0.180	0.130	0.140	0.100	0.190	0.110
COD (percentage)	0.160	0.120	0.080	0.020	0.180	0.100
COE (percentage)	0.190	0.130	0.210	0.140	0.210	0.140
GR (number)	-0.540	0.380	-0.290	0.320	1.500	1.620
OP (number)	2.360	0.460	3.140	0.030	3.860	0.370
RES (number)	-0.240	1.420	-0.070	1.030	-0.210	0.750
ECON (number)	0.630	0.750	0.920	0.370	1.710	0.660
TESG (number)	8.060	1.460	8.210	1.320	8.250	1.310
ENV (number)	3.760	0.420	3.760	0.420	3.770	0.420
SOC (number)	2.020	0.980	2.160	1.030	2.180	0.990
GOV (number)	2.270	0.470	2.290	0.450	2.290	0.460
LIQU (ratio)	1.080	0.700	0.530	0.550	0.610	0.510
LEV (ratio)	0.190	0.120	0.270	0.160	0.250	0.150
SIZE (ratio)	10.410	1.260	11.580	2.130	14.840	1.610
Z-SCORE (number)	3.120	1.600	2.600	1.540	2.870	1.440
DLOSS (dummy)	0.760	0.420	0.870	0.330	0.910	0.280
ACCR (ratio)	-0.020	0.070	-0.040	0.050	-0.010	0.070
BETA (ratio)	0.560	0.040	0.690	0.070	0.710	0.010
MSP (ratio)	6.380	2.210	11.640	3.760	14.340	6.170
GDP (ratio)	0.050	1.310	0.430	3.220	7.400	1.380
INF (ratio)	5.810	1.270	7.110	1.640	2.940	2.770
POP (ratio)	44.600	2.050	24.140	0.620	145.040	2.630
N (Number)	500.000	500.000	500.000	500.000	500.000	500.000

This table shows the country-wise descriptive statistics of South Africa, Brazil and China. In this table, COC is the cost of capital, COD is the cost of debt, COE is the cost of equity, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance, TESG is the overall non-financial sustainability performance, ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governmental sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population.

Average leverage position of firms also shows that firms in Brazil are most levered (0.27) as compared with China (0.25) and South Africa (0.19). This means debt component is highest for Brazil firms followed by Chinese and South African firms. Size (natural log of market value of equity) is highest for China (14.84), followed by Brazil (11.58) and South Africa (10.41). The higher values of size shows that firms are selected based on highest market capitalization. The mean and standard deviation value of money supply (a macro-economic variable) for South Arica (Mean = 6.38, S.D = 2.21), Brazil ((Mean = 11.64, S.D = 3.76), China (Mean = 14.34, S.D = 6.17). Average GDP growth is highest for China (7.40) compared with Brazil (0.43) and China (0.05). Inflation rate is highest in Brazil (7.11), followed by South Africa (5.81)

4.2.4 Results of Exploratory Factor Analysis (EFA)

4.2.4.1 Communalities

A communality is the sum of the squared component loadings and represents the amount of variance in that variable accounted for by all the components. The amount of variance in each variable that can be explained by the retained factors is represented by the communalities after extraction. After extraction some of the factors are discarded and so some information is lost. This tells us that 89.2% of the variance associated with Tobin's Q is common or shared variance and so on.

Table 4.5: Communalities

Initial	Extraction
1	0.892
1	0.918
1	0.706
1	0.474
1	0.366
1	0.434
1	0.577

Extraction Method: Principal Component Analysis

4.2.4.2 KMO and Bartlett's Test

Kaiser (1974) recommended to accept values greater than 0.5 as acceptable. The value in this case is 0.537 which is acceptable as per criteria defined by Kaiser.

Bartlett's test needs to be significant. A significant test tells us that the R-matrix is not an identity matrix. Therefore, there are some relationships between the variables we hope to include in the analysis. In this study, Bartlett's Test is highly significant ($p < 0.000$), and therefore factor analysis is appropriate.

Table 4.6: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.537
Bartlett's Test of Sphericity	Approx. Chi-Square	5554.48
	Df	21
	Sig.	0.000

4.2.4.3 Total Variance Explained

This table explains the eigenvalues associated with each linear component (factor) before extraction, after extraction and after rotation. There were seven linear components within the data set before extraction. The eigenvalues associated with each factor represent the variance explained by that particular linear component. Factor 1, 2, 3 explains 30.381%, 17.132%, 14.869% of total variance respectively. The factors with eigenvalues greater than 1 are retained, therefore, only three factors are retained.

Table 4.7: Total Variance Explained

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
	Total	**% of Var**	**% of Cum**	**Total**	**% of Var**	**% of Cum**	**Total**	**% of Var**	**% of Cum**
1	2.127	30.381	30.381	2.127	30.381	30.381	2.068	29.545	29.545
2	1.199	17.132	47.513	1.199	17.132	47.513	1.255	17.926	47.471
3	1.041	14.869	62.381	1.041	14.869	62.381	1.044	14.91	62.381
4	0.966	13.796	76.177						
5	0.873	12.476	88.654						
6	0.695	9.925	98.579						
7	0.099	1.421	100						

Whereas, Var= Variance, Cum= Cumulative
Extraction Method: Principal Component Analysis

4.2.4.4 Component Matrix and Rotated Component Matrix

Component matrix contains the loadings of each variable onto each factor. This is the matrix before rotation. This matrix is not particularly important for interpretation. Rotated component matrix is the matrix of the factor loadings for each variable onto each factor. This matrix contains the same information as the component matrix except it is calculated after rotation. This matrix tells us that Tobin's Q (TOBINSQ) and MVBV are loaded as factor 1, ROE, SALES and SALESGR are loaded as factor 2 and RD and DIVIDOMS are loaded as factor 3.

TABLE 4.8: Component Matrix[a] and Rotated Component Matrix[b]

Variables	**Un-rotated Component Solution**[a]			**Rotated Component Solution**[b]		
	1	**2**	**3**	**1**	**2**	**3**
TOBINSQ	0.921	-0.21	0.011	0.944		
MVBV	0.942	-0.178	0.011	0.956		
ROE	-0.032	0.839	-0.026		0.8	
SALES	0.51	0.457	0.067		0.558	
SALESGR	0.288	0.415	-0.333		0.514	
RD	-0.132	-0.008	0.645			0.638
DIVIDOMS	0.175	0.196	0.713			0.733

In this table, TOBINSQ is the Tobin's Q, MBR is the market to book ratio, ROE is the return on equity, SALES is the sales scaled by total assets, SALESGR is the sales growth, RD is the research and development, DIVIDOMS is the dividend omission, a dummy variable

4.2.4.5 Construction of Economic Sustainability Performance (ECON)

ECON takes into account long term along-with short-term profitability while considering investment for future growth (Ng and Rezaee, 2015). It is the financial sustainability of firms. We have taken seven variables i.e. Tobin's Q (TOBINSQ), return on equity (ROE), sales scaled by total assets (SALES), sales growth (SALESGR), market value to book value (MVBV), Research and development (RD), dividend omissions (DIVIDOMS). By employing these variables, we capture measures of profitability (ROE and SALES), Growth measurement

(TOBINSQ, SALESGR and MVBV) and long-term profitability's investment (RD and DividendOms).

In order to determine organizational performance, a framework was developed by Hamann et al. (2013) and suggested different methods of creating organizational performance i.e. CFA, EFA, PCA and MTMM. We have performed Exploratory Factor Analysis (EFA) in order to employ small number of constructs used to capture elements of ECON which is consistent with previous studies (Larcker et al., 2007). We have retained components with loadings higher than 0.40 consistent with prior research (Larcker et al., 2007). Only three factors are retained which have eigenvalues greater than 1.

These factors explain majority of variances (over 62%). We have further used varimax orthogonal rotation in order to minimize number of variables and assigned indicators which are related to each factor and grouped MVBV and TOBINSQ as growth factor at time t (GR), and SALES, ROE and SALESGR is grouped as Operation efficiency factor at time t (OP) and RD and DIVIDOMS is grouped as research effort factor at time t (RES). These three factors are used as proxies for economic sustainability performance (ECON).

4.3 Impact of Business Sustainability Performance on Cost of Financing (Cost of Capital (COC), Cost of Equity (COE) and Cost of Debt (COD))

When we apply statistical models to panel data, there are two issues which arise. First is related to incorrectly specified test statistics (overstated t statistics) due to firm fixed effects that drive time series correlation and year specific fixed effects that drive cross sectional correlation (Gow et al., 2010). There are two methodologies used in previous research to overcome this problem. First is related to the use of regressions with fixed effects at industry/firm and year levels as used in the previous research (Ng and Rezaee, 2015). We have also controlled fixed effects of

years and industries in this study. Cost of financing means cost of capital (COC), cost of equity (COE) and cost of debt (COD) in this study.

The second problem is of endogeneity. Cost of financing may be affected by sustainability performance. However, at the same time, Cost of financing and measures of sustainability performance could be jointly determined by other factors. Endogeneity may be caused by reverse causality or omitted variables. Our results may be guided by omitted variables that may be correlated with sustainability performance (financial and non-financial) and cost of financing. Therefore, when we omit these variables, it may lead to biases in the coefficients of CSR (Dahiya and Singh, 2020). The results may be influenced by reverse causality. This means choice of company to engage in social activities may not be independent of COC.

This study has addressed this issue by employing system generalized method of moments (System GMM) following (Dahiya and Singh, 2020). Following El Ghoul et al. (2011); Dahiya and Singh (2020), this study estimated the dynamic panel model by employing system GMM. The Blundell-Bond / Arellano-Bover estimator helps in obtaining unbiased and efficient estimates in case of short dynamic panels, which have lagged endogenous variables as an explanatory variable. In order to serve this purpose, this study includes the lagged values of Cost of financing in the regression models.

4.3.1 Impact of Economic Sustainability Performance (ECON) on Cost of Equity (COE)

This study has examined the impact of ECON on COE individually and in aggregate. The model in this study is based on the equation 3.9 & 3.10 which tests the impact of ECON on COE, after controlling industry and fixed year effects. This study has not only explored the integrated impact of ECON (an equally weighted index) on COE (equation 3.10) but also checked the differential impact of different components of ECON including growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COE (equation 3.9).

$$COE_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 OPj, i, t-1 + \beta_3 RES_{j,i,t-1} + \beta_4 LIQ_{j,i,t_{-1}}$$
$$+\beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1}$$
$$+\beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1}$$
$$+\beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1}$$
$$+\beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1}$$
$$+\beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t}$$

Where

$COE_{j,i,t}$ Industry adjusted EP (IndEP) ratio in percent - Difference between firm's EP and the median industry EP ratio in year t, according to the FF 49 industry classification;

$GR_{j,i,t-1}$ Economic dimension of sustainability performance - Growth factor

$OP_{j,i,t-1}$ Economic dimension of sustainability performance - Operation factor

$RES_{j,i,t-1}$ Economic dimension of sustainability performance - Research factor

$ECON_{j,i,t-1}$ Summary of economic dimension of sustainability performance - Equally Weighted Average of GRt, OPt, and RESt.

$LIQ_{j,i,t-1}$ Liquidity measure, equals to common shares traded during fiscal year divided by number of total shares outstanding;

$LEV_{j,i,t-1}$ Ratio of total debt to total assets

$SIZE_{j,i,t-1}$ Natural logarithm of market value of equity

$ZMIJ_{j,i,t-1}$ Probability of bankruptcy proxied by Zmijewski's Z-score = -4.3 to 4.5 × net income/total assets 5.7 × total debt/total assets - 0.004 × current assets/current liabilities

$BETA_{j,i,t-1}$ Beta calculated using the market model

$DLOSS_{j,i,t-1}$ Dummy variable; equals 1 when net income is less than 0 and 0 otherwise;

$ACCL_{j,i,t-1}$ Scaled total accruals, calculated as the difference between net income and operating cash flows, scaled by the average asset of year t and t1.

$MSP_{j,t-1}$ MSP is the measure of money supply and is proxied by broad money

growth

$GDP_{j,t-1}$ GDP is the per capita GDP growth rate

$INF_{j,t-1}$ INF is an indicator of inflation measured with GDP deflator

$POP_{j,t-1}$ POP is the measure of population. Population density is midyear population divided by land area in square kilometers

The results of equations 3.9 & 3.10 are reported in Table 4.9 where COE is used as a dependent variable. The commonly used form of the equations 3.9 & 3.10 are depicted above. The results show that operation efficiency (OP) and research effort factor (RES) are negatively related with COE whereas there is no relation between growth factor (GR) and COE (Model 1, 2 and 3). Therefore, Hypothesis 1b and 1c is accepted. Firms with higher operational efficiency and more research effort are associated with lower funding costs while firm's growth has nothing to do with its funding costs. The possible reason for the reduction of funding costs is firms that operate more efficiently and invest more in research are associated with lower cost of financing. This study found the insignificant relationship between growth factor and cost of financing. The possible reason for such insignificant relationship is that market prices are not true representative of company's fundamentals. When we include growth factor (GR), operation efficiency (OP) and research effort factor (RES) simultaneously (Model 4), the results shown by Model (1) to (3) are still effective. In case of combining proxies of (GR), (OP) and (RES) into ECON (an equally weighted index), the significant negative relationship remains intact (Model 5). Therefore, Hypothesis 1 is accepted. The results are in-line with the findings of previous research (Hou et al., 2012; Ng and Rezaee, 2015; Gode and Mohanram, 2003). Ng and Rezaee (2015) explored that ECON sustainability performance creates opportunities to identify and correct operational in-efficiencies and financial and reputational risks that would resultantly enhance economic performance and decreases the COE.

It is further argued that ECON measured by market and financial performance negatively related with COC (Hou et al., 2012; Gode and Mohanram, 2003). The results show that strong operating efficiency (OP) and research effort (RES) decrease COE whereas growth factor (GR) is not related to COE. Previous research

also documented that COC is affected differently by different components of ECON (Ng and Rezaee, 2015). They have also explored that there exists negative relation between research effort (RES) and COE in their study.

This study uses company level control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual and macroeconomic control variables including Money Supply, GDP, Inflation and Population. In line with Hou et al. (2012); El Ghoul et al. (2011); Ng and Rezaee (2015); Gonçalves et al. (2022) company specific control variables are selected and are related with different types of risk. Hou et al. (2012); Ng and Rezaee (2015) found an inverse relation between beta and COE. As per CAPM, there exists positive relation between beta and COE. Prior research also complements the positive relation between beta and COE ((Gonçalves et al., 2022; El Ghoul et al., 2011). The reason for such a relationship is provided as firms with higher level of systematic risk are charged with higher COC (El Ghoul et al., 2011). This study also explored the positive relation between beta and COE which is consistent with the findings of prior research (Gonçalves et al., 2022; Hail and Leuz, 2006; Dahiya and Singh, 2020; El Ghoul et al., 2011).

Size is calculated as natural log of market value of equity in this study. Fama and French (1993) proved that there exists negative relationship between firm's size and COE. Dahiya and Singh (2020) explained that due to more analyst coverage available for larger firms, more information is available with the investors. Bowen et al. (2008) also pointed out that information asymmetry problem is addressed, due to increase attention, therefore, risk is decreased and COE also reduces for large firms. Interestingly, we have found the positive relationship between firm size and COE. One possible explanation in this regard is the choice of firms with large market capitalization. All the large firms in size does not provide the true differentiation between large and small firms. The results are consistent with the findings of previous research (Li and Liu, 2018; Gonçalves et al., 2022; Breuer et al., 2018).

Leverage is used as a ratio of total debt divided by total assets. Modigliani and Miller (1958) explained that COE increases due to higher leverage ratio, assuming

no transaction costs or no taxes. Fama and French (1993) pointed out that higher levered firms provide higher stock returns. Dahiya and Singh (2020) pointed out that higher leverage ratio tells us that there is solvency issue in the long run, which means investors are exposed to greater risk. To get compensation for greater risk, higher rate of return is demanded by investors. Therefore, positive relation between leverage and COE is expected. In line with the results of Gonçalves et al. (2022); Gode and Mohanram (2003); Hail and Leuz (2006); El Ghoul et al. (2011), this study also explored the positive relationship between leverage and COE.

Breuer et al. (2018) employed Z-Score as a proxy of default risk. This study explored the negative relation between Z-Score and COE because Z-Score is the measure of firm's financial strength. The higher the Z-Score, the lower is the financial distress / default risk. However, there are studies which found the opposite relationship between Z-Score and COE (Ng and Rezaee, 2015) or inconclusive about the relationship (Breuer et al., 2018). Bui et al. (2020) employed macroeconomic variables to minimize the probability of model misspecification which may arise due to country differences. Hail and Leuz (2006) explored that there can be misleading results by making simple comparisons across the countries. The plausible reason provided was they don't control for various factors which are known to affect company's COC. Therefore, this study included country factors along with number of risks factors before going towards variables of interest.

The macroeconomic variables employed in this study are Inflation, GDP growth, Money supply and Population. This study explored the positive relationship between Inflation and COE because when there is an increase in inflation, there will be increase in real rate of return and inflation will be added in real rate of return which ultimately increase COE. Moreover, stock prices, analyst forecasts and book values are stated in local currency and in nominal terms, which means that resultant estimates should reveal expected rates of inflation in their relevant countries (Breuer et al., 2018; Hail and Leuz, 2006).

This study also explored that Money supply and COE is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COE. Prior research employed GDP per capita and GDP growth rate to control for economic

TABLE 4.9: Impact of Economic Sustainability Performance (ECON) on Cost of Equity (COE)

	(1) COE	**(2) COE**	**(3) COE**	**(4) COE**	**(5) COE**
GR	0.005			0.005	
	(0.0050)			(0.0050)	
OP		-.026**		-.025**	
		(0.0120)		(0.0110)	
RES			-.011***	-.011***	
			(0.0040)	(0.0040)	
ECON					-.024***
					(0.0080)
SIZE	.005**	.005**	.006***	.006***	.006***
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
Z-SCORE	-.005***	-.005**	-.004**	-.004**	-.004**
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
BETA	.05***	.049***	.05***	.05***	.042***
	(0.0200)	(0.0100)	(0.0200)	(0.0200)	(0.0100)
MSP	.004***	.004***	.004***	.004***	.004***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
GDP	.003**	.004**	.003***	.004**	.003***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
INF	.003***	.002***	.002***	.003***	.002***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
LEV	.024*	.022*	0.019	0.021	0.017
	(0.0140)	(0.0130)	(0.0130)	(0.0130)	(0.0140)
POP	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
DLOSS	-0.024	-0.023	-0.025	-0.022	-0.024
	(0.0040)	(0.0030)	(0.0040)	(0.0040)	(0.0030)
ACCR	0.037	0.034	0.027	0.029	0.026
	(0.0320)	(0.0320)	(0.0320)	(0.0310)	(0.0320)
LIQU	0.026	0.026	0.027	0.028	0.027
	(0.0230)	(0.0230)	(0.0230)	(0.0230)	(0.0230)
CONS	-31.609***	-31.418***	-31.789***	-31.647***	-31.649***
	(1.1810)	(1.1750)	(1.1850)	(1.1940)	(1.1670)
Observations	2665	2665	2665	2665	2665
F-Stat	65.16***	66.64***	64.71***	56.52***	67.13***
R-squared	0.448	0.45	0.451	0.453	0.45

Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) countries including Pakistan. In this table, COE is the cost of equity, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

development of a respective country (Breuer et al., 2018). We have also found the significant positive relationship between GDP growth rate and COE in this study which is in line with the findings of prior literature (Breuer et al., 2018). The possible reason for such relationship is that GDP growth is connected with demand of funds. High growth rate means high demand of funds which will ultimately increase the COE.

4.3.2 Impact of Economic Sustainability Performance (ECON) on Cost of Debt (COD)

This study has examined the impact of ECON on COD individually and in aggregate. The model in this study is based on the equation 3.14 & 3.15 which tests the impact of ECON on COD, after controlling industry and fixed year effects. This study has not only explored the integrated impact of ECON on COD (equation 3.15) but also checked the differential impact of different components of ECON including growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COD (equation 3.14).

$$COD_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 OPj, i, t-1 + \beta_3 RES_{j,i,t-1} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t}$$

Where $COD_{j,i,t}$ Realized Cost of Debt – ratio of firm's interest expense in year t+1 to average interest-bearing debt outstanding in year t and t+1

The results of equations 3.14 & 3.15 are reported in Table 4.10 where COD is used as a dependent variable. The commonly used form of the equations 3.14 & 3.15 are depicted above. The results show that operation efficiency (OP) and research effort factor (RES) are negatively related with COD whereas there is no

relation between growth factor (GR) and COD (Model 1, 2 and 3). Therefore, Hypothesis 4b and 4c is accepted. When we include growth factor (GR), operation efficiency (OP) and research effort factor (RES) simultaneously (Model 4), the results shown by Model (1) to (3) are still effective. In case of combining proxies of (GR), (OP) and (RES) into ECON (the equally weighted index), the significant negative relationship remains intact (Model 5). The results show that strong operation efficiency (OP) and research effort (RES) reduces COD whereas growth factor (GR) is not related to COD. Moreover, when we combine these factors (GR, OP & RES) into ECON (an equally weighted Index), the significant negative relation remains intact which means ECON significantly reduces COD. Therefore, Hypothesis 4 is accepted.

This study employs company level control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual. The control variables used in this study are in line with previous studies (Gonçalves et al., 2022; Suto and Takehara, 2017; Ng and Rezaee, 2012; Magnanelli and Izzo, 2017; Yeh et al., 2020; Bhuiyan and Nguyen, 2019). Attig et al. (2013) pointed out that firm's systematic risk has an adverse effect on default probability and creditworthiness, therefore, having an impact on COD. Gonçalves et al. (2022) found the positive relationship indicating that with higher systematic risk, COD increases. This study explored positive relation between size and COD. The results drawn in this study complements the international evidence, where beta is showing positive relationship with COD (Gonçalves et al., 2022).

Size is computed as natural logarithm of firm's market value of equity in this study. Goss and Roberts (2011) were of the view that large firms are considered less risky, because these firms can provide more collateral as compared with small firms. The other argument advocates that negative events impact on larger firm's cash flows is lower as compared with smaller firms which ultimately decreases default risk of larger firms. Drempetic et al. (2020) also pointed out that firm size is relevant in ESG context. Goss and Roberts (2011); Gonçalves et al. (2022); Sharfman and Fernando (2008) found the negative relationship between size and COD. In this study, we have also observed negative relationship between size and COD. Liquidity which is used as a control for liquidity risk shows the significant

positive relation with COD which complements the results of previous literature (Gonçalves et al., 2022; La Rosa et al., 2018).

Goss and Roberts (2011) explained that default risk increase with leverage. On the other hand, Ye and Zhang (2011) pointed out that leverage may be linked with higher creditworthiness, providing a lower COD. Gonçalves et al. (2022) found a negative relationship between leverage and COD citing the reason as firms which are more creditworthy can take on more leverage. No significant relation exists as per results of this study between leverage and COD in the context of BRICS

economies including Pakistan. This supports the results of Ng and Rezaee (2012) citing the reason that realized cost of debt may be a noisy proxy (Pittman and Fortin, 2004).

Macroeconomic variables used in this study are Money supply, Inflation, GDP growth and Population. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries. Hail and Leuz (2006) explored that there is no control for various factors which affect firm's COC. Therefore, macroeconomic variables are also included in this study.

This study found that Money supply and COD is positively related because money supply creates liquidity in short term which translates into inflation. Increase in money supply means increase in inflation which increase the COD. GDP growth rate and COD have the significant positive relation which complements the prior literature (Breuer et al., 2018). Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. GDP growth is linked with demand of funds. High growth shows high demand which enhances COD. Inflation is also having significant positive relation with COD. The reason for such relation is that when there is increase in inflation, real rate of return will increase and inflation is added in real rate of return ultimately raises COD. Hail and Leuz (2006); Breuer et al. (2018) explained that stock prices, analyst forecasts and book values are stated in local currency and in nominal terms, which means that resultant estimates should reveal expected rates of inflation in their relevant countries.

Table 4.10: Impact of Economic Sustainability Performance (ECON) on Cost of Debt (COD)

	(1) COD	**(2) COD**	**(3) COD**	**(4) COD**	**(5) COD**
GR	0.002			0.002	
	(0.0050)			(0.0050)	
OP		-.028**		-.028**	
		(0.0110)		(0.0110)	
RES			-.011***	-.011***	
			(0.0020)	(0.0020)	
ECON					-.027***
					(0.0060)
LIQU	.113***	.111***	.114***	.112***	.112***
	(0.0400)	(0.0400)	(0.0400)	(0.0390)	(0.0400)
SIZE	-.001*	-.002*	-.001*	-.002*	-.001**
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
BETA	.043***	.048***	.064***	.045***	.05***
	(0.0100)	(0.0100)	(0.0200)	(0.0100)	(0.0200)
MSP	.004***	.005***	.004***	.005***	.004***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
GDP	.007***	.007***	.007***	.007***	.007***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
INF	.004***	.005***	.004***	.005***	.004***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
POP	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.0030)	(0.0030)	(0.0030)	(0.0030)	(0.0030)
DLOSS	-0.03	-0.03	-0.03	-0.029	-0.03
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)
LEV	0.007	0.006	0.001	0.002	-0.001
	(0.0120)	(0.0110)	(0.0110)	(0.0110)	(0.0120)
Z-SCORE	-0.001	-0.001	-0.0003	-0.0004	0.0001
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
ACCR	-0.0004	-0.002	-0.01	-0.01	-0.013
	(0.0210)	(0.0210)	(0.0210)	(0.0210)	(0.0220)
CONS	-28.112***	-27.875***	-28.294***	-28.087***	-28.128***
	(1.2190)	(1.1990)	(1.2240)	(1.2170)	(1.2030)
Observations	2215	2215	2215	2215	2215
F-Stat	59.77***	60.72***	58.68***	50.99***	60.03***
R-squared	0.632	0.637	0.637	0.642	0.637

Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) countries including Pakistan. In this table, COD is the cost of debt, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

4.3.3 Impact of Economic Sustainability Performance (ECON) on Cost of Capital (COC)

This study has examined the impact of ECON on COC individually and in aggregate. The model in this study is based on the equations 3.4 & 3.5 which tests the impact of ECON on COC, after controlling industry and fixed year effects. This study has not only explored the integrated impact of ECON on COC (equation 3.5) but also checked the differential impact of different components of ECON including growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COC (equation 3.4).

$$COC_{j,i,t} = \beta_0 + \beta_1 GR_{j,i,t_{-1}} + \beta_2 OPj, i, t-1 + \beta_3 RES_{j,i,t-1} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t_{-1}} + \beta_2 LIQ_{j,i,t_{-1}} + \beta_3 LEV_{j,i,t_{-1}} + \beta_4 SIZE_{j,i,t-1} + \beta_5 ZMIG_{j,i,t-1} + \beta_6 DLOSS_{j,i,t-1} + \beta_7 ACC_{j,i,t-1} + \beta_8 BETA_{j,i,t-1} + \beta_9 MSP_{j,t-1} + \beta_{10} GDP_{j,t-1} + \beta_{11} INF_{j,t-1} + \beta_{12} POP_{j,t-1} + \varepsilon_{j,i,t}$$

Where

$COC_{j,i,t}$ Weighted Average Cost of Capital

The results of equations 3.4 & 3.5 are reported in Table 4.11 where COC is used as a dependent variable. The commonly used form of the equations 3.4 & 3.5 is depicted above. This study examines the impact of ECON on COC individually by including growth factor, operation efficiency and research effort factor (GR, OP and RES) in the model separately (Model 1 to 3). Results depict that operation efficiency and research effort factor (OP and RES) are significantly and negatively related to COC (coefficients of OP and RES are significant and negative in Model 2 and 3 respectively). Therefore, Hypothesis 7b and 7c is accepted. However, coefficient of growth factor (GR) is not significant in Model 1. Model 4 include the growth factor, operation efficiency and research effort factor (GR, OP and RES) simultaneously in order to investigate the relative impact of different factors

of ECON. Results show that once growth factor, operation efficiency and research effort factor (GR, OP and RES) are included in the model simultaneously, the conclusions drawn from Model 1 to 3 are still valid. This study includes ECON (an equally weighted index) as a proxy for economic sustainability in Model 5, and the coefficient for ECON is significant and negative at 1% significance level. Therefore, Hypothesis 7 is accepted.

This study uses company level control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual. The control variables used in this study are consistent with previous studies (Suto and Takehara, 2017; Atan et al., 2018; Gholami et al., 2022). Higher beta values indicate charge of higher rate of return by investors for compensating uncertain realization of stock returns. In line with the results of previous studies, this study also found a positive relation between beta and COC (Mariani et al., 2021). Liquidity which is a measure to control liquidity risk, also positively related to COC which complements the results of prior research (Gholami et al., 2022). Ge and Liu (2015); Fonseka et al. (2019) explored that higher the Z-Score, the lower the financial distress. It is employed to check the financial distress and it decreases the default risk. Moreover, it captures the firm's financial strength. This study has found that Z-Score and COC are significantly negative related.

Size is computed as natural logarithm of firm's market value of equity in this study. Gholami et al. (2022); Wong et al. (2021) explored the positive relation between size and COC. Drempetic et al. (2020) also pointed out that firm size is relevant in ESG context. It is explained that impact of negative events on larger firm's cash flows is lower as compared with smaller firms which ultimately decreases default risk of larger firms. Large firms are considered less risky, because these firms can provide more collateral as compared with small firms (Goss and Roberts, 2011). Atan et al. (2018) explored that large firms enjoy lower COC and found significant negative relationship between size and COC. This study found the significant positive relation of size with COC. The possible reason for such relationship is the choice of firms which are selected on the basis of higher market capitalization and the findings are consistent with the finding of (Wong et al., 2021; Gholami et al., 2022).

Macroeconomic variables used in this study are Money supply, Inflation, GDP growth and Population. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. Hail and Leuz (2006) explored that there can be confusing results in case of making simple comparisons across different countries and there is no control for various factors which affect firm's COC. Therefore, macroeconomic variables are also included in this study.

GDP growth rate and COC have the significant positive relation which complements the prior literature (Breuer et al., 2018). Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. GDP growth is linked with demand of funds. High growth shows high demand which enhances COC. This study found that Money supply and COC is positively related because money supply creates liquidity in short term which translates into inflation. Increase in money supply means increase in inflation which increase the COC. Inflation is also having significant positive relation with COC. The reason for such relation is that when there is increase in inflation, real rate of return will increase and real rate of return ultimately adds the impact of inflation in it, which rises COC. Hail and Leuz (2006); Breuer et al. (2018) explained that stock prices, analyst forecasts and book values are stated in local currency and in nominal terms, which means that resultant estimates should reveal expected rates of inflation in their relevant countries

4.3.4 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Equity (COE)

This study employed the different models which are based on equation 3.24 & 3.25 and tests the impact of environmental, social and governance (TESG), a non-financial sustainability performance measure on COE individually and in aggregate after controlling industry and year fixed effects. This study also controlled the impact of ECON while checking the relationship between TESG and COE. This study has not only explored the integrated impact of TESG on COE (equation 3.25) but

TABLE 4.11: Impact of Economic Sustainability Performance (ECON) on Cost of Capital (COC)

	(1) COC	**(2) COC**	**(3) COC**	**(4) COC**	**(5) COC**
GR	0.006			0.006	
	(0.004)			(0.004)	
OP		-.025***		-.024***	
		(0.008)		(0.008)	
RES			-.011***	-.011***	
			(0.002)	(0.002)	
ECON					-.022***
					(0.005)
LIQU	.083***	.081***	.083***	.082***	.082***
	(0.029)	(0.028)	(0.028)	(0.028)	(0.028)
Z-SCORE	-.003**	-.002*	-0.001	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SIZE	.005**	.006**	.004***	.006***	.005***
	(0.002)	(0.002)	(0.001)	(0.002)	-0.002
BETA	.041***	.034***	.057***	.04***	.055***
	(0.011)	(0.01)	(0.021)	(0.01)	(0.021)
MSP	.004***	.004***	.004***	.004***	.004***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
GDP	.007***	.007***	.007***	.007***	.007***
	(0.001)	(0.001)	(0.0005)	(0.001)	(0.0005)
INF	.004***	.004***	.004***	.004***	.004***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
DLOSS	0.022	0.021	0.022	0.021	0.021
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
POP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
LEV	-0.001	-0.002	-0.007	-0.005	-0.009
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
ACCR	0.029	0.026	0.017	0.019	0.016
	(0.019)	(0.019)	(0.019)	(0.018)	(0.019)
CONS	-28.145***	-27.908***	-28.301***	-28.146***	-28.129***
	(0.686)	(0.663)	(0.666)	(0.643)	(0.669)
Observations	2215	2215	2215	2215	2215
F-Stat	197.55***	205.19***	210.03***	188.17***	206.40***
R-squared	0.739	0.743	0.744	0.749	0.742

Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. In this table, COC is the cost of capital, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance , LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

also checked the differential impact of different components of TESG namely environmental (ENV), social (SOC) and governance (GOV) on COE (equation 3.24) after controlling ECON.

$$COE_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 SOC_{j,i,t-1} + \beta_3 GOV_{j,i,t-1} + \beta_4 ECON_{j,i,t-1} + \beta_5 LIQ_{j,i,t_{-1}} + \beta_6 LEV_{j,i,t_{-1}} + \beta_7 SIZE_{j,i,t-1} + \beta_8 ZMIG_{j,i,t-1} + \beta_9 DLOSS_{j,i,t-1} + \beta_{10} ACC_{j,i,t-1} + \beta_{11} BETA_{j,i,t-1} + \beta_{12} MSP_{j,t-1} + \beta_{13} GDP_{j,t-1} + \beta_{14} INF_{j,t-1} + \beta_{15} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 TESG_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t}$$

Where

$ENV_{j,i.t-1}$ Environmental dimension of sustainability performance: Number of environmental strengths minus number of environmental concerns;

$SOC_{j,i.t-1}$ Social dimension of sustainability performance: Number of social strengths minus number of social concerns;

$GOV_{j,i.t-1}$ Governance dimension of sustainability performance: Number of governance strengths minus number of governance concerns;

$TESG_{j,i.t-1}$ Summary of ESG dimension of sustainability performance: Number of total strengths minus number of total concerns

The results of equations 3.24 & 3.25 are reported in Table 4.12 where COE is used as a dependent variable. The commonly used form of the equations 3.24 & 3.25 is depicted above. Model 1 to 3 shows the relation of environmental, social and governance (ENV, SOC and GOV) sustainability performance with COE individually after controlling ECON (an equally weighted index). Results show that coefficients of ENV and GOV sustainability performance are significantly negative in model 1 and 3 which shows that environmental (ENV) and governance (GOV) sustainability performance is negatively related with COE. Therefore, Hypothesis 2a and 2c is accepted. However, social (SOC) sustainability performance does

not show any significance with COE (Model 2). This means that strong social (SOC) initiatives does not result in lowering COE. Our results related to governance (GOV) sustainability performance are in line with the results of previous research (Bebchuk et al., 2013).

While employing ENV, SOC, and GOV sustainability performance simultaneously into the model, it shows that the conclusions drawn while using ENV, SOC, and GOV individually in the models (Model 1 to 3) still exists. To be precise, ENV and GOV sustainability performance inversely impact COE (Model 4). The possible reasons for negative relationships are the reduction of environmental liabilities related to environmental initiative or the enhancement of the governance measures effectiveness. Social sustainability performance requires additional resources and does not directly create value for shareholders. There is also time to spend for social cause by the companies so that market price it and ultimately cost of financing is reduced. The reason for environmental (ENV) and governance (GOV) significant impact is that by reducing environmental liabilities or improving the effectiveness of measures of corporate governance, there comes a straight impact on financial performance. Moreover, social (SOC) sustainability performance does not straightly generate shareholder value, therefore, this measure is not directly related to cost of financing. The results are in-line with the findings of prior literature (Gupta, 2018; Cheng et al., 2006; Shad et al., 2020; Plumlee et al., 2015; Ng and Rezaee, 2015; Chen et al., 2009; Pham et al., 2012). The results confirm the findings of Gupta (2018) that improvement in environmental practices leads to reduction of the implied COE. Most of the benefits come from reduction of emission and unnecessary wastage of resources. The possible reason for insignificant relationship between social (SOC) sustainability performance and COE is provided by Ng and Rezaee (2015) that it may require additional resources. However, does not directly create value for shareholders and therefore, is not directly linked to COE. Previous literature also confirms that strong governance and greater financial transparency reduces the COE (Cheng et al., 2006).

Model 5 which includes composite measure (TESG) as a proxy for non-financial sustainability performance also provides significant and negative relationship with COE at 10% significance level. Therefore, Hypothesis 2 is accepted.

The results complement the findings of past studies (Gonçalves et al., 2022; Ng and Rezaee, 2015; El Ghoul et al., 2011; Hmaittane et al., 2019; Dhaliwal et al., 2011). Non-financial sustainability performance reduces the COE because of the strong environmental and governance mechanisms directly affecting firm's financial performance either by enhancing the effectiveness of governance measures in the case of governance (GOV) sustainability performance or by reducing environmental liabilities in the case of environmental initiatives.

Following El Ghoul et al. (2011); Hou et al. (2012); Ng and Rezaee (2015); Gonçalves et al. (2022), this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. This study explored the positive relation between beta and COE which is consistent with the findings of prior research (Gonçalves et al., 2022; Hail and Leuz, 2006; Dahiya and Singh, 2020; El Ghoul et al., 2011). Sharpe (1964) pointed out that beta should positively affect COE due to its sensitively to market risk. Following prior research (Gonçalves et al., 2022; Li and Liu, 2018; Breuer et al., 2018), this study also explored the positive relationship between firm size and COE. One possible explanation in this regard is the choice of firms with large market capitalization. All the large firms in size does not provide the true differentiation between large and small firms.

Bouslah et al. (2013); Breuer et al. (2018) explained Z-Score as distress risk or default risk. There is lower probability of default of firms which are having higher Z-Score value. Z-Score a measure for probability of bankruptcy score used as a proxy for financial distress in this study. This study have explored the significant negative relation between Z-Score and COE. Leverage is calculated as the ratio between total debt and total assets. This study explored the positive relationship between leverage and COE which complements the findings of previous studies (Hail and Leuz, 2006; Gonçalves et al., 2022; El Ghoul et al., 2011). Fama and French (1993) established that higher stock returns are earned by high leveraged firms. Moreover, higher leverage ratio increases the COE when considering no taxes or transaction costs (Modigliani and Miller, 1958). Inflation, GDP and Money supply is showing significant relation with COE consistent with the findings of previous studies (Breuer et al., 2018; Hail and Leuz, 2006).

TABLE 4.12: Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Equity (COE)

	(1) COE	**(2) COE**	**(3) COE**	**(4) COE**	**(5) COE**
ENV	-.004*			-.007*	
	(0.0040)			(0.0050)	
SOC		-0.001		-0.001	
		(0.0020)		(0.0030)	
GOV			-.003**	-.006*	
			(0.0030)	(0.0060)	
TESG					-.001*
					(0.0010)
ECON	-.022***	-.022***	-.022***	-.022***	-.022***
	(0.0060)	(0.0060)	(0.0060)	(0.0060)	(0.0060)
SIZE	.006***	.006***	.006***	.006***	.006***
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
Z-SCORE	-.004**	-.004*	-.004*	-.004*	-.004*
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
LEV	.027*	.024*	.026*	.027*	.027*
	(0.0200)	(0.0200)	(0.0200)	(0.0200)	(0.0200)
BETA	.051***	.043***	.049***	.042***	.049***
	(0.0100)	(0.0100)	(0.0180)	(0.0100)	(0.0181)
MSP	.004***	.004***	.004***	.004***	.004***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
GDP	.003**	.003**	.003**	.003**	.003**
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
INF	.002***	.002***	.002***	.002***	.002***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
POP	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
DLOSS	-0.025	-0.025	-0.025	-0.025	-0.025
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)
LIQU	0.018	0.019	0.018	0.018	0.019
	(0.0130)	(0.0130)	(0.0130)	(0.0130)	(0.0130)
ACCR	0.026	0.026	0.026	0.027	0.026
	(0.0320)	(0.0320)	(0.0320)	(0.0320)	(0.0320)
CONS	-31.662***	-31.636***	-31.63***	-31.642***	-31.634***
	(1.166)	(1.165)	(1.163)	(1.163)	(1.164)
Observations	2665	2665	2665	2665	2665
F-Stat	61.76***	61.98***	61.90***	54.22***	61.77***
R-squared	0.451	0.451	0.451	0.451	0.451

Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. In this table, COE is the cost of equity, ENV is the environmental sustainability performance, SOC is the social sustainability disclosure, GOV is the governance sustainability performance, TESG is the composite of environmental, social and governance sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

The plausible reason for significant relationship between inflation and COE is that when inflation increases, real rate of return also increases and resultantly inflation is added in real rate of return which ultimately increases the COE. Moreover, stock prices, analyst forecasts and book values are stated in local currency and in nominal terms, which means that resultant estimates should reveal expected rates of inflation in their relevant countries (Breuer et al., 2018; Hail and Leuz, 2006).

Money supply and COE relationship describes that money supply creates liquidity in short term which translates into inflation. Increase in money supply means increase in inflation which resultantly increase the COE. The possible reason for GDP and COE relationship is that GDP growth is connected with demand of funds. High growth rate implies high demand of finds which resultantly increase the COE. Previous studies employ GDP per capita and GDP growth rate for controlling economic development of a respective country which could affect the relationship checked in this study (Breuer et al., 2018).

4.3.5 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Debt (COD)

This study employed the different models which are based on equation 3.29 & 3.30 and tests the impact of environmental, social and governance (TESG), a non-financial sustainability performance measure on COD individually and in aggregate after controlling industry and year fixed effects. This study also controlled the impact of ECON while checking the relationship between TESG and COD.

This study has not only explored the integrated impact of TESG on COD (equation 3.30) but also checked the differential impact of different components of TESG namely environmental (ENV), social (SOC) and governance (GOV) on COD (equation 3.29) after controlling ECON.

$$COD_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 SOC_{j,i,t-1} + \beta_3 GOV_{j,i,t-1} + \beta_4 ECON_{j,i,t-1}$$
$$+\beta_5 LIQ_{j,i,t_{-1}} + \beta_6 LEV_{j,i,t_{-1}} + \beta_7 SIZE_{j,i,t-1} + \beta_8 ZMIG_{j,i,t-1} + \beta_9 DLOSS_{j,i,t-1}$$
$$+\beta_{10} ACC_{j,i,t-1} + \beta_{11} BETA_{j,i,t-1} + \beta_{12} MSP_{j,t-1} + \beta_{13} GDP_{j,t-1} + \beta_{14} INF_{j,t-1}$$
$$+\beta_{15} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 TESG_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}}$$
$$+\beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1}$$
$$+\beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t}$$

The results of Equation 3.29 & 3.30 are reported in Table 4.13 where COD is used as a dependent variable. The commonly used form of the Equation 3.29 & 3.30 is depicted above. Regarding the relation between environmental sustainability performance (ENV), an explanatory variable and COD, Model (1) shows significant relationship between these variables. Model 2 and 3 further explores the social and governance (SOC & GOV) sustainability performance-COD relationship. The results show that firms showing better governance (GOV) sustainability performance pay lower COD whereas there exists no relationship between social (SOC) sustainability performance and COD. Therefore, Hypothesis 5a and 5c is accepted. Model 4 takes on ENV, SOC, and GOV sustainability performance simultaneously into the model. The results of our study show that there exists negative relation between ENV & GOV sustainability performance and COD whereas there exists no relation between SOC sustainability performance and COD (Model 4). There exists inverse relation between TESG, a composite measure of non-financial sustainability performance and COD (Model 5). Therefore, Hypothesis 5 is accepted. Our results complement the results of previous studies (Bhuiyan and Nguyen, 2019; Yeh et al., 2020).

These findings support the risk mitigation view which means sustainability performance provide support in increasing reputation, reduce information asymmetry, leading towards higher earnings quality, lowering risks and ultimately lowering COD. Eliwa et al. (2021) also found that governance (ENV) sustainability performance helps in reducing COD and overall sustainability performance and disclosure (TESG) lowers COD. This employs that lending institutions do integrate

information about TESG performance of borrowing firms when evaluating their risk profile in their lending decision model.

The results are consistent with prior studies (Ge and Liu, 2015; Goss and Roberts, 2011; Hasan et al., 2017) Following Gonçalves et al. (2022); Suto and Takehara (2017); Ng and Rezaee (2012); Magnanelli and Izzo (2017); Yeh et al. (2020); Bhuiyan and Nguyen (2019) this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. This study explored the positive relation between beta and COD which is consistent with these findings of prior research (Gonçalves et al., 2022; Attig et al., 2013).

The expected reason is with higher systematic risk, there is an increase in COD. This study have found the significant negative relation between liquidity and COD because lenders perceive liquidity as buffer to decrease default risk. The findings are in-line with the results of (Suto and Takehara, 2017). Size is also negatively related to COD because large firms are considered less risky as these firms can provide more collateral as compared with small firms. The results complements the findings of previous research (Goss and Roberts, 2011; Gonçalves et al., 2022; Sharfman and Fernando, 2008).

Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries. Therefore, this study also employed macro-economic control variables and found that money Supply, inflation and GDP are significantly related with COD. Money supply-COD is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increases the COD. The reason for inflation-COD relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COD. The possible explanation regarding GDP-COD relationship is that high growth rate means high demand of funds which will ultimately increase the COD.

TABLE 4.13: Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Debt (COD)

	(1) COD	**(2) COD**	**(3) COD**	**(4) COD**	**(5) COD**
ENV	-.002*			-.002*	
	(0.0010)			(0.0030)	
SOC		-0.003		-0.001	
		(0.0010)		(0.0020)	
GOV			-.007***	-.006*	
			(0.0020)	(0.0040)	
TESG					-.003***
					(0.0010)
ECON	-.023***	-.023***	-.023***	-.023***	-.024***
	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)
LIQU	-.111***	-.118***	-.115***	-.118***	-.117***
	(0.0400)	(0.0400)	(0.0400)	(0.0400)	(0.0400)
SIZE	-.004*	-.007*	-.005*	-.006*	-.007*
	(0.0010)	(0.0020)	(0.0010)	(0.0020)	(0.0020)
BETA	.04***	.05***	.03***	.05***	.04***
	(0.0100)	(0.0100)	(0.0100)	(0.0200)	(0.0100)
MSP	.006***	.007***	.005***	.006***	.005***
	(0.0020)	(0.0020)	(0.0010)	(0.0020)	(0.0010)
GDP	.007***	.007***	.007***	.007***	.007***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
INF	.005***	.006***	.004***	.005***	.004***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
POP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
LEV	0.001	0.001	0.002	0.002	0.001
	(0.0110)	(0.0110)	(0.0110)	(0.0110)	(0.0110)
DLOSS	-0.03	-0.03	-0.03	-0.03	-0.03
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)
Z-SCORE	0.001	0.001	0.001	0.001	0.001
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
ACCR	-0.012	-0.011	-0.012	-0.011	-0.011
	(0.0210)	(0.0220)	(0.0210)	(0.0220)	(0.0220)
CONS	-28.124***	-28.101***	-28.073***	-28.078***	-28.079***
	(1.215)	(1.209)	(1.207)	(1.206)	(1.207)
Observations	2215	2215	2215	2215	2215
F-Stat	55.43***	56.49***	55.83***	49.01***	56.05***
R-squared	0.637	0.638	0.638	0.639	0.639

Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. In this table, COD is the cost of debt, ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governance sustainability performance, TESG is the composite of environmental, social and governance sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

4.3.6 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Capital (COC)

This study employed the different models which are based on equation 3.19 & 3.20 and tests the impact of environmental, social and governance (TESG), a non-financial sustainability performance measure on COC individually and in aggregate after controlling industry and fixed year effects. This study also controlled the impact of ECON while checking the relationship between TESG and COC. This study has not only explored the integrated impact of TESG on COC (equation 3.20) but also checked the differential impact of different components of TESG namely environmental (ENV), social (SOC) and governance (GOV) on COC (equation 3.19) after controlling ECON.

$$COC_{j,i,t} = \beta_0 + \beta_1 ENV_{j,i,t_{-1}} + \beta_2 SOC_{j,i,t-1} + \beta_3 GOV_{j,i,t-1} + \beta_4 ECON_{j,i,t-1} + \beta_5 LIQ_{j,i,t_{-1}} + \beta_6 LEV_{j,i,t_{-1}} + \beta_7 SIZE_{j,i,t-1} + \beta_8 ZMIG_{j,i,t-1} + \beta_9 DLOSS_{j,i,t-1} + \beta_{10} ACC_{j,i,t-1} + \beta_{11} BETA_{j,i,t-1} + \beta_{12} MSP_{j,t-1} + \beta_{13} GDP_{j,t-1} + \beta_{14} INF_{j,t-1} + \beta_{15} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 TESG_{j,i,t_{-1}} + \beta_2 ECONj, i, t-1 + \beta_3 LIQ_{j,i,t_{-1}} + \beta_4 LEV_{j,i,t_{-1}} + \beta_5 SIZE_{j,i,t-1} + \beta_6 ZMIG_{j,i,t-1} + \beta_7 DLOSS_{j,i,t-1} + \beta_8 ACC_{j,i,t-1} + \beta_9 BETA_{j,i,t-1} + \beta_{10} MSP_{j,t-1} + \beta_{11} GDP_{j,t-1} + \beta_{12} INF_{j,t-1} + \beta_{13} POP_{j,t-1} + \varepsilon_{j,i,t}$$

The results of equations 3.19 & 3.20 are reported in Table 4.14 where COC is used as a dependent variable. The commonly used form of the equations 3.19 & 3.20 are depicted above. This study examines the impact of TESG sustainability performance on COC individually by including environmental, social and governance (ENV, SOC, GOV) sustainability performance in the model separately (Model 1 to 3). Results depict that ENV and GOV sustainability performance are significantly and negatively related to COC (coefficients of ENV and GOV sustainability performance are significant and negative in Model 1 and 3 respectively). Therefore, Hypothesis 8a and 8c is accepted. However, coefficient of SOC sustainability performance is not significant in Model 2 which means firms with strong social sustainability initiatives does not enjoy lower COC. Model 4 include the ENV, SOC,

and GOV sustainability performance simultaneously in order to investigate the relative impact of measures of different sustainability performance. Results show that once ENV, SOC, and GOV sustainability performance measures are included in the model simultaneously, there exists no significant association among ENV & SOC sustainability performance and COC variables and only governance (GOV) sustainability performance is negatively related to COC (coefficient of GOV sustainability performance is significant and negative in Model 4). This study includes composite measure of environmental, social and governance (TESG) sustainability performance as a proxy for sustainability in Model 5, and the coefficient for TESG is significant and negative at 5% significance level which means there exists significant negative relation between TESG and COC. Therefore, Hypothesis 8 is accepted.

Following Suto and Takehara (2017); Atan et al. (2018); Gholami et al. (2022) this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. Higher beta values indicate charge of higher rate of return by investors for compensating uncertain realization of stock returns. In line with the results of previous studies, this study also found a positive relation between beta and COC (Mariani et al., 2021). Liquidity which is a measure to control liquidity risk, also positively related to COC which omplements the results of prior research (Gholami et al., 2022; Sassen et al., 2016; Bouslah et al., 2013). This study found the significant positive relation of size with COC. The possible reason for such relationship is the choice of firms which are selected on the basis of higher market capitalization and the findings are consistent with the finding of (Wong et al., 2021; Gholami et al., 2022).

This study employed macro-economic control variables and found that money Supply, inflation and GDP are significantly related with COC. The reason for inflation-COC relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COC. The possible explanation regarding GDP-COC relationship is that high growth rate means high demand of funds which will ultimately increase the COC. Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. Money supply-COC is positively

TABLE 4.14: Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Capital (COC)

	(1) COC	**(2) COC**	**(3) COC**	**(4) COC**	**(5) COC**
ENV	-.002**			0.001	
	(0.0010)			(0.0030)	
SOC		-0.001		-0.001	
		(0.0010)		(0.0010)	
GOV			-.004**	-.003*	
			(0.0020)	(0.0030)	
TESG					-.002**
					(0.0010)
ECON	-.02***	-.02***	-.02***	-.02***	-.02***
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)
LIQU	.082***	.086***	.083***	.086***	.085***
	(0.0280)	(0.0280)	(0.0280)	(0.0280)	(0.0280)
SIZE	.007*	.006**	.007**	.004**	.007**
	(0.0020)	(0.0010)	(0.0020)	(0.0010)	(0.0010)
BETA	.03***	.04***	.05***	.04***	.05***
	(0.0100)	(0.0100)	(0.0200)	(0.0100)	(0.0200)
MSP	.004***	.004***	.004***	.004***	.004***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
GDP	.007***	.007***	.007***	.007***	.007***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
INF	.004***	.004***	.004***	.004***	.004***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
POP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
LEV	-0.007	-0.007	-0.007	-0.007	-0.007
	(0.0110)	(0.0110)	(0.0110)	(0.0110)	(0.0110)
DLOSS	0.022	0.022	0.022	0.022	0.022
	(0.0030)	(0.0030)	(0.0030)	(0.0030)	(0.0030)
Z-SCORE	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
ACCR	0.017	0.018	0.017	0.018	0.017
	(0.0190)	(0.0190)	(0.0190)	(0.0190)	(0.0190)
CONS	-28.128***	-28.112***	-28.097***	-28.1***	-28.099***
	(0.675)	(0.673)	(0.672)	(0.672)	(0.672)
Observations	2215	2215	2215	2215	2215
F-Stat	196.53***	196.02***	195.74***	172.93***	196.3
R-squared	0.742	0.743	0.743	0.743	0.743

Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. In this table, COC is the cost of capital, ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governance sustainability performance, TESG is the composite of environmental, social and governance sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COC. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries.

4.3.7 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance and Cost of Equity (ECON-COE) Relationship

This study employed the different models which are based on equation 3.39 & 3.40 and tests the moderating effect of TESG on ECON-COE relationship after controlling industry and year fixed effects. This study not only explored the differential effect of different elements (ENV, SOC and GOV) of TESG on ECON-COE relationship (equation 3.39) but also checked the overall impact of TESG on ECON-COE relationship by using TESG index (equation 3.40).

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 SOC_{j,i,t_{-1}} + \beta_4 GOV_{j,i,t_{-1}} + \beta_5 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_6 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_7 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_8 LIQ_{j,i,t_{-1}} + \beta_9 LEV_{j,i,t_{-1}} + \beta_{10} SIZE_{j,i,t-1} + \beta_{11} ZMIG_{j,i,t-1} + \beta_{12} DLOSS_{j,i,t-1} + \beta_{13} ACC_{j,i,t-1} + \beta_{14} BETA_{j,i,t-1} + \beta_{15} MSP_{j,t-1} + \beta_{16} GDP_{j,t-1} + \beta_{17} INF_{j,t-1} + \beta_{18} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 TESG_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times TESG_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t}$$

Where

$ECON_{j,i,t-1} \times ENV_{j,i,t-1}$ Interaction term between economic sustainability performance (ECON) and Environmental sustainability performance (ENV)

$ECON_{j,i,t-1} \times SOC_{j,i,t-1}$ Interaction term between economic sustainability performance (ECON) and Social sustainability performance (SOC)

$ECON_{j,i,t-1} \times GOV_{j,i,t-1}$ Interaction term between economic sustainability performance (ECON) and governance sustainability performance (GOV)

$ECON_{j,i,t-1} \times TESG_{j,i,t-1}$ Interaction term between economic sustainability performance (ECON) and Composite of (ENV, SOC and GOV) sustainability performance (TESG)

The results of equations 3.39 & 3.40 are reported in Table 4.15 where COE is used as a dependent variable. The commonly used form of the equations 3.39 & 3.40 are depicted above. This study has explored the moderating effect of TESG sustainability performance on ECON-COE relationship using equation 3.39 & 3.40. ECON is significantly negatively related to COE in all the models (Model 1 to 5) shown in Table 4.15. Coefficients of ECON describes the relationship (coefficients of ECON are significantly negative). Based on these results, we may safely assume that ECON is the key determinant of COE. Environmental sustainability performance (ENV) is showing significant relationship with COE (Model 1). However, once ECON is placed in the equation, this negative relationship becomes more strong between these variables (coefficient of ECON*ENV is negative and significant). Therefore, Hypothesis 3a is accepted.

Model 2 describes that there is no association between social sustainability performance (SOC) and COE. Moreover, once ECON is taken into account, still there exists no relationship between these variables. Model 3 also shows that governance sustainability performance (GOV) is showing inverse relationship with COE and the relationship is also significant. However, once ECON is placed in the equation, there still exists negative relationship between these variables (coefficient of ECON*GOV is negative and significant). Moreover, the relationship becomes strong as well. Therefore, Hypothesis 3c is accepted. In model 4, this study places environmental, social and governance (ENV, SOC and GOV) sustainability performance variables simultaneously and found only GOV sustainability performance shows significant negative relationship. Model 5 which includes TESG, a composite measure of non-financial sustainability performance shows significantly inverse relationship with COE and strong TESG sustainability performance further

strengthens the negative ECON-COE relationship (coefficient of ECON*TESG is significant and negative). Therefore, Hypothesis 3 is accepted. These findings confirms our hypothesis that TESG strengthens the ECON-COE relationship and results are in-line with the findings of (Ng and Rezaee, 2015).

The control variables are employed following prior literature (Gonçalves et al., 2022; El Ghoul et al., 2011; Hou et al., 2012; Ng and Rezaee, 2015). This study explored the positive relation between beta and COE because investor's charge higher return in order to get compensation for uncertain stock returns realization, which gives the higher beta values. These results are consistent with the findings of prior research (Gonçalves et al., 2022; Hail and Leuz, 2006; Dahiya and Singh, 2020; El Ghoul et al., 2011). This study has also found the positive relationship between firm size and COE. The possible explanation for such relationship is the choice of firms with large market capitalization. All the large firms in size does not provide the true differentiation between large and small firms. The results are consistent with the findings of previous research (Li and Liu, 2018; Gonçalves et al., 2022; Breuer et al., 2018).

This study found the positive relationship between leverage and COE which complements the findings of previous studies (Hail and Leuz, 2006; Gonçalves et al., 2022; El Ghoul et al., 2011). Modigliani and Miller (1958) explained that higher leverage ratio increases the COE in the absence of taxes or transaction costs. Moreover, higher returns are earned by high leveraged firms (Fama and French, 1993). Inflation, Money Supply and GDP are found significantly positive with COE. The reason for inflation-COE relationship is provided as increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COE. Money supply-COE is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COE. The possible explanation regarding GDP-COE relationship is that high growth rate means high demand of funds which will ultimately increase the COE. These findings complement the results of Breuer et al. (2018).

TABLE 4.15: Moderating Effect of TESG on ECON-COE Relationship

	(1) COE	**(2) COE**	**(3) COE**	**(4) COE**	**(5) COE**
ECON	-.018**	-.023***	-.019**	-.018**	-.019**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ENV	-.003*			-0.006	
	(0.004)			(0.005)	
ENV*ECON	-.005***			-0.002	
	(0.002)			(0.003)	
SOC		-0.001		-0.001	
		(0.002)		(0.003)	
SOC*ECON		-0.001		-0.001	
		(0.001)		(0.002)	
GOV			-.003*	-.006*	
			(0.003)	(0.006)	
GOV*ECON			-.006***	-.005*	
			(0.002)	(0.004)	
TESG					-.001*
					(0.001)
TESG*ECON					-.002***
					(0.001)
SIZE	.006***	.006***	.006***	.006***	.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
LEV	.015*	.017*	.016*	.015*	.016*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
BETA	.064***	.049***	.042***	.05***	.049***
	(0.028)	(0.017)	(0.010)	(0.020)	(0.010)
MSP	.004***	.004***	.004***	.004***	.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	.003**	.003***	.003***	.003**	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	.002***	.002***	.002***	.002***	.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
POP	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Z-SCORE	0.003	0.004	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
LIQ	0.027	0.027	0.027	0.027	0.027
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
DLOSS	-0.025	-0.024	-0.025	-0.025	-0.025
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)
ACCR	0.02	0.026	0.023	0.022	0.022
	(0.032)	(0.032)	(0.033)	(0.033)	(0.033)
CONS	-31.669***	-31.664***	-31.631***	-31.622***	-31.674***
	(1.165)	(1.169)	(1.160)	(1.167)	(1.166)
Observations	2665	2665	2665	2665	2665
F-Stat	58.01***	58.10***	58.24***	46.95***	58.06***
R-squared	0.452	0.451	0.452	0.453	0.452

*Above table shows the fixed effect regression for BRICS including Pakistan. The table present the COE as cost of equity, TESG as composite of (ENV, SOC and GOV) sustainability performance, ECON*ENV is the interaction term between ECON and ENV, ECON*SOC is the interaction term between ECON and SOC, ECON*GOV is the interaction term between ECON and GOV, ECON*TEST is the interaction term between ECON and TESG and control variables. Standard errors are shown in parentheses with* $***p < 0.01, **p < 0.05, *p < 0.1$.

4.3.8 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance and Cost of Debt (ECON-COD) Relationship

This study employed the different models which are based on equation 3.44 & 3.45 and tests the moderating effect of TESG on ECON-COD relationship after controlling industry and year fixed effects. This study not only explored the differential effect of different elements (ENV, SOC and GOV) of TESG on ECON-COD relationship (equation 3.44) but also checked the overall impact of TESG on ECON-COD relationship by using TESG index (equation 3.45).

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 SOC_{j,i,t_{-1}} + \beta_4 GOV_{j,i,t_{-1}} + \beta_5 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_6 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_7 ECON_{j,i,t-1} \times GOV_{j,i,t_{-1}} + \beta_8 LIQ_{j,i,t_{-1}} + \beta_9 LEV_{j,i,t_{-1}} + \beta_{10} SIZE_{j,i,t-1} + \beta_{11} ZMIG_{j,i,t-1} + \beta_{12} DLOSS_{j,i,t-1} + \beta_{13} ACC_{j,i,t-1} + \beta_{14} BETA_{j,i,t-1} + \beta_{15} MSP_{j,t-1} + \beta_{16} GDP_{j,t-1} + \beta_{17} INF_{j,t-1} + \beta_{18} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 TESG_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times TESG_{j,i,t_{-1}} + \beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1} + \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1} + \beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t}$$

The results of equations 3.44 & 3.45 are reported in Table 4.16 where COD is used as a dependent variable. The commonly used form of the equations 3.44 & 3.45 are depicted above. This study has checked the moderating effect of TESG sustainability performance on ECON-COD using equation 3.44 & 3.45. Table 4.16 depicts that all the models (Model 1 to 5) show that strong ECON has negative effect on COD (all coefficients of ECON are negative and significant). These results demonstrate that ECON is the key determinant of COD. Model 1 demonstrates that environmental sustainability performance (ENV) has significant negative impact on COD but once ECON is taken into account, ENV sustainability performance

strengthens the negative ECON-COD relationship (coefficient of ECON*ENV is negative and significant). Therefore, Hypothesis 6a is accepted. Model 2 shows that social sustainability performance (SOC) has no impact on COD. Moreover, with the presence of ECON, the relationship still remains insignificant. Model 3 also confirm our conjecture that strong governance mechanisms are value enhancing and the relationship further strengthens when we incorporate ECON into the equation. Therefore, Hypothesis 6c is accepted. In model 4, this study places ENV, SOC and GOV sustainability performance variables simultaneously and found no significant relationship for ENV and SOC sustainability performance and COD. Moreover, with the presence of ECON, there still exists insignificant relationship for these two variables. Strong governance mechanisms are value enhancing and the relationship further strengthens when we incorporate ECON into the equation (Model 4). Model 5 which include TESG, a composite non-financial sustainability performance measure shows inverse relationship with COD. The results depict that TESG is value enhancing (coefficient of TESG is significant and negative) and strong overall sustainability performance further strengthen the negative relationship between (ECON) sustainability performance and COD (coefficient of ECON*TESG is significant and negative). Therefore, Hypothesis 6 is accepted.

Following Gonçalves et al. (2022); Suto and Takehara (2017); Ng and Rezaee (2012); Magnanelli and Izzo (2017); Yeh et al. (2020); Bhuiyan and Nguyen (2019), this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. Size is negatively related to COD because large firms are considered less risky as these firms can provide more collateral as compared with small firms. The results complement the findings of previous research (Goss and Roberts, 2011; Gonçalves et al., 2022; Sharfman and Fernando, 2008). This study explored the positive relation between beta and COE which is consistent with the findings of prior research (Gonçalves et al., 2022; Attig et al., 2013). The expected reason is with higher systematic risk, there is an increase in COD. This study has found the significant positive relation between liquidity and COD complementing the results of prior research (La Rosa et al., 2018; Gonçalves et al., 2022).

This study employed macro-economic control variables and found that money

supply, inflation and GDP are significantly related with COD. Money supply-COD is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COD. The reason for inflation-COD relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COD. The possible explanation regarding GDP-COD relationship is that high growth rate means high demand of funds which will ultimately increase the COD. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries.

TABLE 4.16: Moderating Effect of TESG on ECON-COE Relationship

	(1) **COE**	**(2)** **COE**	**(3)** **COE**	**(4)** **COE**	**(5)** **COE**
ECON	-.021***	-.026***	-.021***	-.021***	-.022***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
ENV	-.001*			-0.001	
	(0.003)			(0.003)	
ENV*ECON	-.005***			-0.001	
	(0.001)			(0.002)	
SOC		-0.004		-0.001	
		(0.001)		(0.002)	
SOC*ECON		-0.002		0.002	
		(0.001)		(0.001)	
GOV			-.008*	-.007*	
			(0.003)	(0.004)	
GOV*ECON			-.007***	-.008**	
			(0.002)	(0.003)	
TESG					-.003***
					(0.001)
TESG*ECON					-.002***
					(0.001)
LIQU	.112***	.119***	.115***	.116***	.118***
	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)
SIZE	-.007*	-.006*	-.007*	-.005*	-.007*
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
BETA	.04***	.036***	.05***	.043***	.046***
	(0.010)	(0.010)	(0.020)	(0.010)	(0.010)
MSP	.004***	.004***	.004***	.004***	.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

	(1) COE	(2) COE	(3) COE	(4) COE	(5) COE
GDP	.007***	.007***	.007***	.007***	.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	.004***	.004***	.004***	.004***	.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
POP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DLOSS	-0.03	-0.03	-0.03	-0.03	-0.03
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
ACCR	-0.019	-0.012	-0.017	-0.017	-0.017
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
LEV	-0.004	-0.002	-0.004	-0.004	-0.004
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Z-SCORE	0.001	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CONS	-28.117***	-28.135***	-28.059***	-28.024***	-28.111***
	(1.202)	(1.201)	(1.187)	(1.189)	(1.196)
Observations	2215	2215	2215	2215	2215
F-Stat	51.55***	52.99***	52.48***	42.08***	52.55***
R-squared	0.641	0.639	0.643	0.644	0.642

*Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. In this table, COD is the cost of debt, ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governance sustainability performance, TESG is the composite of (ENV, SOC and GOV) sustainability performance, ECON*ENV is the interaction term between ECON and ENV, ECON*SOC is the interaction term between ECON and SOC, ECON*GOV is the interaction term between ECON and GOV, ECON*TEST is the interaction term between ECON and TESG, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with ***p¡0.01, ** p¡0.05, * p¡0.1.*

4.3.9 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance and Cost of Capital (ECON-COC) Relationship

This study employed the different models which are based on equation 3.34 & 3.35 and tests the moderating effect of TESG on ECON-COC relationship after controlling industry and fixed year effects. This study not only explored the differential effect of different elements (ENV, SOC and GOV) of TESG on ECON-

COC relationship (equation 3.34) but also checked the overall impact of TESG on ECON-COE relationship by using TESG index (equation 3.35).

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 ENV_{j,i,t_{-1}} + \beta_3 SOC_{j,i,t_{-1}} + \beta_4 GOV_{j,i,t_{-1}}$$
$$+\beta_5 ECON_{j,i,t-1} \times ENV_{j,i,t_{-1}} + \beta_6 ECON_{j,i,t-1} \times SOC_{j,i,t_{-1}} + \beta_7 ECON_{j,i,t-1}$$
$$\times GOV_{j,i,t_{-1}} + \beta_8 LIQ_{j,i,t_{-1}} + \ \beta_9 LEV_{j,i,t_{-1}} + \beta_{10} SIZE_{j,i,t-1} + \beta_{11} ZMIG_{j,i,t-1}$$
$$+\beta_{12} DLOSS_{j,i,t-1} + \beta_{13} ACC_{j,i,t-1} + \beta_{14} BETA_{j,i,t-1} + \beta_{15} MSP_{j,t-1} + \beta_{16} GDP_{j,t-1}$$
$$+\beta_{17} INF_{j,t-1} + \beta_{18} POP_{j,t-1} + \varepsilon_{j,i,t}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 ECON_{j,i,t-1} + \beta_2 TESG_{j,i,t_{-1}} + \beta_3 ECON_{j,i,t-1} \times TESG_{j,i,t_{-1}}$$
$$+\beta_4 LIQ_{j,i,t_{-1}} + \beta_5 LEV_{j,i,t_{-1}} + \beta_6 SIZE_{j,i,t-1} + \beta_7 ZMIG_{j,i,t-1} + \beta_8 DLOSS_{j,i,t-1}$$
$$+ \beta_9 ACC_{j,i,t-1} + \beta_{10} BETA_{j,i,t-1} + \beta_{11} MSP_{j,t-1} + \beta_{12} GDP_{j,t-1} + \beta_{13} INF_{j,t-1}$$
$$+\beta_{14} POP_{j,t-1} + \varepsilon_{j,i,t}$$

The results of equations 3.34 & 3.35 are reported in Table 4.17 where COC is used as a dependent variable. The commonly used form of the equations 3.34 & 3.35 is depicted above. This study has explored the moderating effect of TESG sustainability performance on ECON-COC relationship using equation 3.34 & 3.35. Table 4.17 depicts that all the models (Model 1 to 5) show that strong ECON has negative impact on COC (all coefficients of ECON are negative and significant). These results demonstrates that ECON is the key determinant of COC. Model 1 shows that ENV sustainability performance has significant negative impact on COC but once ECON is taken into account, ENV sustainability performance strengthens the negative relationship between ECON-COC relationship (coefficient of ECON*ENV is negative and significant). Therefore, Hypothesis 9a is accepted. Model 2 shows that SOC sustainability performance has no impact on COC. Moreover, once ECON is taken into account, there still exists no relationship. Model 3 also confirm our conjecture that strong governance mechanisms are value enhancing and the relationship further strengthens when we incorporate ECON into the equation. Therefore, Hypothesis 9c is accepted. When all the ENV, SOC and GOV sustainability performance variables are included in the model simultaneously, only conclusions drawn for environmental sustainability performance (ENV) remains intact (Model 4). In Model 5, this study includes TESG, a composite non-financial sustainability performance and results depict that TESG is

value enhancing (coefficient of TESG is significant and negative) and strong overall TESG sustainability performance further strengthen the negative relationship between ECON and COC (coefficient of ECON*TESG is significant and negative). Therefore, Hypothesis 9 is accepted.

Following Suto and Takehara (2017); Atan et al. (2018); Gholami et al. (2022) this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. Liquidity which is a measure to control liquidity risk, positively related to COC which complements the results of prior research (Gholami et al., 2022; Sassen et al., 2016; Bouslah et al., 2013). Higher beta values indicate charge of higher rate of return by investors for compensating uncertain realization of stock returns. In line with the results of previous studies, this study also found a positive relation between beta and COC (Mariani et al., 2021). This study found the significant positive relation of size with COC. The possible reason for such relationship is the choice of firms which are selected on the basis of higher market capitalization and the findings are consistent with the finding of (Wong et al., 2021; Gholami et al., 2022).

Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries. This study employed macro-economic control variables and found that money Supply, inflation and GDP are significantly related with COC. The possible explanation regarding GDP-COC relationship is that high growth rate means high demand of funds which will ultimately increase the COC. Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. Money supply-COC is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COC. The reason for inflation-COC relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COC.

Table 4.17: Moderating Effect of TESG on ECON-COC Relationship

	(1) **COC**	**(2)** **COC**	**(3)** **COC**	**(4)** **COC**	**(5)** **COC**
ECON	-.017***	-.022***	-.018***	-.017***	-.018***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
ENV	-.005*			-.002*	
	(0.002)			(0.001)	
ENV*ECON	-.004***			-.003**	
	(0.001)			(0.002)	
SOC		-0.002		-0.001	
		(0.001)		(0.002)	
SOC*ECON		-0.001		-0.0001	
		(0.001)		(0.001)	
GOV			-.005**	-0.003	
			(0.002)	(0.003)	
GOV*ECON			-.005***	-0.002	
			(0.001)	(0.003)	
TESG					-.002**
					(0.001)
TESG*ECON					-.002***
					(0.001)
LIQU	.082***	.087***	.083***	.086***	.086***
	(0.028)	(0.028)	(0.029)	(0.029)	(0.028)
SIZE	.007*	.005*	.004*	.007*	.006*
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
BETA	.064***	.049***	.042***	.05***	.049***
	(0.028)	(0.017)	(0.010)	(0.020)	(0.010)
MSP	.004***	.004***	.004***	.004***	.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	.007***	.007***	.007***	.007***	.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	.004***	.004***	.004***	.004***	.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
POP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LEV	-0.011	-0.009	-0.011	-0.011	-0.011
	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
DLOSS	-0.022	-0.021	-0.022	-0.022	-0.022
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
ACCR	0.011	0.017	0.014	0.012	0.013
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)

	(1) COC	(2) COC	(3) COC	(4) COC	(5) COC
Z-SCORE	-0.0005	-0.001	-0.001	-0.0005	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CONS	-28.121***	-28.14***	-28.086***	-28.093***	-28.124***
	(0.660)	(0.666)	(0.655)	(0.656)	(0.659)
Observations	2215	2215	2215	2215	2215
F-Stat	192.52***	179.35***	189.12***	153.67***	188.55***
R-squared	0.745	0.743	0.745	0.746	0.745

*Above table shows the fixed effect regression for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. In this table, COC is the cost of capital, ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governance sustainability performance, TESG is the composite of (ENV, SOC and GOV) sustainability performance, ECON*ENV is the interaction term between ECON and ENV, ECON*SOC is the interaction term between ECON and SOC, ECON*GOV is the interaction term between ECON and GOV, ECON*TEST is the interaction term between ECON and TESG, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Industry and year fixed effects are included. Lagged value of variables is used in this study. Standard errors are shown in parentheses with* $***p < 0.01, **p < 0.05, *p < 0.1$.

To sum up, we may say that ECON and TESG sustainability performance affect cost of financing which is consistent with previous research (Plumlee et al., 2015; Gupta, 2018; Dhaliwal et al., 2011; Bhuiyan and Nguyen, 2019; Hasan et al., 2017; Ge and Liu, 2015; Ng and Rezaee, 2015; Crifo et al., 2015; Gonçalves et al., 2022). When ECON is decomposed into growth factor (GR), operation efficiency factor (OP) and research effort factor (RES), OP and RES shows significant negative relationship with cost of financing whereas GR is not related with cost of financing. However, when we decompose TESG, a composite non-financial sustainability performance measure into individual dimensions, ENV and GOV sustainability performance is significantly and negatively related with cost of financing whereas strong SOC sustainability performance is not related with cost of financing. Finally, we have found moderating effect of TESG on the relationship between ECON and cost of financing. Researchers should take into account both ECON and TESG simultaneously in order to obtain a complete picture regarding relation between sustainability and cost of financing. Cost of financing means cost of equity (COE), cost of debt (COD) and cost of capital (COC).

Ng and Rezaee (2015) provided the reason for these relationships is that governance and environmental sustainability performance directly affect financial performance

of a company by either enhancing the effectiveness of governance measures in case of governance (GOV) sustainability performance or reducing environmental liabilities in case of environmental initiatives. Shad et al. (2020) explored that firms with sound environmental sustainability reporting should have lower systematic risk (beta) resulting in lower COC. Pham et al. (2012) established that firms with strong governance mechanisms are associated with reduction in perceived risk and asymmetry of information of the firm, thereby decreasing COE. The possible reason for insignificant relationship between social (SOC) sustainability performance and COE is provided by Ng and Rezaee (2015) that it may require additional resources. However, does not directly create value for shareholders and therefore, is not directly linked to COE.

4.4 Robustness Test

There is potential endogeneity problem exists because cost of capital (COC), cost of equity (COE) and cost of debt (COD) may also affect sustainability performance. In order to address the endogeneity problem and robustness check, this study has employed Generalized Method of Moments (GMM) by Blundell and Bond (1998), adding one-year lag values of COC, COE and COD variables as independent variables. In order to check over identification of variables, in this study, we have performed Hansen's Test and for autocorrelation of errors, Arellano and Bond (AR) test is employed. El Ghoul et al. (2018) and Martínez-Ferrero and García-Sánchez (2017) also employed the same technique. Following El Ghoul et al. (2018) and Nelling and Webb (2009), this research has used lagged values of COC, COE and COD which are employed as dependent variables.

4.4.1 Impact of Economic Sustainability Performance (ECON) on Cost of Equity (COE) by Employing System GMM

This study has examined the impact of ECON on COE individually and in aggregate by employing system GMM. The model in this study is based on the equation

3.48 & 3.49 which tests the impact of ECON on COE. This study has not only explored the integrated impact of ECON on COE (equation 3.49) but also checked the differential impact of different components of ECON namely growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COE (equation 3.48) by using system GMM.

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 GR_{j,i,t} + \beta_3 OP_{j,i,t} + \beta_4 RES_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t} + \beta_9 DLOSS_{j,i,t} + \beta_1 0 ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t} + \beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 LIQ_{j,i,t} + \beta_4 LEV_{j,i,t} + \beta_5 SIZE_{j,i,t} + \beta_6 ZMIG_{j,i,t} + \beta_7 DLOSS_{j,i,t} + \beta_8 ACC_{j,i,t} + \beta_9 BETA_{j,i,t} + \beta_{10} MSP_{j,t} + \beta_{11} GDP_{j,t} + \beta_{12} INF_{j,t} + \beta_{13} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.48 & 3.49 are reported in Table 4.18 where COE is used as a dependent variable. The commonly used form of the equations 3.48 & 3.49 are depicted above. Following El Ghoul et al. (2011) and Dahiya and Singh (2020), this study estimates the dynamic panel model by employing system GMM. The Arellano-Bover / Blundell-Bond estimator aids in gaining unbiased and efficient estimates in case of short dynamic panels, which have lagged endogenous variable as an explanatory variable. This study has employed lagged values of COE in all models for this purpose.

Table 4.18 reports the results of the model estimated by using system GMM. The models employed lagged COE variable as one of the explanatory variables in addition to other variables mentioned in equation 3.48 & 3.49. Over-identifying restrictions as per the Sargan test are also valid, which ensures the validity of the instrument variables. AR (2) test indicates that there is no autocorrelation issue in the models. By conducting these additional tests, this study has ensured that system GMM has addressed the concerns of omitted variable bias. For GMM diagnostic tests for its validity. AR (2) is insignificant showing that the first differenced error term is not serially correlated at second order and the Hansen test is also insignificant which shows identifying restrictions are valid. Moreover, the number of instruments is lesser than number of groups. Hence, these results

are valid.

There exists no relationship between growth factor (GR) and COE (Model 1). Model 2 which tests the relationship between operation efficiency (OP) and COE found the significant negative relationship. Therefore, Hypothesis 1b is accepted. The results obtained by employing system GMM endorse the results from fixed effect employed earlier in this study. There exists significant negative relationship between research effort factor (RES) and COE. Therefore, Hypothesis 1c is accepted. The results are in line with international evidence which also found the same relationship in the different context (Ng and Rezaee, 2015). This study has included different elements of economic (ECON) sustainability performance namely growth factor (GR), operation efficiency (OP) and research effort factor (RES) in order to estimate the differential effect of these elements on COE (Model 4). This study has also explored the overall impact of ECON on COE by using ECON (an equally weighted index) (Model 5).

Model 4 which employs growth factor (GR), operation efficiency (OP) and research effort factor (RES) simultaneously and found operation efficiency (OP) and research factor (RES) are significantly and negatively related to COE. Ng and Rezaee (2015) explored that different component of ECON (an equally weighted index) differently affects the COC and found significant negative relationship between (GR & RES) and COE. When, this study combines proxies of (GR, OP & RES into one factor which is called ECON (an equally weighted index), the significant negative relationship remains intact (Model 5) which endorse the findings of previous research (Ng and Rezaee, 2015). Therefore, Hypothesis 1 is accepted. Lambert et al. (2007); Gebhardt et al. (2001); Ng and Rezaee (2015) also explored the negative relation between ECON and COE. Moreover, ECON measured by financial and market performance is significantly negatively related with COC (Gebhardt et al., 2001; Lambert et al., 2012) .

Following prior research, this study employed different control variables namely Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population (El Ghoul et al., 2011; Hou et al., 2012; Gonçalves et al., 2022; Ng and Rezaee, 2015; Hail and Leuz, 2006; Breuer et al., 2018). This study has explored that negative relation between Beta and COE which is in line with

TABLE 4.18: Impact of Economic Sustainability Performance (ECON) on Cost of Equity (COE) by Employing System GMM

	(1) COE	**(2) COE**	**(3) COE**	**(4) COE**	**(5) COE**
COE (t-1)	.125*	.146*	.23***	.142*	.218***
	(0.085)	(0.084)	(0.083)	(0.077)	(0.079)
GR	-0.009			-0.002	
	(0.013)			(0.010)	
OP		-.072**		-.026*	
		(0.029)		(0.015)	
RES			-.012*	-.004*	
			(0.007)	(0.007)	
ECON					-.029*
					(0.016)
BETA	-.076***	-0.062	-.05***	-0.007	-.036*
	(0.026)	(0.044)	(0.014)	(0.026)	(0.027)
Z-SCORE	-.002**	-.002***	-.002**	-.002***	-.002**
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
INFL	.001*	.002*	.003*	.002***	.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	.001*	.001*	.003*	.001*	.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
LIQ	0.036	-0.001	0.004	0.014	0.017
	(0.035)	(0.025)	(0.023)	(0.026)	(0.022)
LEV	-0.003	0.007	-0.007	0.008	-0.003
	(0.023)	(0.014)	(0.012)	(0.013)	(0.014)
SIZE	0.002	0.0005	0.0005	-0.001	0.0005
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
DLOSS	0.009	0.01	0.011	0.007	0.013
	(0.013)	(0.011)	(0.011)	(0.011)	(0.011)
ACCR	-0.004	-0.03	0.036	-0.034	0.014
	(0.020)	(0.048)	(0.032)	(0.044)	(0.046)
MSP	-0.001	-0.001	0.002	-0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
POP	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.001	-0.001	-.003*	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
CONS	.631***	-0.031	.475***	.284*	.402**
	(0.179)	(0.207)	(0.089)	(0.155)	(0.179)
AR (2) Test	-1.07	-0.82	-0.47	-1	-0.52
(p-value)	0.283	0.411	0.635	0.318	0.606
Sargan Test	111.87	112.29	120.76	175.53	114.31
(p-value)	0.734	0.880	0.921	0.621	0.952
Hansen Test	121.32	146.1	154.62	206.77	144.33
(p-value)	0.5	0.174	0.258	0.101	0.406

Above table shows the results of system GMM regressions for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. Here, lagged values of COE is used as explanatory variable. In this table, COE is the cost of equity, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability , LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POPU is the population. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

results obtained by prior research (Hou et al., 2012; Ng and Rezaee, 2015; Yi et al., 2020). Hou et al. (2012) explained that such relationship occurs mainly due to risk explanations. The relationship between Z-Score and COE is significantly negative in this study. The plausible reason for such relationship is higher the Z-Score, the lower is the default risk / financial distress because Z-Score is considered the measure of firm's financial strength (Ge and Liu, 2015). Breuer et al. (2018) also considered Z-Score as proxy of default risk.

Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. The reason for including country factors is that there can be misleading results by making comparisons across the countries simply because they don't control for various factors which are known to affect cost of capital of the company (Hail and Leuz, 2006). Inflation and GDP are showing significant positive relationship with COE. In case of increase in inflation, real rate of return also increases which is added in inflation and ultimately enhances COE. Moreover, book values, analyst forecasts and stock prices are listed in local currency and in nominal terms which shows that resultant estimates should incorporate expected rates of inflation in these countries (Breuer et al., 2018; Hail and Leuz, 2006). GDP growth is linked with demand of funds. High GDP growth rate means high fund demand which ultimately enhances COE. This study has also found significant positive relation between GDP growth rate and COE. GDP growth rate is employed to control for economic development of the subject country (Breuer et al., 2018).

4.4.2 Impact of Economic Sustainability Performance (ECON) on Cost of Debt (COD) by Employing System GMM

This study has examined the impact of ECON on COD individually and in aggregate by employing system GMM. The model in this study is based on the equations 3.50 & 3.51 which tests the impact of ECON on COD. This study has not only explored the integrated impact of ECON on COD (equation 3.51) but also checked the differential impact of different components of ECON namely growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on

COD (equation 3.50) by using system GMM.

$$COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 GR_{j,i,t} + \beta_3 OP_{j,i,t} + \beta_4 RES_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t} + \beta_9 DLOSS_{j,i,t} + \beta_1 0 ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t} + \beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 LIQ_{j,i,t} + \beta_4 LEV_{j,i,t} + \beta_5 SIZE_{j,i,t} + \beta_6 ZMIG_{j,i,t} + \beta_7 DLOSS_{j,i,t} + \beta_8 ACC_{j,i,t} + \beta_9 BETA_{j,i,t} + \beta_{10} MSP_{j,t} + \beta_{11} GDP_{j,t} + \beta_{12} INF_{j,t} + \beta_{13} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.50 & 3.51 are reported in Table 4.19 where COD is used as a dependent variable. The commonly used form of the equations 3.50 & 3.51 is depicted above. AR (2) test shows values for Model 1 (0.128), Model 2 (0.413), Model 3 (0.279), Model 4 (0.164) and Model 5 (0.230) and in these models, the hypotheses of no serial correlation of errors in our models are accepted taking into account that the probability of Z value is higher than 0.05. The results of Hansen Test are Model 1 (125.87), Model 2 (146.96), Model 3 (158.75), Model 4 (158.80) and Model 5 (186.02). This study does not reject the hypotheses of over-identifying restriction and the instruments are valid.

Model 1 explains that growth factor (GR) and COD are not related as there is insignificant relationship between there variables. The results obtained by employing system GMM endorse the results from fixed effect employed earlier in this study. Operation efficiency (OP) and research effort factor (RES) are negatively related with COD (Model 2 and 3). Therefore, Hypothesis 4b and 4c is accepted. Different elements of ECON which are growth factor (GR), operation efficiency (OP) and research effort factor (RES) are included in order to estimate the differential effect of these elements on COD. When we include these growth (GR), operation (OP) and research (RES) factors into the model simultaneously, the results remain the same as are obtained while employing fixed effect i.e. operation efficiency (OP) and research factor (RES) are significantly negatively related to COD (Model 4). In Model 5, this study also checked the impact of ECON (an equally weighted index), which is an index of growth (GR), operation (OP) and research (RES) proxies on the COD. The results show significant negative relation

which is in line with international evidence (Ng and Rezaee, 2012). Therefore, Hypothesis 4 is accepted.

Control variables are included in this study following the past research (Suto and Takehara, 2017; Magnanelli and Izzo, 2017; Gonçalves et al., 2022; Ng and Rezaee, 2012; Bhuiyan and Nguyen, 2019). Gonçalves et al. (2022) found the positive relationship between Beta and COD indicating that with higher systematic risk, COD increases. The results shown here complements the results of prior literature, where beta is showing positive relationship with COD. Goss and Roberts (2011) explained that default risk increase with leverage. On the other hand, Ye and Zhang (2011) pointed out that leverage may be linked with higher creditworthiness, providing a lower cost of debt. Gonçalves et al. (2022) found a negative relationship between leverage and COD citing the reason as firms which are more creditworthy can take on more leverage. Past research indicates that lesser default risk exists for those firms which are enjoying lower leverage levels (Erragragui, 2018; El Ghoul et al., 2011; Gracia and Siregar, 2021; Fonseka et al., 2019). The results obtained in this study also shows significant positive relationship between leverage and COD.

Size is computed as natural logarithm of firm's market value of equity in this study. Goss and Roberts (2011) were of the view that large firms are considered less risky, because these firms can provide more collateral as compared with small firms. The other argument advocates that negative events impact on larger firm's cash flows is lower as compared with smaller firms which ultimately decreases default risk of larger firms. Drempetic et al. (2020) also pointed out that firm size is relevant in ESG context. Goss and Roberts (2011); Gonçalves et al. (2022); Sharfman and Fernando (2008) found the negative relationship between size and COD. In this study, we have also observed negative relationship between size and COD.

Liquidity which is used as a control for liquidity risk shows the significant positive relation with COD which complements the results of previous literature (Gonçalves et al., 2022; La Rosa et al., 2018). Z-Score which is a measure of financial distress and it is expected that it lowers the default risk and the firms have cushion to meet their debt obligations. It captures the firm's financial strength because the greater the Z-Score, the lesser the financial distress (Ge and Liu, 2015; Fonseka et al., 2019). This study have found the significant negative relationship between

TABLE 4.19: Impact of Economic Sustainability Performance (ECON) on Cost of Debt (COD) by Employing System GMM

	(1) COD	**(2) COD**	**(3) COD**	**(4) COD**	**(5) COD**
COD (t-1)	.188**	.29***	.275***	.227***	.214***
	(0.084)	(0.081)	(0.077)	(0.084)	(0.074)
GR	-0.002			0.009	
	(0.012)			(0.010)	
OP		-.029*		-.008*	
		(0.017)		(0.015)	
RES			-.013*	-.012*	
			(0.007)	(0.007)	
ECON					-.012*
					(0.007)
BETA	.06***	0.041	.068***	.047*	.037**
	(0.016)	(0.027)	(0.017)	(0.027)	(0.017)
LIQU	0.06	.075***	.049**	.012*	.065***
	(0.037)	(0.022)	(0.021)	(0.032)	(0.020)
LEV	-.058**	-.026*	-.012*	-.02*	-.009*
	(0.023)	(0.016)	(0.014)	(0.019)	(0.021)
Z-SCORE	-.006**	-.005*	-0.002	-0.003	-0.003
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
SIZE	-0.002	-0.002	-0.004	-0.005	-.004*
	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)
MSP	0.002	.002*	.002**	.002*	.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	0.001	0.001	0.002	.002*	.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	0.001	.004***	.003**	.002*	.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DLOSS	-0.016	-0.019	-0.036	-0.016	-0.055
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
POP	-0.02	-0.02	-0.02	-0.02	-0.02
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
ACCR	-0.005	-0.046	0.008	-0.031	0.01
	(0.026)	(0.043)	(0.072)	(0.060)	(0.022)
CONS	.469***	.414***	.474***	.317**	.258**
	(0.120)	(0.145)	(0.118)	(0.156)	(0.113)
AR (2) Test	-1.52	-0.82	-1.08	-1.39	-1.2
(p-value)	0.128	0.413	0.279	0.164	0.230
Sargan Test	141.33	129.38	132.43	146.42	196.92
(p-value)	0.111	0.524	0.663	0.296	0.100
Hansen Test	125.87	146.96	158.75	158.8	186.02
(p-value)	0.387	0.161	0.133	0.109	0.176

Above table shows the results of system GMM regressions for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. Here, lagged values of COD is used as explanatory variable. In this table, COD is the cost of debt, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance , LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

Z-Score and COD only in Model 1 and Model 2 in line with the results of (Ge and Liu, 2015).

Macroeconomic variables used in this study are Money supply, Inflation, GDP growth and Population. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries. Hail and Leuz (2006) explored that there is no control for various factors which affect firm's cost of capital. Therefore, macroeconomic variables are also included in this study. This study found that Money supply and COD is positively related because money supply creates liquidity in short term which translates into inflation. Increase in money supply means increase in inflation which increase the COD.

GDP growth rate and COD have the significant positive relation in this study. Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. GDP growth is linked with demand of funds. High growth shows high demand which enhances COD. Inflation is also having significant positive relation with COD. The reason for such relation is that when there is increase in inflation, real rate of return will increase and real rate of return ultimately adds the impact of inflation in it, which rises COD. Hail and Leuz (2006); Breuer et al. (2018) explained that stock prices, analyst forecasts and book values are stated in local currency and in nominal terms, which means that resultant estimates should reveal expected rates of inflation in their relevant countries.

4.4.3 Impact of Economic Sustainability Performance (ECON) on Cost of Capital (COC) by Employing System GMM

This study has examined the impact of ECON on COC individually and in aggregate by employing system GMM. The model in this study is based on the equations 3.46 & 3.47 which tests the impact of ECON on COC. This study has not only explored the integrated impact of ECON on COC (equation 3.47) but also

checked the differential impact of different components of ECON namely growth factor (GR), operation efficiency factor (OP) and research effort factor (RES) on COC (equation 3.46) by using system GMM.

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 GR_{j,i,t} + \beta_3 OP_{j,i,t} + \beta_4 RES_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t} + \beta_9 DLOSS_{j,i,t} + \beta_1 0 ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t} + \beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 LIQ_{j,i,t} + \beta_4 LEV_{j,i,t} + \beta_5 SIZE_{j,i,t} + \beta_6 ZMIG_{j,i,t} + \beta_7 DLOSS_{j,i,t} + \beta_8 ACC_{j,i,t} + \beta_9 BETA_{j,i,t} + \beta_{10} MSP_{j,t} + \beta_{11} GDP_{j,t} + \beta_{12} INF_{j,t} + \beta_{13} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.46 & 3.47 are reported in Table 4.20 where COC is used as a dependent variable. The commonly used form of the Equations 3.46 & 3.47 are depicted above. In this study, we have examined the impact of ECON on COC individually by including growth factor, operation efficiency and research effort factor (GR, OP and RES) in the model separately (Model 1 to 3). Results show that operation efficiency and research effort factor (OP and RES) are significantly and negatively related to COC (coefficients of OP and RES are significant and negative in Model 2 and 3 respectively). Therefore, Hypothesis 7b and 7c is accepted. However, growth factor (GR) is not significant with COC in Model 1. These results are in line with the results obtained with fixed effect regressions. The results obtained with fixed effect are reported in earlier section. Model 4 include the growth factor, operation efficiency and research effort factor (GR, OP and RES) simultaneously in order to investigate the relative impact of different factors of ECON. Results show that once GR, OP and RES are included in the model simultaneously, there exists significant negative relation among (OP and RES) variables. Model 5 check the impact of ECON on COC, the results show significant and negative relationship with COC (coefficients of ECON is significant and negative). Therefore, Hypothesis 7 is accepted.

This study relies on a set of diagnostic tests for the validity of GMM results. The first test, the AR (2), is insignificant at 10% level showing that the first differenced error term is not serially correlated at second order. The second test, Hansen test, is also insignificant at 10% which shows that our instruments are valid. Moreover,

the instruments used in the estimation are less than the number of groups. Hence, these results are valid.

This study uses company level control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual. The control variables used in this study are consistent with previous studies (Suto and Takehara, 2017; Atan et al., 2018; Gholami et al., 2022). Ge and Liu (2015); Fonseka et al. (2019) explored that higher the Z-Score, the lower the financial distress. It is employed to check the financial distress and decreases the default risk. Moreover, it captures the firm's financial strength. This study has found that Z-Score and COC are significantly negative related.

Size is computed as natural logarithm of firm's market value of equity in this study. Gholami et al. (2022); Wong et al. (2021) explored the positive relation between size and COC. Drempetic et al. (2020) also pointed out that firm size is relevant in ESG context. It is explained that impact of negative events on larger firm's cash flows is lower as compared with smaller firms which ultimately decreases default risk of larger firms. Large firms are considered less risky, because these firms can provide more collateral as compared with small firms (Goss and Roberts, 2011). Atan et al. (2018) explored that large firms enjoy lower COC and found significant negative relationship between size and COC. This study found the significant positive relation of size with COC. The possible reason for such relationship is the choice of firms which are selected on the basis of higher market capitalization and the findings are consistent with the finding of (Wong et al., 2021; Gholami et al., 2022).

Leverage is computed as the ratio between total debt and total assets. Goss and Roberts (2011) explained that default risk increase with leverage. Lanis and Richardson (2013) explained that as there is increase in leverage, disclosure of ESG information also enhances by managers because of additional inquiry from financial institutions. Prior et al. (2008) explained that leverage also show an enterprise risk which affect the financial performance of the firm in future. There exists significant negative relation between leverage and COC which complements the results of prior literature (Gholami et al., 2022; Mariani et al., 2021; Ramirez et al., 2022).

Table 4.20: Impact of Economic Sustainability Performance (ECON) on Cost of Capital (COC) by Employing System GMM

	(1) COC	**(2) COC**	**(3) COC**	**(4) COC**	**(5) COC**
COC (t-1)	.254***	.259***	.479***	.318***	.269***
	(0.088)	(0.085)	(0.097)	(0.081)	(0.071)
GR	0.002			0.006	
	(0.010)			(0.007)	
OP		-.111*		-.006*	
		(0.061)		(0.014)	
RES			-.012*	-.006*	
			(0.007)	(0.006)	
ECON					-.016**
					(0.007)
INF	.002**	.002**	.003***	.003***	.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LEV	-.061***	-0.014	-0.009	-0.008	-.057***
	(0.023)	(0.011)	(0.010)	(0.010)	(0.018)
SIZE	0.001	0.002	0.004	0.001	.003*
	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)
Z-SCORE	-.004**	-.02**	0.01	-.02***	-.006***
	(0.002)	(0.010)	(0.010)	(0.010)	(0.002)
MSP	0.001	0.003	.002**	.001*	.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ACCR	-0.027	-0.003	0.003	-0.014	-0.022
	(0.018)	(0.035)	(0.033)	(0.031)	(0.018)
BETA	-0.024	0.136	0.006	-0.001	-0.003
	(0.016)	(0.093)	(0.021)	(0.024)	(0.014)
GDP	0.001	0.005	-0.002	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DLOSS	-0.003	0.002	0.009	0.004	-0.014
	(0.010)	(0.009)	(0.011)	(0.009)	(0.009)
POP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LIQU	0.005	-0.008	-.065*	-0.032	0.012
	(0.033)	(0.031)	(0.035)	(0.027)	(0.020)
CONS	.255**	-0.453	0.001	0.121	0.108
	(0.115)	(0.420)	(0.144)	(0.134)	(0.101)
AR (2) Test	-1.26	-1.35	-0.41	-0.97	-1.16
(p-value)	0.209	0.176	0.679	0.330	0.245
Sargan Test	114.75	138.72	49.09	126.59	159.29
(p-value)	0.667	0.305	0.998	0.747	0.692
Hansen Test	133.81	146.3	97.24	161.23	185.12
(p-value)	0.219	0.171	0.106	0.101	0.188

*Above table shows the results of system GMM regressions for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. Here, lagged values of COC is used as explanatory variable. In this table, COC is the cost of capital, GR is the growth factor, OP is the operation efficiency factor, RES is the research effort factor, ECON is the economic sustainability performance , LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Standard errors are shown in parentheses with ***p¡0.01, ** p¡0.05, * p¡0.1.*

Macroeconomic variables used in this study are Money supply, Inflation, GDP growth and Population. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. Hail and Leuz (2006) explored that there can be confusing results in case of making simple comparisons across different countries and there is no control for various factors which affect firm's cost of capital.

Therefore, macroeconomic variables are also included in this study. Money supply and COC is positively related in this study because money supply creates liquidity in short term which translates into inflation. Increase in money supply means increase in inflation which increase the COC. Inflation is also having significant positive relation with COC. The reason for such relation is that when there is increase in inflation, real rate of return will increase and real rate of return ultimately adds the impact of inflation in it, which rises COC.

4.4.4 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Equity (COE) by Employing System GMM

This study employed the different models which are based on equation 3.54 & 3.55 and tests the impact of environmental, social and governance (TESG), a non-financial sustainability performance measure on COE individually and in aggregate by employing system GMM. This study also controlled the impact of ECON while checking the relationship between TESG and COE. This study has not only explored the integrated impact of TESG on COE (equation 3.55) but also checked the differential impact of different components of TESG namely environmental (ENV), social (SOC) and governance (GOV) on COE (equation 3.54) after controlling ECON by using system GMM.

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 ENV_{j,i,t} + \beta_3 SOC_{j,i,t} + \beta_4 GOV_{j,i,t} +$$
$$\beta_5 ECON_{j,i,t-1} + \beta_6 LIQ_{j,i,t} + \beta_7 LEV_{j,i,t} + \beta_8 SIZE_{j,i,t} + \beta_9 ZMIG_{j,i,t}$$
$$+\beta_{10} DLOSS_{j,i,t} + \beta_{11} ACC_{j,i,t} + \beta_{12} BETA_{j,i,t} + \beta_{13} MSP_{j,t} + \beta_{14} GDP_{j,t}$$
$$+\beta_{15} INF_{j,t} + \beta_{16} POP_{j,t} + \varepsilon_{j,i,t}$$

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 TESG_{j,i,t} + \beta_3 ECON_{j,i,t-1} + \beta_4 LIQ_{j,i,t}$$
$$+\beta_5 LEV_{j,i,t} + \beta_6 SIZE_{j,i,t} + \beta_7 ZMIG_{j,i,t} + \beta_8 DLOSS_{j,i,t} + \beta_9 ACC_{j,i,t}$$
$$+\beta_{10} BETA_{j,i,t} + \beta_{11} MSP_{j,t} + \beta_{12} GDP_{j,t} + \beta_{13} INF_{j,t} + \beta_{14} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.54 & 3.55 are reported in Table 4.21 where COE is used as a dependent variable. The commonly used form of the equations 3.54 & 3.55 are depicted above. Model 1 to 3 shows the association of environmental, social and governance (ENV, SOC and GOV) sustainability performance with COE individually after controlling for ECON. Results show that coefficients of ENV and GOV sustainability performance are significant and negative in model 1 & 3 which shows that environmental (ENV) and governance (GOV) sustainability performance are significantly negatively related with COE. Therefore, Hypothesis 2a and 2c is accepted. Our results related to governance sustainability performance (GOV) are in line with the results of previous research (Bebchuk et al., 2013). However, social (SOC) sustainability performance does not show any significance with COE (Model 2). This means that strong social initiatives does not result in lowering COE. In case of employing ENV, SOC, and GOV sustainability performance simultaneously into the model, the conclusions drawn from Model 1 to 3 remains valid (Model 4).

The results obtained in these models complements the findings of previous studies (Chen et al., 2009; Plumlee et al., 2015; Cheng et al., 2006; Pham et al., 2012; Ng and Rezaee, 2015; Shad et al., 2020; Gupta, 2018). Ng and Rezaee (2015) provided the reason for these relationships is that governance and environmental sustainability performance directly affect financial performance of a company by either enhancing the effectiveness of governance measures in case of governance (GOV) sustainability performance or by reducing environmental liabilities in case of environmental initiatives. Shad et al. (2020) explored that firms with sound environmental sustainability reporting should have lower systematic risk (beta) resulting in lower COC. Pham et al. (2012) established that firms with strong governance mechanisms are associated with reduction in perceived risk and asymmetry of information of the firm, thereby decreasing COE. The possible reason for insignificant relationship between social (SOC) sustainability performance and COE is provided by Ng and Rezaee (2015) that it may require additional

resources. However, does not directly create value for shareholders and therefore, is not directly linked to COE.

Model 5 which includes TESG, a composite measure of non-financial sustainability performance also provides significant and negative relationship with COE at 10% significance level. Therefore, Hypothesis 2 is accepted. These results are in line with the findings of (Dhaliwal et al., 2011; Gonçalves et al., 2022; El Ghoul et al., 2011; Ng and Rezaee, 2015; Hmaittane et al., 2019). Gonçalves et al. (2022) pointed out that investors reward firms which are socially responsible with lower COE. Non-financial (TESG) sustainability performance reduces the COE because of the strong environmental and governance mechanisms directly affecting firm's financial performance either by enhancing the effectiveness of governance measures in the case of governance (GOV) sustainability performance or by reducing environmental liabilities in the case of environmental (ENV) initiatives.

This study has employed lagged values of COE in all the models for this purpose. The models employed lagged COE variable as one of the explanatory variable in addition to other variables. Over-identifying restrictions as per the Sargan test are also valid, which ensures the validity of the instrument variables. AR (2) test indicates that there is no autocorrelation issue in the models. AR (2) is insignificant showing that the first differenced error term is not serially correlated at second order and the Hansen test is also insignificant which shows identifying restrictions are valid. Moreover, the number of instruments is lesser than number of groups. Hence, these results are valid. By conducting these additional tests, this study has ensured that system GMM has addressed the concerns of omitted variable bias (Dahiya and Singh, 2020).

Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual and macroeconomic control variables including Money Supply, GDP, Inflation and Population are the control variables used in this study which are employed following the previous literature in explaining this relationship (Gonçalves et al., 2022; El Ghoul et al., 2011; Hou et al., 2012; Ng and Rezaee, 2015). This study explored the positive relation between Beta and COE which is consistent with the findings of prior research (Gonçalves et al., 2022; El Ghoul et al., 2011; Hail and Leuz, 2006; Dahiya and Singh, 2020). This reason for such relationship is that investor's charge higher

return in order to get compensation for uncertain stock returns realization, which gives the higher beta values. This study established the positive relationship between firm size and COE. One possible explanation in this regard is the choice of firms with large market capitalization. All the large firms in size does not provide the true differentiation between large and small firms. The results are consistent with the findings of previous research (Li and Liu, 2018; Gonçalves et al., 2022; Breuer et al., 2018).

Breuer et al. (2018); Bouslah et al. (2013) explained Z-Score as distress risk or default risk. Z-Score and COE is having the negative relation in this study which complements that there is lower probability of default of firms which are having higher Z-Score value. Z-Score a measure for probability of bankruptcy score used as a proxy for financial distress in this study. Previous research complements that there can be misleading results by making simple comparisons across the countries. The reason provided for such finding is that they don't control for various factors which are known to affect company's COC (Hail and Leuz, 2006)(Hail and Leuz, 2006). Previous research also employed different macro-economic variables in their studies in order to minimize the probability of model misspecification which may arise due to country differences (Bui et al., 2020). Therefore, this study included country factors along with number of risks factors before going towards variables of interest.

This study explored the significant positive relationship between GDP growth rate and COE which is in line with the findings of prior literature (Breuer et al., 2018). The reason for such relationship is that GDP growth is connected with demand of funds. High growth rate means high demand of funds which will ultimately increase the COE. GDP per capita and GDP growth rate is used to control for economic development of a respective country (Breuer et al., 2018). This study also found the positive relationship between Inflation and COE because when there is increase in inflation, there will be increase in real rate of return and inflation will be added in real rate of return which ultimately increase COE. Moreover, stock prices, analyst forecasts and book values are stated in local currency and in nominal terms, which means that resultant estimates should reveal expected rates of inflation in their relevant countries (Breuer et al., 2018; Hail and Leuz, 2006).

TABLE 4.21: Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Equity (COE) by Employing System GMM

	(1) COE	**(2) COE**	**(3) COE**	**(4) COE**	**(5) COE**
COE (t-1)	.154*	.183***	.122*	.181***	.162**
	(0.085)	(0.062)	(0.065)	(0.062)	(0.076)
ENV	-.013*			-.011*	
	(0.015)			(0.009)	
SOC		-0.004		-0.001	
		(0.002)		(0.004)	
GOV			-.006*	-.011*	
			(0.004)	(0.009)	
TESG					-.002*
					(0.001)
ECON	-0.002	-.027***	-.037***	-.027***	-.036***
	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)
SIZE	0.001	0.001	.003**	0.001	.005***
	(0.004)	(0.003)	(0.001)	(0.003)	(0.001)
Z-SCORE	-0.002	-.002***	-0.002	-.002***	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
BETA	.055**	.029*	.027*	.028*	0.018
	(0.027)	(0.016)	(0.015)	(0.016)	(0.014)
GDP	0.003	.003**	.005***	.003**	.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	0.001	.003***	.003***	.003***	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DLOSS	0.008	0.002	-0.023	0.002	0.002
	(0.012)	(0.010)	(0.011)	(0.009)	(0.011)
MSP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
POP	-0.05	-0.05	-0.05	-0.05	-0.05
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
ACCR	0.012	0.027	-0.021	0.028	0.004
	(0.051)	(0.035)	(0.042)	(0.035)	(0.050)
LEV	-0.005	-0.004	-0.004	-0.004	-0.011
	(0.015)	(0.012)	(0.013)	(0.012)	(0.019)
LIQU	0.019	-0.003	-0.002	-0.001	0.005
	(0.029)	(0.016)	(0.014)	(0.015)	(0.014)
CONS	.552***	-0.009	-0.015	-0.025	0.023
	(0.188)	(0.099)	(0.097)	(0.099)	(0.092)
AR (2) Test	-0.99	-0.77	-1.32	-0.83	-0.89
(p-value)	0.322	0.439	0.188	0.408	0.376
Sargan Test	109.27	234.22	232.12	234.79	173.47
(p-value)	0.807	0.484	0.541	0.473	0.623
Hansen Test	123.9	248.74	249	246.71	191.05
(p-value)	0.46	0.243	0.253	0.272	0.272

Above table shows the results of system GMM regressions for BRICS including Pakistan. Here, lagged values of COE is used as explanatory variable. In this table, COE is the cost of equity, , TESG is the composite of environmental, social and governance sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

4.4.5 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Debt (COD) by Employing System GMM

This study employed the different models which are based on equations 3.56 & 3.57 and tests the impact of environmental, social and governance (TESG), a non-financial sustainability performance measure on COD individually and in aggregate by employing system GMM. This study also controlled the impact of ECON while checking the relationship between TESG and COD. This study has not only explored the integrated impact of TESG on COD (equation 3.57) but also checked the differential impact of different components of TESG namely environmental (ENV), social (SOC) and governance (GOV) on COD (equation 3.56) after controlling ECON by using system GMM.

$$COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 ENV_{j,i,t} + \beta_3 SOC_{j,i,t} + \beta_4 GOV_{j,i,t} + \beta_5 ECON_{j,i,t-1} + \beta_6 LIQ_{j,i,t} + \beta_7 LEV_{j,i,t} + \beta_8 SIZE_{j,i,t} + \beta_9 ZMIG_{j,i,t} + \beta_{10} DLOSS_{j,i,t} + \beta_{11} ACC_{j,i,t} + \beta_{12} BETA_{j,i,t} + \beta_{13} MSP_{j,t} + \beta_{14} GDP_{j,t} + \beta_{15} INF_{j,t} + \beta_{16} POP_{j,t} + \varepsilon_{j,i,t}$$

$$COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 TESG_{j,i,t} + \beta_3 ECON_{j,i,t-1} + \beta_4 LIQ_{j,i,t} + \beta_5 LEV_{j,i,t} + \beta_6 SIZE_{j,i,t} + \beta_7 ZMIG_{j,i,t} + \beta_8 DLOSS_{j,i,t} + \beta_9 ACC_{j,i,t} + \beta_{10} BETA_{j,i,t} + \beta_{11} MSP_{j,t} + \beta_{12} GDP_{j,t} + \beta_{13} INF_{j,t} + \beta_{14} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.56 & 3.57 are reported in Table 4.22 where COD is used as a dependent variable. The commonly used form of the equations 3.56 & 3,57 are depicted above. There exists significant negative relation between ENV and COD (Model 1). Model 2 and 3 further explores the social and governance (SOC & GOV) sustainability performance-COD relationship. The results show that firms showing better governance (GOV) sustainability performance pay lower COD and there is no relation between social (SOC) sustainability performance and COD.

Therefore, Hypothesis 5a and 5c is accepted. These results are in line with the results obtained with fixed effect regressions. Model 4 takes on ENV, SOC, and GOV sustainability performance simultaneously into the model. The results of

our study show that SOC sustainability performance is not related with COD whereas ENV & GOV sustainability performance shows significant and negative association with COD. The relationship between TESG, a composite measure of non-financial sustainability performance and COD is explored in Model 5. Results depict that there exists negative and significant relationship between TESG and COD. Therefore, Hypothesis 5 is accepted. Our results complement the results of previous studies (Bhuiyan and Nguyen, 2019; Yeh et al., 2020) and also endorse the results obtained from fixed effect regressions. Shad et al. (2020) established that strong sustainability reporting as well as strong environmental and economic sustainability reporting helps in reduction of COD.

The results show that COC is lower for firms that disclose more information related to sustainability. This reduction is explained by risk mitigation, information asymmetry reduction and transparent reporting provided by sustainability reports to relevant speculators and investors. They have also found that social sustainability reporting is not related to COD which is explained by lack of reporting in the areas of human rights, diversity, and anti-corruption likely due to absence of legislation on transparency policies and procedures.

AR (2) test shows p-values for Model 1 (0.245), Model 2 (0.244), Model 3 (0.336), Model 4 (0.298) and Model 5 (0.166) and in these models, the hypotheses of no serial correlation of errors in our models are accepted taking into account that the probability of Z value is higher than 0.05. The results of Hansen Test (p-values) are Model 1 (0.362), Model 2 (0.400), Model 3 (0.350), Model 4 (0.477) and Model 5 (0.121). Sargan test shows p-values for Model 1 (0.146), Model 2 (0.109), Model 3 (0.226), Model 4 (0.175) and Model 5 (0.903). Over-identifying restrictions as per the Sargan test are also valid, which ensures the validity of the instrument variables.

Following Gonçalves et al. (2022); Suto and Takehara (2017); Ng and Rezaee (2012); Magnanelli and Izzo (2017); Yeh et al. (2020); Bhuiyan and Nguyen (2019) this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. This study explored the positive relation between beta and COD which is consistent

with the findings of prior research (Gonçalves et al., 2022; Attig et al., 2013). The expected reason provided is that with higher systematic risk, there is an increase in COD.

This study has also found the significant negative relation between leverage and COD which endorses the results obtained by prior research (Gonçalves et al., 2022; La Rosa et al., 2018). Ye and Zhang (2011) pointed out that leverage may be linked with higher creditworthiness, providing a lower COD. Size is also negatively related to COD because large firms are considered less risky as these firms can provide more collateral as compared with small firms. The results complements the findings of previous research (Goss and Roberts, 2011; Gonçalves et al., 2022; Sharfman and Fernando, 2008).

This study employed macro-economic control variables and found that money Supply, inflation and GDP are significantly related with COD. The reason for inflation-COD relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COD. The possible explanation regarding GDP-COD relationship is that high growth rate means high demand of funds which will ultimately increase the COD. GDP growth rate and COD have the significant positive relation which complements the prior literature (Breuer et al., 2018). Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. GDP growth is linked with demand of funds. High growth shows high demand which enhances COD.

Money supply-COD is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COD. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries.

TABLE 4.22: Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Debt (COD) by Employing System GMM

	(1) COD	**(2) COD**	**(3) COD**	**(4) COD**	**(5) COD**
COD (t-1)	.27***	.268***	.296***	.28***	.208***
	(0.068)	(0.063)	(0.063)	(0.064)	(0.070)
ENV	-0.04*			-.005*	
	(0.001)			(0.006)	
SOC		-0.003		-0.004	
		(0.002)		(0.002)	
GOV			-.01**	-.01**	
			(0.004)	(0.005)	
TESG					-.003*
					(0.001)
	(1) COD	**(2) COD**	**(3) COD**	**(4) COD**	**(5) COD**
ECON	-.031***	-.031***	-.032***	-.032***	-.024***
	(0.008)	(0.009)	(0.009)	(0.009)	(0.008)
SIZE	-.011***	-.011***	-.01***	-.011***	-.003**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
BETA	.035**	.038**	.041***	.038**	.046***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
LEV	-0.032	-.036*	-0.027	-.034*	-0.021
	(0.019)	(0.019)	(0.017)	(0.019)	(0.017)
MSP	.001*	.001**	.001**	.001**	.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	.002*	.002**	.002**	.002**	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	.003***	.003***	.004***	.003***	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
POP	0.002	0.002	0.002	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LIQU	-0.006	-0.009	-0.008	-0.009	0.019
	(0.016)	(0.017)	(0.016)	(0.017)	(0.016)
Z-SCORE	0.003	0.004	0.003	0.004	0.002
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
DLOSS	0.001	0.004	0.005	0.003	0.017
	(0.006)	(0.007)	(0.006)	(0.007)	(0.008)
ACCR	0.02	0.024	0.027	0.022	0.019
	(0.040)	(0.042)	(0.041)	(0.041)	(0.042)
CONS	-.224**	-.233**	-.238**	-.25**	-.193**
	(0.097)	(0.102)	(0.100)	(0.099)	(0.097)
AR (2) Test	-1.16	-1.17	-0.96	-1.04	-1.38
(p-value)	0.245	0.244	0.336	0.298	0.166
Sargan Test	256.88	260.97	247.12	254.12	164.24
(p-value)	0.146	0.109	0.226	0.175	0.903
Hansen Test	241.05	238.84	241.73	234.57	212
(p-value)	0.362	0.4	0.35	0.477	0.121

Above table shows the results of system GMM regressions for BRICS including Pakistan. Here, lagged values of COD is used as explanatory variable. In this table, COD is the cost of debt, TESG is the composite of environmental, social and governance sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

4.4.6 Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Capital (COC) by Employing System GMM

This study employed the different models which are based on equations 3.52 & 3.53 and tests the impact of environmental, social and governance (TESG),a non-financial sustainability performance measure on COC individually and in aggregate by employing system GMM. This study also controlled the impact of ECON while checking the relationship between TESG and COC. This study has not only explored the integrated impact of TESG on COC (equation 3.53) but also checked the differential impact of different components of TESG namely environmental (ENV), social (SOC) and governance (GOV) on COD (equation 3.52) after controlling ECON by using system GMM.

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 ENV_{j,i,t} + \beta_3 SOC_{j,i,t} + \beta_4 GOV_{j,i,t} + \beta_5 ECON_{j,i,t-1} + \beta_6 LIQ_{j,i,t} + \beta_7 LEV_{j,i,t} + \beta_8 SIZE_{j,i,t} + \beta_9 ZMIG_{j,i,t} + \beta_{10} DLOSS_{j,i,t} + \beta_{11} ACC_{j,i,t} + \beta_{12} BETA_{j,i,t} + \beta_{13} MSP_{j,t} + \beta_{14} GDP_{j,t} + \beta_{15} INF_{j,t} + \beta_{16} POP_{j,t} + \varepsilon_{j,i,t}$$

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 TESG_{j,i,t} + \beta_3 ECON_{j,i,t-1} + \beta_4 LIQ_{j,i,t} + \beta_5 LEV_{j,i,t} + \beta_6 SIZE_{j,i,t} + \beta_7 ZMIG_{j,i,t} + \beta_8 DLOSS_{j,i,t} + \beta_9 ACC_{j,i,t} + \beta_{10} BETA_{j,i,t} + \beta_{11} MSP_{j,t} + \beta_{12} GDP_{j,t} + \beta_{13} INF_{j,t} + \beta_{14} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.52 & 3.53 are reported in Table 4.23 where COC is used as a dependent variable. The commonly used form of the equations 3.52 & 3.53 are depicted above. This study examines the impact of TESG sustainability performance on COC individually by including environmental, social and governance (ENV, SOC, GOV) sustainability performance in the model separately (Model 1 to 3) by employing system GMM. Results depict that ENV and GOV sustainability performance are significantly and negatively related to COC (coefficients of ENV and GOV sustainability performance are significant and negative in Model 1 and 3 respectively). Therefore, Hypothesis 8a and 8c is accepted. However, coefficient

of SOC sustainability performance is not significant in Model 2 which means firms with strong SOC sustainability initiatives do not enjoy lower COC. Model 4 include the ENV, SOC, and GOV sustainability performance simultaneously in order to investigate the relative impact of measures of different sustainability performance. Results show that once ENV, SOC, and GOV sustainability performance measures are included in the model simultaneously, there exists significant negative relationship among ENV and GOV sustainability performance with COC and significantly positive relationship between SOC sustainability performance and COC (Model 4). This study includes TESG, a composite measure of non-financial sustainability performance in Model 5, and the coefficient for TESG is significant and negative at 10% significance level which means there is significant negative relation between TESG and COC. Therefore, Hypothesis 8 is accepted. The results obtained while employing system GMM confirms the results found through fixed effect regressions.

This study relies on a set of diagnostic tests for the validity of GMM results. The first test, the AR (2), is insignificant at 10% level showing that the first differenced error term is not serially correlated at second order. Sargan test is also insignificant at 10% level which shows over-identification restrictions are also valid showing validity of the instrument variables. The third test, Hansen test, is also insignificant at 10% which shows that our instruments are valid. Moreover, the instruments used in the estimation are less than the number of groups. Hence, these results are valid.

This study uses company level control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual. The control variables used in this study are consistent with previous studies (Suto and Takehara, 2017; Gholami et al., 2022). There exists significant negative relation between leverage and COC which complements the results of prior literature (Gholami et al., 2022; Mariani et al., 2021; Ramirez et al., 2022). Liquidity which is a measure to control liquidity risk, also positively related to COC which omplements the results of prior research (Gholami et al., 2022; Sassen et al., 2016; Bouslah et al., 2013). Higher beta values indicate charge of higher rate of return by investors for compensating uncertain realization of stock returns. In line with the results of previous studies, this study

also found a positive relation between beta and COC (Mariani et al., 2021). This study found the significant positive relation of size with COC. The possible reason for such relationship is the choice of firms which are selected on the basis of higher market capitalization and the findings are consistent with the finding of (Wong et al., 2021; Gholami et al., 2022).

TABLE 4.23: Impact of Environmental, Social and Governance (TESG) Sustainability Performance on Cost of Capital (COC) by Employing System GMM

	(1) **COC**	**(2)** **COC**	**(3)** **COC**	**(4)** **COC**	**(5)** **COC**
COC (t-1)	.302***	.25***	.219***	.249***	.234***
	(0.074)	(0.067)	(0.068)	(0.064)	(0.066)
ENV	-.001*			-.014**	
	(0.014)			(0.007)	
SOC		-0.003		.007***	
		(0.002)		(0.002)	
GOV			-.008*	-.01*	
			(0.005)	(0.006)	
TESG					-.002*
					(0.001)
ECON	-.011**	-.014**	-.025***	-.014***	-.013**
	(0.005)	(0.006)	(0.007)	(0.005)	(0.006)
LIQU	0.028	.034*	.037*	.036*	.035*
	(0.022)	(0.020)	(0.021)	(0.019)	(0.019)
LEV	-0.023	-.05***	-.041**	-.028*	-.043***
	(0.018)	(0.017)	(0.016)	(0.016)	(0.016)
SIZE	.005**	.007***	.007***	.006***	.007***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
BETA	.031**	.041***	.052***	.038***	.041***
	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
MSP	.002**	0.002	0.002	.002***	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	.002*	.005***	.005***	.003***	.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

This study employed macro-economic control variables and found that money Supply, inflation and GDP are significantly related with COC. The reason for inflation-COC relationship is increase in inflation will cause increase in real rate of

	(1) COC	(2) COC	(3) COC	(4) COC	(5) COC
INF	.003***	.003***	.003***	.004***	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Z-SCORE	0.002	0.004	0.003	0.002	0.003
	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
POP	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ACCR	-0.01	-0.008	-0.004	-0.004	-0.008
	(0.017)	(0.068)	(0.064)	(0.067)	(0.065)
DLOSS	0.001	-.013*	-0.011	0.01	-0.009
	(0.008)	(0.008)	(0.007)	(0.010)	(0.007)
CONS	-0.138	-.214**	-.265**	-0.136	-.201**
	(0.114)	(0.099)	(0.105)	(0.091)	(0.101)
AR (2) Test	-1.15	-1.3	-1.51	-1.28	-1.4
(p-value)	0.252	0.193	0.130	0.200	0.160
Sargan Test	191.31	239.79	258.43	263.65	240.03
(p-value)	0.204	0.299	0.173	0.630	0.311
Hansen Test	186.14	241.88	238.78	241.52	237.97
(p-value)	0.286	0.267	0.473	0.908	0.345

Above table shows the results of system GMM regressions for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. Here, lagged values of COC are used as explanatory variable. In this table, COC is the cost of capital, ECON is the economic sustainability performance , ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governance sustainability performance, TESG is the composite of environmental, social and governance sustainability performance, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POP is the population. Standard errors are shown in parentheses with $***p < 0.01, **p < 0.05, *p < 0.1$.

return and inflation will be added in real rate of return which ultimately increase COC. The possible explanation regarding GDP-COC relationship is that high growth rate means high demand of funds which will ultimately increase the COC. Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. Money supply-COC is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COC. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple

comparisons across different countries.

4.4.7 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance and Cost of Equity (ECON-COE) Relationship by Employing System GMM

This study employed the different models which are based on equation 3.60 & 3.61 and tests the moderating effect of TESG on ECON-COE relationship by employing system GMM. This study not only explored the differential effect of different elements (ENV, SOC and GOV) of TESG on ECON-COE relationship (equation 3.60) but also checked the overall impact of TESG on ECON-COE relationship by using TESG index (equation 3.61).

$$COE_{j,i,t} = \beta_0 + \beta_1 COE_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 TESG_{j,i,t}$$
$$+\beta_4 ECON_{j,i,t} \times TESG_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t}$$
$$+\beta_9 DLOSS_{j,i,t} + \beta_{10} ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t}$$
$$+\beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.60 & 3.61 are reported in Table 4.24 where COE is used as a dependent variable. The commonly used form of the equations 3.60 & 3.61 are depicted above. This study has explored the moderating effect of TESG sustainability performance on the relationship between ECON-COE using equation 61. ECON is significantly and negatively related to COE in all the models (Model 1 to 5) shown in Table 4.24. Coefficients of ECON describes the inverse relation (coefficients of ECON are significant and negative). Based on these results, we may safely assume that ECON is the key determinant of COE. Environmental sustainability performance (ENV) is showing significant negative relationship with COE (Model 1). However, once ECON is placed in the equation, there still exists negative relationship between these variables (coefficient of ECON*ENV is negative and significant). Therefore, Hypothesis 3a is accepted.

Model 2 describes that there is no association between social sustainability performance (SOC) and COE. Moreover, once ECON is taken into account, still there exists no relationship between these variables. Model 3 also shows that governance sustainability performance (GOV) is showing significant and negative relationship with COE. However, once ECON is placed in the equation, there exists negative relationship between these variables (coefficient of ECON*GOV is negative and significant). Moreover, governance sustainability performance (GOV) strengthens the ECON-COE relationship. Therefore, Hypothesis 3c is accepted. In model 4, this study places ENV, SOC and GOV sustainability performance variables simultaneously and found that only GOV sustainability performance is inversely and significantly related to COE.

Once ECON is placed in the equation, there still exists negative relationship between these variables (coefficient of ECON*GOV is negative and significant). Model 5 which includes TESG, a composite measure of non-financial sustainability performance shows significantly inverse relationship with COE and strong TESG sustainability performance further strengthens the ECON-COE relationship (coefficient of ECON*TESG is significant and negative). Therefore, Hypothesis 3 is accepted. These findings confirms our hypothesis that TESG strengthens the ECON-COE relationship and results are in-line with the findings of (Ng and Rezaee, 2015).

This study has employed lagged values of COE in the models for this purpose. The models employed lagged COE variable as one of the explanatory variables in addition to other variables. Over-identifying restrictions as per the Sargan test are also valid, which ensures the validity of the instrument variables. AR (2) test indicates that there is no autocorrelation issue in the models. AR (2) is insignificant showing that the first differenced error term is not serially correlated at second order and the Hansen test is also insignificant which shows identifying restrictions are valid. Moreover, the number of instruments is lesser than number of groups. Hence, these results are valid. By conducting these additional tests, this study has ensured that system GMM has addressed the concerns of omitted variable bias (Dahiya and Singh, 2020). The control variables are employed following prior literature (Gonçalves et al., 2022; El Ghoul et al., 2011; Hou et al., 2012; Ng and

Rezaee, 2015). This study has found the positive relationship between firm size and COE. The possible explanation for such relationship is the choice of firms with large market capitalization. All the large firms in size does not provide the true differentiation between large and small firms. The results are consistent with the findings of previous research (Li and Liu, 2018; Gonçalves et al., 2022; Breuer et al., 2018). This study explored the positive relation between beta and COE because investor's charge higher return in order to get compensation for uncertain stock returns realization, which gives the higher beta values. These results are consistent with the findings of prior research (Gonçalves et al., 2022; Hail and Leuz, 2006; Dahiya and Singh, 2020; El Ghoul et al., 2011).

This study has explored the significant negative relation between Z-Score and COE. Breuer et al. (2018) and Bouslah et al. (2013) explained Z-Score as distress risk or default risk. There is lower probability of default of firms which are having higher Z-Score value. Z-Score a measure for probability of bankruptcy score used as a proxy for financial distress in this study. Inflation and GDP are found significantly positive with COE. The possible explanation regarding GDP-COE relationship is that high growth rate means high demand of funds which will ultimately increase the COE. These findings complement the results of (Breuer et al., 2018). The reason for inflation-COE relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COE.

TABLE 4.24: Moderating Effect of TESG on ECON-COE Relationship by Employing System GMM

	(1) COE	**(2) COE**	**(3) COE**	**(4) COE**	**(5) COE**
COE (t-1)	.147*	.193***	.128*	.193***	.169**
	(0.085)	(0.063)	(0.065)	(0.064)	(0.077)
ECON	-.011**	-.014**	-.034*	-.026**	-.03*
	(0.013)	(0.017)	(0.020)	(0.019)	-0.02
ENV	-.002*			-0.021	
	(0.017)			(0.028)	
ENV*ECON	-.005*			0.031	
	(0.005)			(0.025)	
SOC		0.003		0.005	
		(0.007)		(0.025)	
SOC*ECON		-0.005		-0.003	
		(0.006)		(0.022)	

	(1) COE	**(2) COE**	**(3) COE**	**(4) COE**	**(5) COE**
GOV			-.006*	-.038*	
			(0.009)	(0.065)	
GOV*ECON			-.005**	-.048*	
			(0.006)	(0.058)	
TESG					-.002*
					(0.003)
TESG*ECON					-.003***
					(0.007)
SIZE	.001**	.001**	.003**	.001*	.005***
	(0.003)	(0.003)	(0.001)	(0.002)	(0.001)
BETA	.059**	.028*	.022**	.026*	.014*
	(0.027)	(0.016)	(0.015)	(0.017)	(0.014)
Z-SCORE	-0.001	-.002***	-0.002	-.002*	-0.002
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)
GDP	.003*	.003**	.005***	.003**	.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	.002*	.003***	.003***	.003***	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LIQU	0.017	-0.006	-0.003	-0.004	0.004
	(0.029)	(0.016)	(0.014)	(0.015)	(0.014)
LEV	-0.003	-0.005	-0.003	-0.003	-0.01
	(0.015)	(0.012)	(0.013)	(0.012)	(0.018)
DLOSS	0.008	0.002	.021*	0.001	-0.001
	(0.012)	(0.010)	(0.011)	(0.009)	(0.010)
ACCR	0.004	0.029	-0.021	0.026	0.004
	(0.049)	(0.035)	(0.042)	(0.034)	(0.050)
MSP	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
POP	0.001	0.002	0.001	0.002	0.004
	(0.002)	(0.003)	(0.002)	(0.003)	(0.001)
CONS	.534***	-0.018	0.012	-0.015	0.05
	(0.179)	(0.099)	(0.093)	(0.103)	(0.094)
AR (2) Test	-1.05	-0.66	-1.25	-0.66	-0.81
(p-value)	0.293	0.508	0.212	0.511	0.415
Sargan Test	108.96	231.9	231.99	227.62	173.19
(p-value)	0.795	0.509	0.525	0.55	0.608
Hansen Test	121.76	244.09	244.39	251.78	186.66
(p-value)	0.489	0.296	0.307	0.166	0.332

*Above table shows the results of system GMM regressions for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. Here, lagged values of COE is used as explanatory variable. In this table, COE is the cost of equity, ECON is the economic sustainability performance , ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governance sustainability performance, TESG is the composite of environmental, social and governance sustainability performance, ECON*ENV is the interaction term between ECON and ENV, ECON*SOC is the interaction term between ECON and SOC, ECON*GOV is the interaction term between ECON and GOV, ECON*TEST is the interaction term between ECON and TESG, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POPU is the population. Standard errors are shown in parentheses with* $***p < 0.01, **p < 0.05, *p < 0.1$.

4.4.8 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance and Cost of Debt (ECON-COD) Relationship by Employing System GMM

This study employed the different models which are based on equations 3.62 & 3.63 and tests the moderating effect of TESG on ECON-COD relationship by employing system GMM. This study not only explored the differential effect of different elements (ENV, SOC and GOV) of TESG on ECON-COD relationship (equation 3.62) but also checked the overall impact of TESG on ECON-COD relationship by using TESG index (equation 3.63).

$$COD_{j,i,t} = \beta_0 + \beta_1 COD_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 TESG_{j,i,t}$$
$$+\beta_4 ECON_{j,i,t} \times TESG_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t}$$
$$+\beta_9 DLOSS_{j,i,t} + \beta_{10} ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t}$$
$$+\beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.62 & 3.63 are reported in Table 4.25 where COD is used as a dependent variable. The commonly used form of the equations 3.62 & 3.63 are depicted above. This study has checked the moderating effect of TESG sustainability performance on ECON-COD relationship using equation 3.63. Table 4.25 depicts that all the models (Model 1 to 5) show that strong ECON has negative effect on COD (all coefficients of ECON are negative and significant). These results demonstrate that ECON is the key determinant of COD.

Model 1 and 2 demonstrates that ENV & SOC sustainability performance has no impact on COD but once ECON is taken into account, both ENV & SOC sustainability has negative effect on COD (coefficient of ECON*ENV, SOC*ECON are negative and significant). Therefore, Hypothesis 6a is accepted. Model 3 also confirm our conjecture that strong gov- ernance mechanisms are value enhancing and the relationship further strengthens when we incorporate ECON into the

equation. Therefore, Hypothesis 6c is accepted. In model 4, this study places ENV, SOC and GOV sustainability performance variables simultaneously and found no significant relationship among the variables. Model 5 which include TESG, a composite non-financial sustainability performance measure and found that TESG is value enhancing (coefficient of TESG is significant and negative) and strong overall sustainability performance further strengthen the negative relationship between ECON and COD (coefficient of ECON*TESG is significant and negative). Therefore, Hypothesis 6 is accepted.

AR (2) test shows p-values for Model 1 (0.217), Model 2 (0.280), Model 3 (0.303), Model 4 (0.261) and Model 5 (0.222) and in these models, the hypotheses of no serial correlation of errors in our models are accepted taking into account that the probability of Z value is higher than 0.05. The results of Hansen Test (p-values) are Model 1 (0.247), Model 2 (0.396), Model 3 (0.457), Model 4 (0.471) and Model 5 (0.108). Sargan test shows p-values for Model 1 (0.128), Model 2 (0.157), Model 3 (0.360), Model 4 (0.126) and Model 5 (0.904). Over-identifying restrictions as per the Sargan test are also valid, which ensures the validity of the instrument variables.

Following Gonçalves et al. (2022); Suto and Takehara (2017); Ng and Rezaee (2012); Magnanelli and Izzo (2017); Yeh et al. (2020); Bhuiyan and Nguyen (2019), this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. This study has found the significant negative relation between leverage and COD which endorses the results obtained by prior research (Gonçalves et al., 2022; La Rosa et al., 2018). The reason for such relationship is firms which are more creditworthy can take on more leverage. This study explored the positive relation between beta and COE which is consistent with the findings of prior research (Gonçalves et al., 2022; Attig et al., 2013). The expected reason is with higher systematic risk, there is an increase in COD. Size is also negatively related to COD because large firms are considered less risky as these firms can provide more collateral as compared with small firms. The results complement the findings of previous research (Goss and Roberts, 2011; Gonçalves et al., 2022; Sharfman and Fernando, 2008). Z-Score which is a measure of financial distress and it is expected that it lowers

the default risk and the firms have cushion to meet their debt obligations. It captures the firm's financial strength because the greater the Z-Score, the lesser the financial distress (Ge and Liu, 2015; Fonseka et al., 2019). This study has found the significant negative relationship between Z-Score and COD only in Model 4 which is in-line with the results of (Ge and Liu, 2015).

Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries. This study employed macro-economic control variables and found that money Supply, inflation and GDP are significantly related with COD. The reason for inflation-COD relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COD. Money supply-COD is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COD. The possible explanation regarding GDP-COD relationship is that high growth rate means high demand of funds which will ultimately increase the COD.

TABLE 4.25: Moderating Effect of TESG on ECON-COD Relationship by Employing System GMM

	(1) COD	**(2) COD**	**(3) COD**	**(4) COD**	**(5) COD**
COD (t-1)	.248***	.279***	.271***	.278***	.226***
	(0.083)	(0.062)	(0.060)	(0.060)	(0.073)
ECON	-.005*	-.007**	-.009*	-.009*	-.007***
	(0.012)	(0.015)	(0.018)	(0.017)	-0.019
ENVT	-0.001			0.007	
	(0.015)			(0.023)	
ENV*ECON	.002*			-0.002	
	(0.005)			(0.021)	
SOC		-0.009		0.021	
		(0.006)		(0.020)	
SOC*ECON		-.011**		-0.018	
		(0.005)		(0.017)	
GOV			-.001*	-0.025	
			(0.008)	(0.051)	
GOV*ECON			-.007**	0.011	
			(0.006)	(0.044)	
TESG					-.003*
					(0.002)

	(1) COD	(2) COD	(3) COD	(4) COD	(5) COD
TESG*ECON					-.002**
					(0.002)
LEV	-0.015	-.042**	-.032**	-.04**	-0.028
	(0.013)	(0.018)	(0.013)	(0.018)	(0.018)
SIZE	-.001*	-.011***	-.005***	-.01***	-.002*
	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)
Z-SCORE	-0.002	-.005*	-0.003	-.004*	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
BETA	.054***	.038**	.029**	.035**	.046***
	(0.020)	(0.015)	(0.014)	(0.015)	(0.016)
MSP	0.001	.001*	.001*	.001*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	0.001	.003**	0.001	.003**	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SIZE	-.001*	-.011***	-.005***	-.01***	-.002*
	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)
Z-SCORE	-0.002	-.005*	-0.003	-.004*	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
BETA	.054***	.038**	.029**	.035**	.046***
	(0.020)	(0.015)	(0.014)	(0.015)	(0.016)
MSP	0.001	.001*	.001*	.001*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	0.001	.003**	0.001	.003**	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INF	0.001	.003***	.003***	.003***	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LIQ	0.049	-0.012	0.018	0.009	0.018
	(0.026)	(0.017)	(0.014)	(0.017)	(0.016)
DLOSS	-0.017	0.002	0.005	0.003	-0.016
	(0.010)	(0.007)	(0.007)	(0.007)	(0.008)
ACCR	0.031	0.018	0.03	0.018	0.015
	(0.046)	(0.042)	(0.039)	(0.042)	(0.041)
POPU	0.002	0.001	0.003	0.001	0.003
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
CON	.422***	.256**	0.121	.229**	.211**
	(0.146)	(0.100)	(0.089)	(0.100)	(0.101)
AR (2) Test	-1.24	-1.08	-1.03	-1.12	-1.22
(p-value)	0.217	0.280	0.303	0.261	0.222
Sargan Test	139.92	254.72	274.25	255.79	154.83
(p-value)	0.128	0.157	0.36	0.126	0.904
Hansen Test	132.31	238.07	235.69	231.88	202.72
(p-value)	0.247	0.396	0.457	0.471	0.108

*Above table shows the results of system GMM regressions for BRICS including Pakistan. Here, lagged values of COD is used as explanatory variable. In this table, COD is the cost of debt, TESG is the composite of environmental, social and governance sustainability performance, ECON*ENV is the interaction term between ECON and ENV, ECON*SOC is the interaction term between ECON and SOC, ECON*GOV is the interaction term between ECON and GOV, ECON*TEST is the interaction term between ECON and TESG, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POPU is the population. Standard errors are shown in parentheses with* $***p < 0.01, **p < 0.05, *p < 0.1$.

4.4.9 Moderating Effect of Environmental, Social and Governance (TESG) Sustainability Performance on Economic Sustainability Performance and Cost of Capital (ECON-COC) Relationship by Employing System GMM

This study employed the different models which are based on equations 3.58 & 3.59 and tests the moderating effect of TESG on ECON-COC relationship by employing system GMM. This study not only explored the differential effect of different elements (ENV, SOC and GOV) of TESG on ECON-COC relationship (equation 3.58) but also checked the overall impact of TESG on ECON-COC relationship by using TESG index (equation 3.59).

$$COC_{j,i,t} = \beta_0 + \beta_1 COC_{j,i,t-1} + \beta_2 ECON_{j,i,t} + \beta_3 TESG_{j,i,t}$$
$$+\beta_4 ECON_{j,i,t} \times TESG_{j,i,t} + \beta_5 LIQ_{j,i,t} + \beta_6 LEV_{j,i,t} + \beta_7 SIZE_{j,i,t} + \beta_8 ZMIG_{j,i,t}$$
$$+\beta_9 DLOSS_{j,i,t} + \beta_{10} ACC_{j,i,t} + \beta_{11} BETA_{j,i,t} + \beta_{12} MSP_{j,t}$$
$$+\beta_{13} GDP_{j,t} + \beta_{14} INF_{j,t} + \beta_{15} POP_{j,t} + \varepsilon_{j,i,t}$$

The results of equations 3.58 & 3.59 are reported in Table 4.26 where COC is used as a dependent variable. The commonly used form of the equations 3.58 & 3.59 is depicted above. This study has explored the moderating effect of TESG sustainability performance on the relationship between ECON and COC using equation 3.59. Table 4.26 depicts that all the models (Model 1 to 5) show that strong ECON has negative impact on COC (all coefficients of ECON are negative and significant). These results demonstrates that ECON is the key determinant of COC. Model 1 shows that ENV sustainability performance has significant impact on COC but once ECON is taken into account, strong ENV sustainability performance further strengthens the association between ECON and COC (coefficient of ECON*ENV is negative and significant). Therefore, Hypothesis 9a is accepted. Model 2 shows that SOC sustainability performance has no impact on COC. Moreover, once ECON is taken into account, there still exists no association (coefficient

of ECON*SOC is insignificant). Model 3 also confirm our conjecture that strong governance mechanisms are value enhancing and the relationship further strengthens when we incorporate ECON into the equation. Therefore, Hypothesis 9c is accepted. When all the ENV, SOC and GOV sustainability performance variables are included in the model simultaneously, there exists negative relationship between (ENV and GOV) sustainability performance and COC. Moreover, ENV and GOV sustainability performance strengthens the negative relation between ECON-COC. In Model 5, this study include TESG, a composite non-financial sustainability performance and results depict that TESG is value enhancing (coefficient of TESG is significant and negative) and strong overall TESG sustainability performance further strengthen the negative relationship between ECON and COC (coefficient of ECON*TESG is significant and negative). Therefore, Hypothesis 9 is accepted. The results found in this study endorses the findings of prior research (Ng and Rezaee, 2015) and confirm our results obtained from fixed effects earlier in this study.

This study relies on a set of diagnostic tests for the validity of GMM results. The first test, the AR (2), is insignificant at 10% level showing that the first differenced error term is not serially correlated at second order. Sargan test is also insignificant at 10% level which shows over-identification restrictions are also valid showing validity of the instrument variables. The third test, Hansen test, is also insignificant at 10% which shows that our instruments are valid. Moreover, the instruments used in the estimation are less than the number of groups. Hence, these results are valid.

Following Suto and Takehara (2017); Atan et al. (2018); Gholami et al. (2022), this study employs control variables including Liquidity, Leverage, Size, Z-Score, Beta, DLoss, and Accrual, Money Supply, GDP, Inflation and Population. Liquidity which is a measure to control liquidity risk, also positively related to COC which omplements the results of prior research (Gholami et al., 2022; Sassen et al., 2016; Bouslah et al., 2013). Higher beta values indicate charge of higher rate of return by investors for compensating uncertain realization of stock returns. In line with the results of previous studies, this study also found a positive relation between beta and COC (Mariani et al., 2021). There exists significant negative

relation between leverage and COC which complements the results of prior literature (Gholami et al., 2022; Mariani et al., 2021; Ramirez et al., 2022). This study found the significant positive relation of size with COC. The possible reason for such relationship is the choice of firms which are selected on the basis of higher market capitalization and the findings are consistent with the finding of (Wong et al., 2021; Gholami et al., 2022).

This study employed macro-economic control variables and found that money Supply, inflation and GDP are significantly related with COC. Money supply-COC is positively related because money supply creates liquidity in short term which translates in inflation. Increase in money supply means increase in inflation which increase the COC. The possible explanation regarding GDP-COC relationship is that high growth rate means high demand of funds which will ultimately increase the COC. Breuer et al. (2018) explained that GDP growth rate is employed to control for economic development of that subject country. The reason for inflation-COC relationship is increase in inflation will cause increase in real rate of return and inflation will be added in real rate of return which ultimately increase COC. Bui et al. (2020) employed macroeconomic variables in their study in order to minimize the probability of model misspecification which may arise due to country differences. There can be confusing results in case of making simple comparisons across different countries.

TABLE 4.26: Moderating Effect of TESG on ECON-COC Relationship by Employing System GMM

	(1) **COC**	**(2)** **COC**	**(3)** **COC**	**(4)** **COC**	**(5)** **COC**
COC (t-1)	.332***	.314***	.237***	.313***	.232***
	(0.082)	(0.061)	(0.062)	(0.108)	(0.077)
ECON	-.002**	.002*	-.008**	-.004*	-.005***
	(0.010)	(0.013)	(0.016)	(0.021)	-0.016
ENV	-.002*			-.003*	
	(0.014)			(0.032)	
ENV*ECON	-.003**			-.007***	
	(0.004)			(0.032)	
SOC		-0.007		0.015	
		(0.006)		(0.031)	

	(1) **COC**	**(2)** **COC**	**(3)** **COC**	**(4)** **COC**	**(5)** **COC**
SOC*ECON		-0.009		-0.013	
		(0.005)		(0.030)	
GOV			-.001*	-.005**	
			(0.007)	(0.067)	
GOV*ECON			-.006**	-.004***	
			(0.005)	(0.069)	
TESG					-.006*
					(0.004)
TESG*ECON					-.002***
					(0.002)
LIQ	0.002	.031**	.013*	.03*	.024*
	(0.022)	(0.016)	(0.014)	(0.034)	(0.017)
LEV	-.02*	-.022*	-.046***	-0.021	-.041**
	(0.012)	(0.012)	(0.014)	(0.015)	(0.017)
SIZE	.006*	.005***	0.002	0.005	.003**
	(0.003)	(0.002)	(0.001)	(0.006)	(0.001)
Z-SCORE	-0.001	-0.004	-0.004	-0.003	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
BETA	0.014	.039***	.04***	0.039	.049***
	(0.015)	(0.014)	(0.014)	(0.029)	(0.015)
MSP	0.001	.002***	.002**	0.002	.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP	.02*	.002*	.002*	0.002	.003**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
INF	.002***	.004***	.003***	.004***	.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DLOSS	0.001	-0.005	0.002	-0.004	-0.002
	(0.010)	(0.007)	(0.007)	(0.015)	(0.008)
ACCR	0.021	0.048	0.014	0.047	0.016
	(0.036)	(0.031)	(0.034)	(0.063)	(0.037)
POPU	0.02	0.03	0.02	0.04	0.03
	(0.010)	(0.010)	(0.010)	(0.020)	(0.010)
CONS	-0.179	-.202**	-0.138	-0.189	-.21**
	(0.121)	(0.090)	(0.088)	(0.211)	(0.095)
AR (2) Test	-0.94	-1.14	-1.42	-1.11	-1.38
(p-value)	0.345	0.253	0.155	0.267	0.167
Sargan Test	110.24	206.8	230.2	206.71	144.98
(p-value)	0.769	0.891	0.558	0.873	0.971
Hansen Test	128.42	243.04	241.61	240.88	200.27
(p-value)	0.328	0.312	0.352	0.314	0.132

*Above table shows the results of system GMM regressions for BRICS (Brazil, Russia, India, China and South Africa) including Pakistan. Here, lagged values of COC is used as explanatory variable. In this table, COC is the cost of capital, ECON is the economic sustainability performance , ENV is the environmental sustainability performance, SOC is the social sustainability performance, GOV is the governance sustainability performance, TESG is the composite of environmental, social and governance sustainability performance, ECON*ENV is the interaction term between ECON and ENV, ECON*SOC is the interaction term between ECON and SOC, ECON*GOV is the interaction term between ECON and GOV, ECON*TEST is the interaction term between ECON and TESG, LIQU is the liquidity, LEV is the leverage, SIZE is the size, Z-Score is the zmijewski's Z-score, DLOSS is the dummy variable to capture negative net income, ACCR is the accrual, BETA is the beta, MSP is the money supply, GDP is the growth rate, INF is the inflation, POPU is the population. Standard errors are shown in parentheses with* $***p < 0.01, **p < 0.05, *p < 0.1$.

To sum up, we may say that ECON and TESG sustainability performance affect cost of financing which is consistent with previous research (Bhuiyan and Nguyen, 2019; Gonçalves et al., 2022; Crifo et al., 2015; Plumlee et al., 2015; Dhaliwal et al., 2011; Ge and Liu, 2015; Gupta, 2018; Ng and Rezaee, 2015; Hasan et al., 2017). When ECON is decomposed into growth factor (GR), operation efficiency factor (OP) and research effort factor (RES), OP and RES shows significant negative relationship with cost of financing whereas GR is not related with cost of financing. However, when we decompose TESG, a composite non-financial sustainability performance measure into individual dimensions, ENV and GOV sustainability performance is significantly and negatively related with cost of financing whereas strong SOC sustainability performance is not related with cost of financing.

Ng and Rezaee (2015) provided the reason for these relationships is that governance and environmental sustainability performance directly affect financial performance of a company by either enhancing the effectiveness of governance measures in case of governance (GOV) sustainability performance or reducing environmental liabilities in case of environmental initiatives. Shad et al. (2020) explored that firms with sound environmental sustainability reporting should have lower systematic risk (beta) resulting in lower cost of financing. Pham et al. (2012) established that firms with strong governance mechanisms are associated with reduction in perceived risk and asymmetry of information of the firm, thereby decreasing cost of financing. The possible reason for insignificant relationship between social (SOC) sustainability performance and COE is provided by Ng and Rezaee (2015) that it may require additional resources. However, does not directly create value for shareholders and therefore, is not directly linked to COE. Finally, we have explored the moderating effect of TESG between ECON and Cost of financing and found that strong TESG sustainability performance strengthens the negative relationship between ECON and cost of financing. Researchers should take into account both ECON and TESG simultaneously in order to obtain a complete picture regarding relationship between sustainability and cost of financing. Cost of financing means cost of capital (COC), cost of debt (COD) and cost of equity (COE).

There are multiple studies which have explored the negative relationship between sustainability performance and cost of financing. However, a relatively small body

of literature finds little or no support regarding this relationship. This inconsistency may be due to other variables which play a role in this relationship, such as industry membership, type of measure used to assess sustainability performance, choice of sample and other institutional and cultural factors that impact the context of the firm (Gianfrate et al., 2018).

In a nutshell, the summary of results is shown in the below listed table.

TABLE 4.27: Summary of Results

Hypothesis	**Description of Hypothesis**	**Result**
H1	There is inverse relationship between ECON and COE.	Accepted
H1a	There is inverse relationship between GR and COE.	Rejected
H1b	There is inverse relationship between OP and COE.	Accepted
H1c	There is inverse relationship between RES and COE.	Accepted
H2	There is inverse relationship between TESG and COE.	Accepted
H2a	There is inverse relationship between ENV and COE.	Accepted
H2b	There is inverse relationship between SOC and COE.	Rejected
H2c	There is inverse relationship between GOV and COE.	Accepted
H3	TESG strengthens the negative relationship between ECON and COE.	Accepted
H3a	ENV strengthens the negative relationship between ECON and COE.	Accepted
H3b	SOC strengthens the negative relationship between ECON and COE.	Rejected
H3c	GOV strengthens the negative relationship between ECON and COE.	Accepted
H4	There is inverse relationship between ECON and COD.	Accepted
H4a	There is inverse relationship between GR and COD.	Rejected
H4b	There is inverse relationship between OP and COD.	Accepted
H4c	There is inverse relationship between RES and COD.	Accepted
H5	There is inverse relationship between TESG and COD.	Accepted
H5a	There is inverse relationship between ENV and COD.	Accepted
H5b	There is inverse relationship between SOC and COD.	Rejected
H5c	There is inverse relationship between GOV and COD.	Accepted
H6	TESG strengthens the negative relationship between ECON and COD.	Accepted
H6a	ENV strengthens the negative relationship between ECON and COD.	Accepted
H6b	SOC strengthens the negative relationship between ECON and COD.	Rejected
H6c	GOV strengthens the negative relationship between ECON and COD.	Accepted

Hypothesis	**Description of Hypothesis**	**Result**
H7	There is inverse relationship between ECON and COC.	Accepted
H7a	There is inverse relationship between GR and COC.	Rejected
H7b	There is inverse relationship between OP and COC.	Accepted
H7c	There is inverse relationship between RES and COC.	Accepted
H8	There is inverse relationship between TESG and COC.	Accepted
H8a	There is inverse relationship between ENV and COC.	Accepted
H8b	There is inverse relationship between SOC and COC.	Rejected
H8c	There is inverse relationship between GOV and COC.	Accepted
H9	TESG strengthens the negative relationship between ECON and COC.	Accepted
H9a	ENV strengthens the negative relationship between ECON and COC.	Accepted
H9b	SOC strengthens the negative relationship between ECON and COC.	Rejected
H9c	GOV strengthens the negative relationship between ECON and COC.	Accepted

Chapter 5

Conclusion and Policy Recommendations

This chapter presents summary and conclusion of research findings at section 5.1. Managerial and Research implications of sustainability are discussed in section 5.2 and 5.3 respectively. Limitations are discussed in section 5.4. Future directions are reported in section 5.5.

5.1 Summary and Conclusions

Rezaee (2016) argued that business should focus on achieving economic, environmental, social and governance (EESG) sustainability performance dimensions by taking some initiatives to do social good beyond their self-interests and comply with applicable rules, laws, corporate governance reforms and regulations and enhancement of wealth of shareholders as required by sustainability. To simplify, it means enhancing company's positive impacts and reducing their adverse effects on environment and society while creating stakeholder's value. The degree of company's success should be determined not only by company's reported earnings but also by their environmental performance, social responsibility, governance and ethical behavior.

Sustainability has gained considerable attention from regulators, policy makers, investment and business community over the past several years and it is expected

to continue in future as well. Therefore, the academic researchers and community should pay attention to sustainability by incorporating business sustainability education into their accounting and business curriculum and conducting research related to sustainability in all areas of sustainability performance dimensions, theories, assurance and reporting and risks. The sustainability theories, programs, policies, risk management, activities, assurance, reporting and best practices should support business organizations throughout the world in incorporating the economic, environmental, social and governance (EESG) sustainability performance dimensions into their management processes and research scholars to conduct research related to sustainability.

In a nutshell, we may say that sustainability performance dimensions and related risk, practical sustainability standards, sustainability theoretical framework, reporting and performance should be beneficial for policy makers, companies and their management, investors, regulators, research scholars and educators. All theories (including stakeholder, shareholder, institutional, stewardship, signaling and legitimacy) emphasis on sustainability performance key measures namely customer satisfaction, innovation, operational efficiency, talent management and should be derived from external factors of technology, reputation, globalization, completion and utilization of natural resources as well as internal aspects of risk profile, corporate culture, strategy and strengths and weaknesses (Rezaee, 2016).

Stakeholder and stewardship theories fit well with sustainability as these theories guide management to act as stewards whose motives are aligned with stakeholder's interests. These standards and theories help explain management practices and strategies in creating financial / economic (ECON) sustainable performance to create value for shareholders and in attaining TESG (non-financial) sustainability performance in order to protect all stakeholder's interests (Rezaee, 2016). When the firm is showing better sustainability performance, it enjoys good repute and in return their credibility increases which lowers down the interest rates, as a result overall cost of financing decreases. Moreover, Shareholder's reward firms displaying higher sustainability performance in the form of lower required equity premiums whereas debt holders demand higher interest rates from firms which are performing poor in terms of sustainability performance.

This study contributes to the existing literature in a number of ways. First, the relation between ECON and cost of financing is explored in emerging markets including Brazil, Russia, India, China, South Africa and Pakistan considering the non-financial firms which are involved in financial (ECON) and non-financial (TESG) sustainable activities over the period 2009-2018. ECON is a key financial measure that ensures sustainability as well as current profitability and future prospects of companies. There are three factors which represent ECON, calculated through Exploratory Factor Analysis (EFA) and are applied to seven proxies of ECON.

These three factors are grouped into growth opportunities (GR), operation efficiency (OP), and research factor (RES). ECON is the equally weighted average of growth opportunities (GR), operation efficiency (OP), and research factor (RES). Cost of financing means cost of capital (COC), cost of equity (COE) and cost of debt (COD). This study has not only employed composite ECON (financial) measure but also used individual ECON factors and checked the overall as well as individual effect of these factors on cost of financing as well. The results show that overall ECON decreases the cost of financing. This relationship is mainly contributed by operation efficiency (OP) and research factor (RES). Both factors also show negative relationship with cost of financing.

Second, this study has also investigated the effect of TESG, a composite non-financial measure of sustainability performance on cost of financing. TESG sustainability performance is the composite score obtained by subtracting number of concerns from number of strengths for each dimension i.e. Environmental, Social and Governance. The data is collected on the strengths and concerns normally referred to as positive and negative signs, using approximately eighty signs in seven areas. The main areas are, community, corporate governance, diversity, environment, employee relations, human rights, and products quality. Firstly, by using all the strengths and concerns which represent TESG sustainability performance, we have developed an Index called TESG. Secondly, we have mapped attributes to TESG dimensions to check the effect of various measures of sustainability performance on COC, COE and COD.

Environmental dimension includes four strengths namely beneficial products and

services, recycling, clean energy, pollution prevention and six concerns namely hazardous waste, substantial emissions, climate change, regulatory problems, agricultural chemicals and ozone depleting chemicals. Social dimension includes seven strengths namely charitable giving, support for housing, innovative giving, support for education, employment of the disabled, work / life benefits and women & minority contracting and four concerns namely tax disputes, investment controversies, negative economic impact and controversies. Governance dimension include three strengths namely limited compensation, transparency strength and ownership strength and two concerns namely high compensation and ownership concern.

This study checked the composite (TESG) along with individual impact of environmental (ENV), social (SOC) and governance (GOV) sustainability performance on cost of financing. The findings show that only environmental (ENV) and governance (GOV) sustainability performance decreases the cost of financing. The composite measure i.e. TESG sustainability performance also reduces the cost of financing in this study which is in line with previous research (Dhaliwal et al., 2011).

The possible reasons for such results are the reduction of environmental liabilities related to environmental initiative or the enhancement of the governance measures effectiveness. Social sustainability performance requires additional resources and does not directly create value for shareholders. There is also time to spend for social cause by the companies so that market price it and ultimately cost of financing is reduced. The reason for environmental (ENV) and governance (GOV) significant impact is that by reducing environmental liabilities or improving the effectiveness of measures of corporate governance, there comes a straight impact on financial performance. Moreover, social (SOC) sustainability performance does not straightly generate shareholder value, therefore, this measure is not directly related to cost of financing.

Finally, this study also explored that TESG sustainability performance strengthens the negative relationship between ECON and cost of financing. The relationship between ECON-Cost of financing and TESG-cost of financing is already established. Most of the previous research takes into account only individual measure

of sustainability performance dimensions. However, this study has managed to focus on individual as well as composite measures of sustainability performance and checked their individual and integrated impact on cost of financing (cost of capital (COC), cost of equity (COE) and cost of debt (COD).

5.2 Research Implications of Sustainability

Previous research in corporate social responsibility (CSR) / ESG let to the discussion on various sustainability performance dimensions. Past studies ponder towards the fields of business ethics and strategic management (Orlitzky and Benjamin, 2001). Academic scholars in the field of economics, finance and accounting have studied the link between corporate social responsibility (CSR) performance / disclosures and earning management, COC, financial performance and firm value (Clarkson et al., 2011; Mackey et al., 2007; El Ghoul et al., 2011; Dhaliwal et al., 2011) While these studies enhanced our understanding of CSR / ESG drivers, one of economic, environmental, social and governance (EESG) sustainability performance dimensions and its impact on market and financial performance and firm value, these are often conducted in an isolated fashion and thus don't reveal the integrated effects of financial (ECON) and non-financial (TESG) measures of sustainability performance(Rezaee, 2016).

The relationship between economic disclosures and COC is well documented in finance and accounting literature (Lambert et al., 2007). Ye and Zhang (2011); Dhaliwal et al. (2011) finds a positive relation between CSR/ESG disclosure and COD and COE. These studies have explored one dimension of sustainability performance. The main reason of conducting research in this study is to integrate all economic, environmental, social and governance (EESG) sustainability performance dimensions into corporate reporting and business models. Further, to inform management to focus on sustainability and manage sustainability operation, strategic, financial, compliance, reputation and security risks that effect both financial (ECON) and non-financial (TESG) dimensions of sustainability performance. To inform management those initiatives related to CSR are not an expense rather it is an investment with future returns. Moreover, financial (ECON) and

non-financial (TESG) sustainability performance are interrelated and these have integrated effect on cost of financing (cost of capital (COC), cost of equity (COE) and cost of debt (COD).

5.3 Managerial Implications of Sustainability

The concept of sustainability theories, performance, risks, standards and reporting and assurance recommends that management should extend its emphasis beyond maximizing short term profit by considering the effect of its operations and entire value chain on all stakeholders including society, community and environment. The move towards integrity information related to sustainability performance is first step towards incorporating data related to sustainability performance into corporate reporting. As investor's protection provided by country's legal system and companies varies, the content and type of disclosures also vary across countries and companies.

Standard setters and regulators who are considered policymakers need to decide whether to encourage sustainability performance assurance and reporting through voluntary initiatives by companies as required by investors or mandatory requirements or a combination of voluntary and mandatory initiatives as encouraged by IIRC, GRI and SASB. Regulators and policymakers view financial information more factual, backward looking and quantitative and non-financial information as qualitative, conjectural and forward looking. Management requires to identify potential environmental, social, governance and ethical issues worldwide and needs to integrate them into their managerial processes and strategic planning.

Companies which aspire to be leaders in sustainability are tested by effective governance measures, increasing innovation, quality improvement, enhancing public expectations, heightened environmental and social problems and high standards of integrity and ethics. Therefore, management needs to maintain and develop sustainability programs that offer a common framework for integration of all economic, environmental, social and governance (EESG) sustainability dimensions to their management reporting and processes.

Dahiya and Singh (2020) pointed out that managers and policymakers must take

into account difference in cultures, legal norms, religion, regions, institutional frameworks and social backgrounds while harmonizing CSR activities. Firms often report positive contributions and under report negative effects (Richardson and Welker, 2001). CSR expenses are considered additional costs for firms and may impact firm's performance in long run(Sayed et al., 2017). There are various implications for the corporate, regulators and the investors. Regulators need to provide public awareness of these CSR activities and make sure strict enforcement of CSR acts. Efforts should be made to recognize quality of activities related to CSR instead of focusing on quantity of such activities. Manufacturing companies are required to give weightage to environmental aspect as investors give weightage to those companies which are providing contribution towards environment.

Investors while making investment decisions, consider CSR as a source of providing greater returns in future instead of taking it as moral obligation. Therefore, firm's financial performance is considered pre-requisite for investors, even the firms are engaged in social activities. Companies have to pay price in order to indulge in CSR activities and therefore, these firms have to pay price for it. Therefore, these firms will only go for these activities if these are beneficial to them. Sustainability reporting is considered value adding activity means there exists positive relationship between sustainability reporting and firm's performance (Uwuigbe et al., 2018).

This study has examined the impact of different sustainability dimensions on cost of financing mainly focusing on ECON (financial) and TESG (non-financial) sustainability performance and found inverse relationship between sustainability and cost of financing. The reason for inverse relationship is due to reduction of information asymmetry, risk mitigation and transparent reporting through sustainability reports to speculators and investors. The results are in line with the results of prior research (Ng and Rezaee, 2015; Dhaliwal et al., 2011).

The primary result of this study provides the inverse relationship between sustainability and cost of financing, which has some practical implications. Firstly, managers feel confident that sustainable activities are not only socially good but also decreasing their cost of financing. Managers found investing in environmental and social activities as beneficial because these are investments not costs and

reducing information asymmetries which ultimately reducing cost of financing and enhancing performance of the firm. Secondly, credit rating agencies should note the sustainability reporting potential in order to reduce firm risk. This study found that (ECON), environmental and governance sustainability individually and TESG sustainability performance, a composite non-financial measure reduces the cost of financing. Thirdly, equity analysts along with shareholders consider sustainability activities as a cost instead of investment and consider it a cause for firm value reduction. However, the results show otherwise. Due to sustainability activities, transparency and accountability of firm activities improves which help investors to make informed investment decisions. Fourthly, legislators and regulators can use these findings for mandatory sustainability reporting and future legislation.

5.4 Limitations of the Study

There are a few caveats to our study. Problem may exist with data sources. In this study, we have counted number of sustainability performance measures for companies when exploring business sustainability. This means we have treated economic, environmental, social and governance (EESG) sustainability performance dimensions equally. However, we have not considered comparative standing of each measure of performance. It is possible that one measure is more related as compared to some other measure. Furthermore, our primary focus was on ECON while investigating the connection between sustainability and cost of financing. Since this study checks the effect of individual sustainability performance components on cost of financing. We have defined TESG sustainability performance score by using different components, therefore, we have tested the robustness of our results which are not reported here.

5.5 Directions for Future Research

Future research should focus on formalizing the definition of different dimensions of sustainability performance so that results drawn from different researches could

be comparable. This study also opens possibilities for future studies. Although we have shown that firms that focus on sustainability performance enjoy lower cost of financing, additional work is needed in order to isolate the reasons behind such an association. For example, can this relationship be explained using a risk-related justification? Or is a higher return required to compensate for the additional resources allocated to the maintenance of strong sustainability? These are all interesting research questions, and answers to these questions have important policy implications.

The linkage between ECON and TESG sustainability performance and their integrated effect on cost of financing, market performance and firm value is yet to be addressed in academic research. There are abundant research opportunities in sustainability including environmental sustainability, sustainability in education, governance, sustainability in supply chain management, sustainability in social, economic, governance, ethical and cultural contexts, integrated reporting on sustainability performance, sustainability policies and practices, standard setters in advancement of business sustainability management and assurance on sustainability reporting and role of policymakers.

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Appendix-A

Definition of Variables

Variables	Measurements
TOBINSQj,i,t	Total Market value divided by Total Asset Value of the firm
ROEj,i,t	Net Income divided by Shareholders Equity
SALESj,i,t	Sales scaled by total assets
SALESGRj,i,t	Total annual sales growth in yeart
MVBVj,i,t	Market to book value of equity
RDj,i,t	Research and development expenses scaled by total assets
DIVIDOMSj,i,t	Dummy variable that represents omission of dividend: 1 if dividend payment is zero; 0 otherwise;
Dependent Variables	
COCj,i,t	Weighted Average cost of capital
COEj,i,t	Industry adjusted EP (IndEP) ratio in percent — Difference between firm's EP and the median industry EP ratio in year t, according to the FF 49 industry classification;
CODj,i,t	Realized Cost of Debt – ratio of firm's interest expense in year t+1 to average interest-bearing debt Outstanding in year t and t+1
Independent Variables	
GRj,i,t	Economic dimension of sustainability performance — Growth factor
OPj,i,t	Economic dimension of sustainability performance — Operation factor
RESj,i,t	Economic dimension of sustainability performance — Research factor
ECONj,i,t	Summary of economic dimension of sustainability performance - Equally Weighted Average of GR, OP, and RES.
ENVj,i,t	Environmental dimension of sustainability performance: Number of environmental strengths minus number of environmental concerns;
SOC j,i,t	Social dimension of sustainability performance: Number of social strengths minus number of social concerns;
GOV j,i,t	Governance dimension of sustainability performance: Number of governance strengths minus number of governance concerns;
TESG j,i,t	Composite score obtained by subtracting number of concerns from number of strengths for each dimension i.e. environmental, social and governance.

Variables	Measurements
	Interaction Terms
ECON j,i,t*ENV j,i,t	Interaction Term between environmental and economic sustainability performance.
ECON j,i,t * SOC j,i,t	Interaction Term between social and economic sustainability performance.
ECON j,i,t*GOV j,i,t	Interaction Term between governance and economic sustainability performance.
ECON j,i,t*TESG j,i,t	Interaction Term between composite score of sustainability performance and economic sustainability performance
	Control Variables
	Company Specific Control Variables
LIQj,i,t	Liquidity measure, equals to common shares traded during fiscal year divided by number of total shares outstanding;
LEVj,i,t	Ratio of total debt to total assets
SIZEj,i,t	Natural logarithm of market value of equity
ZMIJj,i,t	Probability of bankruptcy proxied by Zmijewski's Z-score = -4.3 to 4.5 × net income/total assets 5.7 × total debt/total assets- 0.004 × current assets/current liabilities liabilities
BETAj,i,t	Beta calculated using the market model
DLOSSj,i,t	Dummy variable; equals 1 when net income is less than 0 and 0 otherwise;
ACCLj,i,t	Scaled total accruals, calculated as the difference between net income and operating cash flows, scaled by the average asset of year t and t1.
	Country Specific Control Variables
MSPj,t	MSP is the measure of money supply and is proxied by broad money growth
GDPj,t	GDP is the per capita GDP growth rate
INFj,t	INF is an indicator of inflation measured with GDP deflator
POPj,t	POP is the measure of population. Population density is midyear population divided by land area in square kilometers economic sustainability performance (ECON),