ENVIRONMENTAL, SOCIAL, GOVERNANCE PERFORMANCE, AND

BANK COST OF FINANCING

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I, Suzan Bekçi, certify that

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- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;

- this is a true copy of the thesis approved by my advisor and thesis committee at Boğaziçi University, including final revisions required by them.

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ABSTRACT

Environmental, Social, Governance Performance, and Bank Cost of Financing

Today more and more companies are shifting their focus from pure profit maximization to achieving a balanced bottom line, i.e. environmental, societal and economic targets. Environmental, Social and Governance has become a board-level issue for many companies. These companies aim to serve multiple stakeholders, customers, shareholders, business partners, nature, and society in general. In line with this, there emerged numerous studies in this area, mostly measuring the association between ESG and financial performance. In this thesis, I investigate the association between cost of capital and ESG performance for banks listed around the world. Results show that there are not mostly statistically significant relationships between cost of capital and environmental, social and governance scores of the banks. The initial OLS regression provided a weak negative association between Governance performance and both cost of equity and cost of deposits while a positive relationship between ENV performance and cost of equity and cost of deposit. In order to check for robustness, I have conducted IV regression with average country ESG scores as instrumental variable for cost of equity financing and cost of deposit regressions. As a result of IV regression, I found positive relationship between each pillar and cost of deposit while positive relationship between cost of equity and ENV pillar score but no relationship at all between the remaining three scores and cost of equity. Panel regression with fixed effects analysis indicated a lack of meaningful association between cost of equity and cost of deposit against ESG variables.

ÖZET

Çevresel, Sosyal, ve Kurumsal Yönetişim Performansı

ve Banka Finansman Maliyeti

Günümüzde gitgide daha çok sayıda şirket yalın kar maksimizasyonundan ziyade çevresel, sosyal ve ekonomik hedefleri baz alan daha dengeli bir kurumsal hedefe odaklanmaktadır. Çevresel, Sosyal ve Kurumsal Yönetişim alanındaki faaliyetler birçok şirket için yönetim kurulu düzeyinde ele alınması gereken bir mesele haline gelmiştir. Bu şirketler müşterileri, hissedarları, iş ortaklarını, doğayı&çevreyi ve toplumu da içeren çoklu paydaşlara hizmet etmeyi hedeflemektedir. Bununla birlikte bu alanda daha çok çevresel, sosyal ve kurumsal yönetişim ile firma mali performansı arasındaki ilişkiyi irdeleyen birçok akademik çalışma yapılmıştır. Bu çalışmada bütün dünyadaki halka açılmış bankaların finansman maliyeti ile çevresel, sosyal ve kurumsal yönetişim alanındaki performansı arasındaki ilişki incelenmektedir. Yapılan regresyon analizleri sonucu bankaların finansman maliyeti ile çevresel, sosyal ve kurumsal yönetişim alanındaki performansı arasında dikkate değer bir ilişki olmadığını göstermektedir. İlk etapta yapılan sıradan en küçük kareler yöntemi sonucu olarak kurumsal yönetişim ve hem sermaye maliyeti hem de mevduat maliyeti arasında zayıf bir ilişki bulunurken çevre ve hem sermaye maliyeti hem de mevduat maliyeti arasında pozitif bir ilişki saptanmıştır. Sağlamlık testi olarak ortalama ülke puanları baz alınarak araç değişkenler yöntemi ile hem sermaye maliyeti hem de mevduat maliyeti için regresyon analizleri yapılmıştır. Araç değişkenler yöntemi sonucunda çevresel, sosyal ve kurumsal yönetişim'in her bir ayağı ile mevduat maliyeti arasında pozitif bir ilişki bulunmuşken çevresel ayağı ile sermaye maliyeti arasında pozitif bir ilişki saptanmıştır.

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DEDICATION

I dedicate this thesis to my late mother, Raziye Bekçi, to my sisters, Tuğba Bekçi

and Çiğdem Bekçi as well as to my brother, Kazım Bekçi.

TABLE OF CONTENTS

ABBREVIATIONS

ESG	Environmental, Social and Governance
ENV	Environmental
SOC	Social
GOV	Governance
CSR	Corporate Social Responsibility
PRI	Principles for Responsible Investment
SDG	Social Development Goals
MENAT	Middle East, North Africa and Turkey
ROE	Return on Equity
ROA	Return on Assets
WACC	Weighted Average Cost of Capital
OLS	Ordinary Least Squares
IV	Instrumental Variable

CHAPTER 1

INTRODUCTION

Environmental, Social, Governance (ESG) is a metric/scoring mechanism that
evaluates and rates the activities of companies and countries in these three
dimensions as a relative to best standards. Firstly, Environmental (ENV) activities
refer to actions taken by companies in three subcategories, namely Resource Use
Score, Emissions Score, and Environmental Innovation Score. The companies are
expected to conduct their daily operations with minimum detrimental effect on the
natural environment in which they are operating. Hence, for example, they need to
be cautious with their CO_2 emissions and toxic chemicals releases, resource (energy,
water etc.) use without wasting these resources, materials uses (plastic, cement) and
their treatment to the animals. Secondly, Social (SOC) activities refer to how socially
responsible companies in terms of their treatment to the people or group of people in
their social environment. It measures company activities in four main subcategories,
which are workforce, human rights, community, and product responsibility
dimensions. To illustrate, whether they equally pay to their male and female
workers, discriminate between employees from different racial backgrounds, provide
the necessary compensations/benefits packages to their employees, take into account
the work/life balance, engage in activities against the international standards such as
employing child labor or breaching human rights, pay attention to the customer
satisfaction and consider the disadvantaged groups of people/communities when they
design their products/services shows how socially responsible a company is. Thirdly,
Governance (GOV) activities, on the other hand, is a metric measuring how good
management/governance systems a company has. It has three subcategories, which

are management, shareholders, and corporate social responsibility (CSR). For example, the existence of CEO-chairman separation, diversity in the management board and independent audit committee implies a good governance system and might result in a high corporate governance score ceteris paribus. Although ESG applies to companies in all industries, some measures make more sense to companies in some specific industries. For instance, the measurement of CO_2 emissions is more relevant for the companies in oil and gas industry and not so for the financial services industry and so is the measurement of release of toxic chemicals and treatment to the animals for pharmaceuticals and cosmetic industry.

With the increasingly criticized pure capitalist system and profit-making motives, it has become more and more important to ask the question how companies can contribute to their immediate environment, including society and nature in a transparent and accountable way. This question has become focal point of many studies since firms are expected to create a greater good for all the stakeholders involved. At this point, Corporate social responsibility or ESG has come out. For many years, some companies have been following sustainability activities however these activities were more voluntary and limited to a few companies. With the increasing salience of climate change, social issues such as child labor and fraud instances such as Enron scandal, intra-governmental initiatives, e.g. Kyoto Protocol and Paris Agreement, have made ESG a must-do for all organizations across the world. Thus, in the first two decades of twenty first century, we have seen more and more companies implementing ESG practices. According to Governance & Accountability Institute's 2021 Sustainability Reporting report, nearly 90% of the S&P 500 companies issued sustainability report in 2020, up by 90% from 2019. Apart from its being necessary, it has also become curious whether these activities

inherently serve the traditional profit-making motives of companies. In other words, it has drawn the attention of many scholars whether there is a financial reason for firms to follow ESG activities. Some ESG related studies point out to a positive relationship between two important measurements while others contend that either a neutral or negative relationship exists between two important metrics (Cornett et al., 2016). There are even fewer studies investigating the relationship between cost of capital and ESG for financial companies. This study focuses on empirically testing the association between cost of capital (that is, cost of equity and cost of deposits) and ESG for publicly listed banks around the world. I am using forward looking cost of equity because it is said to be better at capturing expected returns changing with time and predicting future returns.

CHAPTER 2

LITERATURE REVIEW

Environmental, Social and Governance targets and activities have drawn the interest of both academicians and practitioners since early 1980's. There have been several international initiatives regarding the encouragement of the adoption of ESG goals and actions such as Paris Agreement, PRI (Principles for Responsible Investments), SDG (Social Development Goals) by UN and Equator Principles. Consequently, there has been quite a lot of interest on understanding the effect of ESG actions on the firm. Many studies show a positive association between ESG activities and financial performance such as meta study by Friede et al. (2015). Though, some studies like Horvathova (2010) show that ESG has a negative effect on financial performance. Lastly, studies like Raimo et al. (2021) investigate the link between ESG activities and cost of financing. Raimo et al. (2021) considers 919 non-financial companies listed in S&P 1200 Global Index for the period 2010 to 2019. They find evidence for a negative association between cost of debt and ESG activities, implying a possibility of obtaining financial resources at favorable conditions for more transparent companies adopting broader ESG goals and activities.

There are quite a number of studies investigating the impact of ESG disclosure on bank performance. Cornett et al. (2016) observed the CSR behaviors of 235 banks before and after 2008 financial crisis and found that banks have become more socially responsible after the global financial crisis, which reveals the inadequacy of banks' CSR strategies. As a result of this shift in the adopted ESG strategies, the banks achieve higher financial performance indicated by higher ROEs in association with CSR scores. Esteban-Sanchez et al. (2017) study the CSR

policies as well as the financial performance of 154 financial entities from 22 different countries during 2005-2010. The authors document that social pillar and corporate governance pillar of good CSR practices predicted a higher corporate financial performance. Though, better product responsibility does not associate with higher performance and corporate governance practices negatively moderate the financial performance during the financial crisis. In her 2019 study, Buallay examines the influence of ESG on 235 European banks' financial (through ROE), operational (through ROA) and market (through Tobin's Q) performance during 2007 to 2016. She documents that ESG activities have a positive effect on the bank performance. While the environmental pillar has a positive association with operational and market performances, social dimension is negatively related with the performance measures. On the other hand, corporate governance pillar is negatively related to operational and financial performance while it is positively linked to market performance.

Buallay (2020) examines the 235 banks from developed and emerging regions between 2009 and 2016. The author finds that ESG is positively associated with banks' stock market performance in developed countries parallel to the argument by value creation theory; however, it is negatively related to financial performance, which is understandable according to cost of capital reduction theory. On the contrary, in emerging countries, ENV, SOC, and GOV activities work in favor of banks' financial performance and yet against their market performance. In another study, Buallay et al. (2020) investigate the effect of ESG after the 2008 financial crisis. The authors compare the developed and developing countries by examining 882 banks in 80 countries between 2008 and 2018 and show that ESG contributes to banks' accounting wise and stock market performances in highly-

developed countries. El Khoury et al. (2021) study the interaction between ENV, SOC, and GOV performances and financial performance in the MENAT region and look at 46 listed banks between 2007 and 2019. Measuring financial performance through operational profitability (ROA), financial profitability (ROE) and stock market performance (Tobin's Q), the authors document that the governance pillar and ROE relationship follows a concave pattern while environmental pillar and market return has a convex relationship. The authors conclude that banks should specify certain ESG breakeven points in order to gain rationale for their returns over investments.

Batae et al. (2021) examines the European banking system and incorporates the 10 dimensions of ENV, SOC, and GOV and financial performances of nearly 30 European banks for the decade after 2008 financial crisis. The authors examine the individual dimensions' influence and find that emissions reductions are positively related to financial performance. However, there is a negative association between product quality, social responsibility actions and corporate governance actions, and financial performance measures. La Torre et al. (2021) did a similar study for all the European banks listed in STOXX 600 for the years between 2008 and 2019. The authors look at VBM (EVA spread) in addition to accounted-based metrics such as operating profitability with ROA and financial profitability with ROE and stock market-based measures of total stock market capitalization to company book value and Tobin's Q. The authors document that there is a positive association between VBM and ESG performance, a negative association between market-based measures and no relationship with accounted-based measures. This implies no clear indication of incentives for improved financial performance as a result of adopted ESG actions

and hence regulators should force the companies to engage in ESG activities in order to minimize ESG risks.

Finally, Demir and Danisman (2021) investigate the association between pre-pandemic ENV, SOC, and GOV performances and stock market returns during the pandemic in order to assess whether higher ESG scores helped companies to reduce the negative effect of COVID. The study sample consists of 1,927 public banks in 110 countries during the period of January 2020 and May 2020. The authors show that environmental and governance pillars do not have a considerable effect on stock performance and higher investment into social pillar and CSR strategy has a negative effect on the stock returns during the COVID.

There also exists studies that analyze the impact of ESG performance from different perspectives. For example, Gangi et al. (2019) measure bank riskiness using Z-scores as well as sensitivity to environmental issues of more than 140 banks from 35 countries during the period of 2011 to 2015, and document that most environmentally committed banks have less risk compared to their peers neglecting the environmental issues. Da Silva Neto (2021) analyzes the efficiencies of nearly 110 listed banks in 21 European countries between 2011 and 2019. The author concludes that European banks in general have low efficiency levels, though, higher ESG score is associated with higher efficiency. Specifically, environmental, and social scores do not have a considerable effect on efficiency while better governance relates to higher efficiency. Another study examining the cost efficiency and ESG relationship is by Chang et al. (2021). The authors test whether ESG benefits exceed the associated costs for 145 Asian banks; 60 from prosperous countries and 85 from emerging countries. The authors show that banks residing in prosperous Asian economies become more cost efficient after initiating environmentally conscious

activities whereas the same relationship holds true with social and governance activities for the banks residing in emerging Asian economies. They also show that banks in prosperous regions perform better than those in emerging countries with respect to technology gap ratio and meta-frontier cost efficiency. A different study by Azmi et al. (2021) investigates the ESG and bank valuation association through three perspectives: cost of debt financing, cost of equity financing, and operational efficiency measure of net interest margin. The authors suggest that cost of capital might not be a direct channel for ESG to improve performance. By separating the cost of capital into cost of equity financing and cost of debt financing, the authors show that although cost of equity decreases following bank overall ESG activity; cost of debt does not seem to have a significant relation. In terms of the individual dimensions, only the environmental dimension has a negative impact on cost of equity and positive impact on cash flow generation. Similar studies have also been done in the literature in terms of both positive and negative impact of ESG on the cost of capital. Firstly, Dhaliwal et al. (2011) examined the cost of equity behavior of CSR initiating firms in USA. Their sample consisted of 213 non-financial companies in USA during 1993-2007. They documented that firms initiating CSR actions enjoyed lower cost of equity following the CSR initiation. Secondly, Ng & Rezaee (2015) investigated nearly 3000 firms during 1990-2013. They found out that ENV pillar and GOV pillar has a reducing effect on the cost of equity while SOC performance is not related to cost of equity at a significant level and full ESG score is negatively related to cost of equity.

Regarding the positive impact of ESG on the cost of capital, Wang et al. (2013) studied nearly 2600 multinational companies from 2002 to 2010. They had 11,055 firm-year observations from 35 countries. As a result of their study, CSR

does not have a reducing impact on the cost of equity in Asian countries. Similarly, Gjergji et al. (2020) investigated the cost of capital (measured through WACC) and ESG relationship for 87 small and medium sized non-financial companies listed in AIM Italia. The authors documented that ENV disclosure has an increasing effect on the cost of capital. Yeh at al. (2020) did a similar study for the period 2008-2011. Their sample consisted of 662 Chinese firms listed in China, giving 4,392 firm-year observations in total. The study did not indicate a negative relationship between ESG performance and cost of equity. Nazir et al. (2021) investigated 64 global technology companies during 2010 -2017 with total firm-year observations of 512. They found that the relationship between ESG and both cost of equity and cost of debt is positive. Lastly, Prasad et al. (2022) studied CSR and cost of equity relationship for the 512 non-financial firms listed in NSE, India during 2010-2019. Their result indicated that CSR has an increasing effect on the cost of equity.

CHAPTER 3

HYPOTHESIS DEVELOPMENT

In the literature, there are opposing views on the effect of investment into ESG on the overall firm/bank performance. For instance, the study by Jensen (2002) states that investment into social programs should be abandoned to the government and non-profit organizations because such an action by a company will reduce the available resources to improve the company efficiency and profitability in line with the prediction of the agent-principle theory.

On the other hand, various studies in the literature also predict the opposing impact on the company performance. For instance, instrumental stakeholder theory (Donaldson and Preston, 1995) cited also by Buallay (2021) states that investment into the needs of multiple stakeholders including employees, customers, investors, suppliers etc. helps to improve the profitability of the company as well as the reputation of that company. Regarding the impact of ESG activities on the cost of capital financing of banks, there are limited studies investigating this. However, Perrini et al., 2011 states that ESG related actions by banks has a decreasing impact on the conflicts between stakeholders and reduces the information asymmetry between these parties. This is also supported by the study of Healy and Palepu (2001), which shows that firms engaging in ESG activities enjoy lower monitoring costs. The proven negative effect of ESG on information asymmetry and monitoring costs are expected to increase the demand for the bonds and shares of a bank (El Ghoul et al., 2011). El Ghoul et al. (2011) states that there is a negative association between ESG reporting and the cost of capital financing. In line with these studies, Hence I propose my hypotheses in line with this argument.

My hypotheses are formulated as below;

H1: There is a positive association between cost of equity for banks and ESG variables

H2: There is a negative association between cost of equity for banks and ESG variables

H3: There is a positive association between cost of deposits of banks and ESG variables

H4: There is a negative association between cost of deposits of banks and ESG variables

CHAPTER 4

DATA AND METHODOLOGY

4.1 Sample and data collection

4.2 Variables definition and operationalization

4.2.1 Dependent variables

4.2.1.1 Cost of equity

The main dependent variable is cost of equity. As a measurement of cost of equity, I am using forward looking cost of equity because it is said to be better at capturing expected returns changing with time and predicting future returns by following Belkhir et al. (2021). In their paper, authors measure the cost of equity through a forward looking measure implied by stock prices and analysts' earning forecasts. By empirically testing, the authors regress cost of equity against the capital ratio and many bank specific and country specific control variables. The authors calculate an average COE from four different implied cost of equities following the papers by Claus and Thomas (2001); Gebhardt et al. (2001); Easton (2004); and Ohlson and Juettner-Nauroth (2005). The authors use data from Thomson Reuters' Datastream, Institutional Brokers Earnings Services (I/B/E/S) from Thomson Reuters and data from World Development Indicators and International Financial Statistics.

4.2.1.2 Cost of deposits

The second dependent variable is cost of deposit. I measure cost of deposit through dividing the interest expenses resulting from taking deposits from customers by total deposits of the banks. I collect the cost of deposit and total deposits of banks from

Thomson Reuters Datastream. As reported in a recent study (Shin, 2021), a bank may collect more deposits from customers if it advertises its sustainability linked activities and policies.

4.2.2 Independent variables

The main independent variables for this study are full ESG score and three main pillar scores, namely Environmental (ENV) score, Social (SOC) score and Governance (GOV) score. ESG scores from Refinitiv Eikon Datastream database are calculated through the ESG information that firms provide via corporate documents (such as sustainability reports and annual reports), press releases, direct communication, third party research and news items and they range from 0 to 100 depending on the performance of the company on that metric.

While the ESG full score provides a total scoring of the bank's ESG performance, Environmental pillar score depends on resource (water, energy etc) use, emissions and environmental innovation. Social information is composed of workforce, human rights, product responsibility and impact on communities while Governance information is more related to board structure and function, executive compensation, and political involvement of the company under three main sub scores of management, shareholders and CSR strategy.

Environmental pillar score includes three main pillars, all of them relevant to this study: resource use efficiency, emissions and environmental innovation. Social pillar score includes four dimensions: workforce, human rights, community and product responsibility. Corporate Governance pillar includes three dimensions, relevant for this study: management, shareholders and CSR strategy.

4.2.3 Control variables

I include several control variables (X_i) in the model. I follow Azmi et al. (2020) and other studies in the literature when selecting the controls (variables measuring the bank size, capital adequacy, asset quality, operating efficiency, profitability, liquidity, economic prosperity and inflation)

Bank-specific control variables;

- Bank size is measured through the natural logarithm of total assets (ln_ta). Previous studies show that larger firms have relatively easier access to financing and operate with less information asymmetry and monitoring costs. Moreover, larger firms endure negative shocks easily and enjoy economies of scale in debt financing costs (Petersen & Rajan, 1994, & Platonova et al., 2018).

- Capital Adequacy is measured through total equity divided by total assets. CAR represents a specific bank measure showing the compliance to capital requirements and it predicts the financial risk arising due to obligations that banks have to their financiers and customers.

- Asset quality is expressed as the loan loss provisions to total assets. Past findings show that asset quality has impact on the bank capital (Belkhir et al.,2021).

- Operating efficiency is expressed as salaries and benefits divided by the total assets. Banks bearing a higher cost-to-income ratio may have a higher cost of equity as their lower cost efficiency may be related to a higher risk to shareholders (Altavilla et al. 2021)

- Profitability is measured through net profit divided by total assets. Following the literature, I include ROA as an indicator for firm profitability. Profitable firms are assumed to be more able to generate financing and to have greater ability to service its obligations than unprofitable firms. (Belkhir et al., 2021)

- Liquidity is measured through total deposits divided by total assets. In line with the literature, I include liquidity as it can reduce the cost of capital financing (Hernan Ortiz-Molina&Gordon M. Philips, 2009).

Country-specific control variables;

- Economic prosperity is measured though natural logarithm of GDP per capita (current prices) (ln (GDP per capita). I control the model using the natural logarithm of GDP per capita to assure that bank cost of financing may depend on the state of the economy in a specific country (Gupta et al., 2018)
- Price level is expressed as annual percentage change in consumer prices. (Kartick Gupta, 2018)

Table 1. shows the sources and the definitions of the variables in my study.

Table 1. Variable Descriptions

Variable	Definition	Source
Cost of Equity (r_avg)	Forward looking cost of equity calculated through ex-ante measure indicated by stock prices and analysts' earning forecasts	Belkhir et al. (2021)
Cost of Deposits (cost_of_deposit2)	Interest Expenses of Deposits/Deposits	Thomson Reuters Datastream
Esg_var1	Overall ESG score	Thomson Reuters Datastream
Esg_var2	Social Score	Thomson Reuters Datastream
Esg_var3	Environmental Score	Thomson Reuters Datastream
Esg_var4	Corporate Governance Score	Thomson Reuters Datastream
Ln_ta	Natural logarithm of total assets	Thomson Reuters Datastream
car_simple	Total equity/Total assets	Thomson Reuters Datastream
Provisions	Loan loss provisions to total loans	Thomson Reuters Datastream
Inefficiency	Salaries and benefits/Total Assets	Thomson Reuters Datastream
Roa_mod	Net profit to total assets	Thomson Reuters Datastream
Deposit_ta	Total deposits to total assets	Thomson Reuters Datastream
Ln_gdp_pc	Natural logarithm of gdp per capita	World Development Indicators
Inflation	Inflation, Consumer Prices (annual %)	World Development Indicators

4.3 Descriptive statistics

Table 2 has the descriptive statistics of my sample. The main dependent variable, cost of equity, has a mean value of 0.118 for my sample for which the minimum cost of equity is 0.043 and maximum is 0.414. The average cost of deposits for my sample

banks is 0.018 whereas the minimum and maximum cost of borrowing are 0 and 0.097, respectively.

As shown in Table 2, the result of the descriptive analysis shows that the mean of Governance disclosure has the largest value of 53.068 followed by mean Social score of 46.56 and mean full ESG score of 46.276 where the mean Environmental score is 28.385. This might mean that many banks are encouraged to be proactive in disclosing corporate governance practices. However, the low score in environmental pillar is understandable considering the fact that bank operations depend on services which include less environmental actions compared to other industries (e.g. chemicals, pharmaceuticals etc.)

Regarding the mean and range of control variables, the average bank in my sample has a mean capital adequacy ratio of 0.096, loan loss provisions to total loans of 0.741, an inefficiency ratio of 0.011, return on assets of 0.01, deposits to total assets of 0.674 and operate in a country with inflation rate of 0.024.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ESG	2995	46.276	19.269	10.03	88.28
SOC	2995	46.56	22.117	4.3	91.95
ENV	2995	28.385	31.421	0	93.01
GOV	2995	53.068	21.471	6.7	93.73
CoE	2995	.118	.044	.043	.414
CoD	2905	.018	.018	0	.097
SIZE	2995	4.068	1.703	.343	7.472
CAR	2995	.096	.034	.023	.212
AQUA	2995	.741	.948	-.26	5.34
INEFF	2995	.011	.005	.003	.036
PROF	2995	.01	.008	-.026	.038
LIQ	2995	.674	.143	.197	.904
GDP PC	2995	10.168	1.026	6.906	11.351
INF	2995	.024	.022	-.008	.139

4.4 Correlation matrix

The correlation of main dependent, independent and control variables is presented in Table 3. The SOC, ENV, and GOV scores are highly correlated with full ESG score, which is understandable considering the full ESG score being an aggregator of main pillar scores. As the correlations are not perfect, not equal to 1.0, it is recommended to test the each pillar separately. It is also noteworthy that correlation between social and environmental scores and combined score are higher than the correlation between governance and the full score, which means that the social and environmental scores are more in line with the full ESG score than the governance score is. It is also clearly shown that size of the banks is highly correlated with the full ESG score, social score and environmental score, which means that larger banks have more resources to devote to the execution of environmental and social activities.

Table 3. Correlation Matrix

Variables	COE	SIZE	CAR	AQUL	INEF	PROF	LIQ	GDP	INF	ESG	SOC	ENV	GOV
COE	1.00												
SIZE	0.22	1.00											
CAR	-0.21	-0.55*	1.00										
AQUL	0.38	0.18	0.02	1.00									
INEF	-0.05	-0.38	0.40	0.17	1.00								
PROF	-0.28	-0.21	0.44	-0.13	0.20	1.00							
LIQ	-0.19	-0.50	0.30	-0.28	0.12	0.20	1.00						
GDP	-0.15	-0.16	0.06	-0.34	0.10	-0.26	0.07	1.00					
INF	0.14	0.03	0.02	0.21	0.09	0.30	-0.08	-0.52*	1.00				
ESG	0.12	0.62*	-0.30	0.11	-0.15	-0.10	-0.41	-0.09	0.00	1.00			
SOC	0.15	0.57*	-0.29	0.15	-0.08	-0.12	-0.41	-0.11	0.04	0.91*	1.00		
ENV	0.20	0.69*	-0.45	0.16	-0.21	-0.21	-0.50	-0.11	0.00	0.82*	0.78*	1.00	
GOV	-0.04	0.33	-0.09	-0.02	-0.14	0.04	-0.17	0.00	-0.06	0.72*	0.40	0.36	1.00

*The absolute correlations above 0.50 are indicated.

CHAPTER 5

EMPIRICAL STRATEGY

To analyze the association between ESG performance and cost of financing of banks, I use the following regression equations:

Cost of Equity $_{it}$ = β_0 + β_1ESG$_{it}$ + β_2Size$_{it}$ + β_3CAR$_{it}$ + β_4Prov$_{it}$ + β_5Ineff$_{it}$ + β_6Prof$_{it}$ + β_7LIQ$_{it}$ + β_8GDP$_{it}$ + β_9Inf$_{it}$ + ε_{it}

Cost of Deposits $_{it}$ = β_0 + β_1ESG$_{it}$ + β_2Size$_{it}$ + β_3CAR$_{it}$ + β_4Prov$_{it}$ + β_5Ineff$_{it}$ + β_6Prof$_{it}$ + β_7LIQ$_{it}$ + β_8GDP$_{it}$ + β_9Inf$_{it}$ + ε_{it}

In the regression equations, I use as Cost of Equity $_{it}$, which is extracted from the paper by Belkhir et al. (2021), and Cost of Deposits $_{it}$ as cost of deposits, which is calculated through interest expenses paid to customer deposits divided by total deposits, as dependent variables. ESG$_{it}$ variable includes four explanatory variables, which are combined ESG score, ENV score, SOC score and GOV score, downloaded from Thomson Reuters Datastream. Size$_{it}$ is a control variable measured through the ln_ta, natural logarithm of total assets. CAR$_{it}$ is a controlling variable measuring the capital adequacy of banks measured through equity divided by total assets. Prov$_{it}$ is a controlling variable measuring the asset quality of banks measured through loan loss provisions divided by total loans. Ineff$_{it}$ stands for the inefficiency level of bank operations measured through salaries and benefits to total assets. Prof$_{it}$ stands for the profitability of banks measured through total profit to total assets. LIQ$_{it}$ stands for the liquidity of banks expressed as deposits to total assets. GDP$_{it}$ measures the economic prosperity of the country where the bank is headquartered and is expressed as natural logarithm of gross domestic product per capita. Inf$_{it}$

stands for the inflation prevalent in the country where the specific bank is headquartered and is expressed as annual % change in consumer prices. B_i's represent the respective coefficients of explanatory variables and control variables while ε_{it} is a disturbance term for individual bank i at year t.

In line with the literature (Buallay, 2019; Buallay et al. 2020), I use panel data model estimates using fixed effects specification and random effects specifiction. The advantage of the fixed effect and random effects specifications lies within the fact that they are controlling for endogeneity. Panel regression with random effect can spot two sources of variation: among banks for the identical year and within each bank over time. On the opposite, panel regression with fixed effect specification spots the variation among units/entities. Fixed effect specification assumes that the constant is not a random value, so that each bank differs from other banks in terms of their base levels.

I regress my dependent variables (cost of equity and cost of deposit) on the ESG scores, bank specific control variables, and country specific variables. Also I run regressions with the one period lagged ESG scores as main independent variables in order to account for the endogeneity.

In order to check for the robustness, I also include instrumental variables such as the average industry score for the ESG pillar tested, excluding the specific bank's own rating.

CHAPTER 6

EMPIRICAL RESULTS

6.1 Ordinary least squares (OLS) regression

In order to assess whether there is an association between ESG scores and cost of equity, I have initially conducted an ordinary least squares regression, which is a technique making quantitative estimates of a statistical relationship by calculating the coefficients that minimize the sum of squared residuals (Studenmund, 2014), through cost of equity on each of the main explanatory variables and controlling variables. I report the main results in Table 4.

To summarize, my OLS regressions predict any significant relationship neither between cost of equity financing and the full ESG score, nor between the social score and cost of equity. However, there is a significant positive association between environmental score and cost of equity financing (estimate 5.92e-05*, p value less than 10%) , implying that benefits of environmental actions might not translate into lower cost of equity financing for banks. On the contrary to the relationship between environmental score and cost of equity financing, the association between GOV score and cost of equity financing is significantly negative (estimate -0.000104, p values less than 1%). This might mean that investors might value the corporate governance initiatives taken by the banks and this is accompanied with a lower cost of capital financing. Regarding the impact of control variables on the cost of equity financing of banks, it is not surprising to see that the relationships between capital adequacy and profitability and the ESG scores, full and each pillar are negative at 1% significance level as these indicators improve, the cost of equity financing is inclined to decline.

Table 4. OLS Regression of Cost of Equity on ESG Variables

Variables	ESG	SOC	ENV	GOV
Size	0.00191***	0.00149**	0.00112*	0.00224***
	(0.00360)	(0.0194)	(0.0908)	(0.000160)
Capital Adequacy	-0.0915***	-0.0922***	-0.0868***	-0.0852***
	(0.00126)	(0.00114)	(0.00230)	(0.00271)
Asset Quality	0.0140***	0.0141***	0.0141***	0.0139***
	(0)	(0)	(0)	(0)
Inefficiency	-0.129	-0.161	-0.167	-0.153
	(0.410)	(0.310)	(0.288)	(0.328)
Profitability	-1.325***	-1.324***	-1.320***	-1.294***
	(0)	(0)	(0)	(0)
Liquidity	0.00157	0.00295	0.00477	0.00131
	(0.792)	(0.619)	(0.429)	(0.823)
GDP Per Capita	-0.000638	-0.000581	-0.000533	-0.000547
	(0.477)	(0.517)	(0.552)	(0.541)
Inflation	0.269***	0.271***	0.274***	0.263***
	(0)	(0)	(0)	(0)
ESG Variable	-2.51e-05	3.40e-05	5.92e-05*	-0.000104***
	(0.596)	(0.393)	(0.0672)	(0.00303)
Constant	0.124***	0.122***	0.121***	0.126***
	(0)	(0)	(0)	(0)
Observations	2,995	2,995	2,995	2,995
R-squared	0.231	0.231	0.232	0.233

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of equity financing is denoted by r_avg extracted from the paper by Belkhir et al. (2021). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

6.2 Instrumental variable (IV) regression with average country scores

Following the works of Azmi et al., (2020) and Crifo et al., (2017), I also did an IV

regression through employing the average country ESG scores (calculated by taking

the average of yearly ESG scores of the banks in a specific country as instruments to

the values of each individual independent variable) as the average ESG performance

within a country might encourage or discourage the ESG performance level of an

individual bank in that country without affecting the cost of equity directly. The

results of instrumental variable panel regressions with fixed effects (Crifo et al.,

2017) are presented in Table 6.

Table 5. Mean Distribution of Instrumental Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Average ESG	2914	46.22	13.702	17.08	81.153
Average SOC	2914	46.468	16.387	14.777	86.47
Average ENV	2914	28.056	24.055	0	91.623
Average GOV	2914	53.192	11.611	18.79	88.173

Table 6. Instrumental Variable (IV) Regression with Average Country Scores As IV Variable

Variables	**ESG**	**SOC**	**ENV**	**GOV**
ESG Variable	0.000134	8.10e-05	0.000280***	-0.000263
	(0.261)	(0.314)	(0.00126)	(0.472)
Size	0.000875	0.00121	-0.00109	0.00308
	(0.377)	(0.134)	(0.305)	(0.103)
Capital Adequacy	-0.111***	-0.110***	-0.0839***	-0.0927**
	(9.82e-05)	(0.000111)	(0.00491)	(0.0121)
Asset Quality	0.0148***	0.0147***	0.0149***	0.0143***
	(0)	(0)	(0)	(0)
Inefficiency	-0.197	-0.203	-0.280*	-0.179
	(0.224)	(0.219)	(0.0853)	(0.267)
Profitability	-1.283***	-1.268***	-1.250***	-1.186***
	(0)	(0)	(0)	(0)
Liquidity	0.00679	0.00588	0.0168**	0.00153
	(0.293)	(0.345)	(0.0190)	(0.819)
GDP Per Capita	-0.000119	-9.05e-05	0.000185	2.95e-05
	(0.896)	(0.921)	(0.841)	(0.975)
Inflation	0.287***	0.283***	0.299***	0.263***
	(0)	(0)	(0)	(2.63e-08)
Constant	0.113***	0.115***	0.107***	0.124***
	(0)	(0)	(0)	(0)
Observations	2,914	2,914	2,914	2,914
R-squared	0.232	0.235	0.224	0.231

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of equity financing is denoted by r_avg extracted from the paper by Belkhir et al. (2021). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

6.3 Ordinary least squares (OLS) regression for CoD and ESG relationship

In order to assess whether there exists a relationship between ESG scores and cost of deposits of a bank, I have initially conducted an ordinary least squares regression, which is a technique making quantitative estimates of a statistical relationship by calculating the coefficients that minimize the sum of squared residuals (Studenmund, 2014), through cost of deposits on each of the main independent variables and control variables. I report the main results in Table 7.

As is displayed in Table 7, I have found a negative relationship between cost of deposits and governance scores with coefficient of -1.91 and p value of 6.56%, which may imply that the customers may demand lower rates on their deposits if they observe the bank has stringent corporate governance mechanism in its internal management and their deposits are in safe hands. It is also noted by Danisman and Tarazi (2022) that deposit rates for higher ESG banks have been more immune from rises during crises compared to less ESG-engaged banks. In contrast to GOV-CoD relationship, I have found significant positive relationships between SOC and ENV scores and cost of deposits, which have coefficients of 3.21 and 1.84 and p values of less than 1% and 10%, respectively. On the other hand, as a result of this OLS regression, no significant relationship has come out for full ESG score and cost of deposits. Despite these results, it is noteworthy that explanatory power of the regression is quite high with 0.61 R^2, which can be attributed to the inclusion of inflation, which is a key factor in determining the deposit rates, as control variable as well as the other control variables.

Table 7. Ordinary Least Squares (OLS) Regression for Cost of Deposits and ESG Relationship

Variables	ESG	SOC	ENV	GOV
Size	-0.00104***	-0.00118***	-0.00114***	-0.000856***
	(8.80e-08)	(4.45e-10)	(5.94e-09)	(1.24e-06)
Capital Adequacy	-0.0888***	-0.0889***	-0.0871***	-0.0873***
	(0)	(0)	(0)	(0)
Asset Quality	0.00374***	0.00375***	0.00373***	0.00369***
	(0)	(0)	(0)	(0)
Inefficiency	0.0794*	0.0640	0.0759	0.0813*
	(0.0897)	(0.174)	(0.104)	(0.0811)
Profitability	0.226***	0.227***	0.229***	0.233***
	(0)	(0)	(0)	(0)
Liquidity	-0.0325***	-0.0320***	-0.0320***	-0.0329***
	(0)	(0)	(0)	(0)
GDP Per Capita	-0.00460***	-0.00457***	-0.00458***	-0.00459***
	(0)	(0)	(0)	(0)
Inflation	0.323***	0.323***	0.323***	0.321***
	(0)	(0)	(0)	(0)
ESG Variable	1.30e-05	3.21e-05***	1.84e-05*	-1.91e-05*
	(0.354)	(0.00664)	(0.0547)	(0.0656)
Constant	0.0849***	0.0841***	0.0846***	0.0858***
	(0)	(0)	(0)	(0)
Observations	2,906	2,906	2,906	2,906
R-squared	0.609	0.610	0.609	0.609

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank..Cost of deposits is denoted by cost_of_deposit2 expressed as interest expenses paid to customer deposits divided by total deposits. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

As is shown in Table 7, I could not find any significant relationship between total ESG scores, SOC scores, GOV scores and cost of equity of banks when employing the mean country scores for these variables, respectively. Though, there is a significant positive relationship between ENV scores and cost of equity.

6.4 IV regression for cost of deposit and ESG relationship

As I have done IV regression for cost of equity and ESG relationship, I repeated the

same regression this time for cost of deposit and ESG relationship by keeping the

average country scores as instrumental variable. The result of the regression is

summarized in Table 8. I have found strong positive association between each of the

ESG pillar scores and cost of deposit with p values less than 1% level.

Table 8. Instrumental Variable (IV) Regression for Cost of deposit and ESG
Relationship

Variables	ESG	SOC	ENV	GOV
ESG Variable	0.000377***	0.000250***	0.000235***	0.000795***
	(0)	(0)	(0)	(0.000121)
Size	-0.00352***	-0.00274***	-0.00337***	-0.00492***
	(0)	(0)	(0)	(3.76e-06)
Capital Adequacy	-0.0962***	-0.0926***	-0.0696***	-0.142***
	(0)	(0)	(0)	(0)
Asset Quality	0.00428***	0.00410***	0.00409***	0.00498***
	(0)	(0)	(0)	(0)
Inefficiency	-0.0854	-0.114**	-0.0607	0.102
	(0.106)	(0.0258)	(0.237)	(0.224)
Profitability	0.221***	0.257***	0.281***	0.0279
	(1.17e-08)	(0)	(0)	(0.752)
Liquidity	-0.0232***	-0.0252***	-0.0208***	-0.0250***
	(0)	(0)	(0)	(0)
GDP Per Capita	-0.00434***	-0.00424***	-0.00418***	-0.00506***
	(0)	(0)	(0)	(0)
Inflation	0.346***	0.334***	0.345***	0.388***
	(0)	(0)	(0)	(0)
Constant	0.0708***	0.0738***	0.0746***	0.0631***
	(0)	(0)	(0)	(0)
Observations	2,835	2,835	2,835	2,835
R-squared	0.531	0.575	0.553	-

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of deposits is denoted by cost_of_deposit2 expressed as interest expenses paid to customer deposits divided by total deposits. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

6.5 Robustness checks

6.5.1 Panel regression with fixed effects specification

As a second step, I have run Hausman test initially in order to assess whether fixed effects or random effects are more appropriate for panel regression analysis although generally recommended this test is said to be not a reliable tool for spotting the bias in typically-sized samples (Clark, T. S., & Linzer, D. A. (2015)). As a result of Hausman test, fixed effect has been shown to be more appropriate for my data. Despite this, as both fixed effects and random effects have their own advantages, I report here the results of both specifications. Initially, I did panel regression with fixed effects by controlling for year dummies. As opposed to OLS regression, I could not find any significant relationship between the full score and each pillar score and cost of equity. It is noteworthy that though the associations are nonsignificant, the signs of the relationships are all positive, meaning that investing into ESG activities might not translate into lower cost of equity in all cases. As for the control variables' impact on the cost of equity, it is not surprising to find that low asset quality and the cost of equity are positively related at a significant level for all of the independent variables. Similarly, it is in line with my expectations and the results of OLS regression that capital adequacy and profitability of the banks are negatively associated with cost of equity of the banks in my sample.

Table 9. Panel Regression With Fixed Effects Specification

Variables	ESG	SOC	ENV	GOV
Size	0.0112**	0.0113**	0.0113**	0.0116**
	(0.0210)	(0.0202)	(0.0200)	(0.0153)
Capital Adequacy	-0.157*	-0.157*	-0.155*	-0.155*
	(0.0952)	(0.0930)	(0.0981)	(0.0983)
Asset Quality	0.00785***	0.00786***	0.00780***	0.00784***
	(0.00159)	(0.00163)	(0.00178)	(0.00170)
Inefficiency	-0.0559	-0.0638	-0.0961	-0.0606
	(0.927)	(0.917)	(0.877)	(0.921)
Profitability	-0.769***	-0.764**	-0.773***	-0.779***
	(0.00871)	(0.0101)	(0.00799)	(0.00759)
Liquidity	-0.0157	-0.0145	-0.0148	-0.0158
	(0.352)	(0.390)	(0.377)	(0.347)
GDP Per Capita	-0.00815	-0.00768	-0.00690	-0.00728
	(0.408)	(0.435)	(0.473)	(0.447)
Inflation	0.296***	0.294***	0.292***	0.293***
	(3.38e-05)	(3.64e-05)	(4.07e-05)	(3.82e-05)
ESG Variable	0.000147	0.000112	5.27e-05	3.52e-05
	(0.236)	(0.324)	(0.478)	(0.537)
Constant	0.150	0.146	0.142	0.143
	(0.134)	(0.143)	(0.152)	(0.144)
Observations	2,995	2,995	2,995	2,995
Number of bank_id	437	437	437	437
R-squared	0.293	0.292	0.292	0.292

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of equity financing is denoted by r_avg extracted from the paper by Belkhir et al. (2021). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

6.5.2 Panel regression with random effects specification

For the sake of being impartial, seeing the result of both specifications and the

possibility that there might be omitted variables that are not correlated with

explanatory variable, I here report the results of panel regression with random effects

specification in Table 10. As a result of this regression, contrary to the OLS and in line with the fixed effects regressions, I could not find any significant relationship between the four independent variables and cost of equity. Though the associations are all nonsignificant, the signs of them are positive yet.

Table 10. Panel Regression with Random Effects Specification

Variables	ESG	SOC	ENV	GOV
Size	0.0112**	0.0113**	0.0113**	0.0116**
	(0.0210)	(0.0202)	(0.0200)	(0.0153)
Capital Adequacy	-0.157*	-0.157*	-0.155*	-0.155*
	(0.0952)	(0.0930)	(0.0981)	(0.0983)
Asset Quality	0.00785***	0.00786***	0.00780***	0.00784***
	(0.00159)	(0.00163)	(0.00178)	(0.00170)
Inefficiency	-0.0559	-0.0638	-0.0961	-0.0606
	(0.927)	(0.917)	(0.877)	(0.921)
Profitability	-0.769***	-0.764**	-0.773***	-0.779***
	(0.00871)	(0.0101)	(0.00799)	(0.00759)
Liquidity	-0.0157	-0.0145	-0.0148	-0.0158
	(0.352)	(0.390)	(0.377)	(0.347)
GDP Per Capita	-0.00815	-0.00768	-0.00690	-0.00728
	(0.408)	(0.435)	(0.473)	(0.447)
Inflation	0.296***	0.294***	0.292***	0.293***
	(3.38e-05)	(3.64e-05)	(4.07e-05)	(3.82e-05)
ESG Variable	0.000147	0.000112	5.27e-05	3.52e-05
	(0.236)	(0.324)	(0.478)	(0.537)
Constant	0.150	0.146	0.142	0.143
	(0.134)	(0.143)	(0.152)	(0.144)
Observations	2,995	2,995	2,995	2,995
Number of bank_id	437	437	437	437
R-squared	0.293	0.292	0.292	0.292

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of equity financing is denoted by r_avg extracted from the paper by Belkhir et al. (2021). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

6.5.3 Panel regression with lagged ESG variables

Dixon-Fowler et al. (2013) state in their study that it is not always clear how long it takes to experience any benefits/costs of CSR investments. Similarly, Piechocka-Kaluzna, A., Tluczak, A., & Lopatka, P. , (2021) point out that the impact of ESG activities on the cost of financing might appear earliest with a one year lag due to the nature of ESG reporting. In line with these arguments in the literature, I also believe that there is a high chance of seeing the impact of a change in ESG activities/reporting on the cost of equity with a lag. Therefore, I run panel regression analysis with fixed effects by employing the lagged values of four independent variables, lagged full ESG, SOC, ENV, and GOV scores, and keeping the same dependent variable (i.e. cost of equity) and control variables that have been used in OLS and fixed effect/random effect regressions. I also controlled for year dummies.

To summarize, as shown in the Table 11, I have found that lagged full ESG score and lagged SOC score are positively associated with cost of equity with P values of less than 5% significance level. The estimates for coefficients of these variables are 0.000235** and 0.000220**, respectively. On the other hand, ENV and GOV scores are not found to be related to cost of equity at any significant level. However, the signs of relationship of these variables with cost of equity are also positive.

Table 11. Panel Regression with Lagged ESG Variables and Fixed Effect
Specification

Variables	Lagged ESG	Lagged SOC	Lagged ENV	Lagged GOV
Size	0.0170***	0.0171***	0.0172***	0.0179***
	(0.00328)	(0.00308)	(0.00322)	(0.00194)
Capital Adequacy	-0.184*	-0.185*	-0.176*	-0.174*
	(0.0832)	(0.0772)	(0.0945)	(0.0993)
Asset Quality	0.00937***	0.00939***	0.00929***	0.00936***
	(0.000486)	(0.000397)	(0.000692)	(0.000617)
Inefficiency	0.0270	0.0293	0.00242	0.0417
	(0.972)	(0.969)	(0.997)	(0.957)
Profitability	-0.473	-0.455	-0.484	-0.500
	(0.157)	(0.168)	(0.145)	(0.141)
Liquidity	0.00231	0.00389	0.00332	0.00253
	(0.913)	(0.855)	(0.876)	(0.905)
GDP Per Capita	-0.0172	-0.0170	-0.0147	-0.0158
	(0.113)	(0.119)	(0.173)	(0.140)
Inflation	0.345***	0.342***	0.343***	0.345***
	(2.24e-05)	(1.90e-05)	(2.00e-05)	(2.27e-05)
ESG Variable	0.000235**	0.000220**	9.60e-05	3.56e-05
	(0.0192)	(0.0210)	(0.205)	(0.528)
Constant				
Observations	2,515	2,515	2,515	2,515
Number of bank_id	418	418	418	418
R-squared	0.305	0.306	0.304	0.303

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of equity financing is denoted by r_avg extracted from the paper by Belkhir et al. (2021). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

6.5.4 Panel regression with fixed effects for cost of deposit and ESG relationship

In this section, I regressed cost of deposits as dependent variable on four ESG

variables through panel regression analysis with fixed effects specification. The

result of the regression is summarized in Table 12. I could not find any significant

relationship between any of the ESG variables and cost of deposit. However, the coefficients of these associations are all negative except SOC pillar score. Also, it is important to mention that GOV score has the lowest P value and hence highest significance among the ESG variables with negative coefficients. It has coefficient of -2.15 and p value of 19.7%.

Table 12. Panel Regression with Fixed Effects Specification for Cost of Deposits and ESG Relationship

Variables	ESG	SOC	ENV	GOV
Size	0.00342**	0.00332**	0.00339**	0.00338**
	(0.0113)	(0.0144)	(0.0122)	(0.0128)
Capital Adequacy	-0.0359*	-0.0363*	-0.0360*	-0.0362*
	(0.0860)	(0.0823)	(0.0844)	(0.0826)
Asset Quality	0.00188***	0.00188***	0.00188***	0.00188***
	(2.83e-06)	(2.57e-06)	(2.48e-06)	(2.62e-06)
Inefficiency	0.516***	0.520***	0.521***	0.510***
	(0.00753)	(0.00737)	(0.00716)	(0.00792)
Profitability	0.115**	0.117**	0.115**	0.117**
	(0.0184)	(0.0156)	(0.0182)	(0.0164)
Liquidity	-0.0302***	-0.0302***	-0.0303***	-0.0298***
	(0.000678)	(0.000705)	(0.000662)	(0.000793)
GDP Per Capita	0.00296	0.00270	0.00279	0.00309
	(0.436)	(0.473)	(0.459)	(0.417)
Inflation	0.0983***	0.0995***	0.0990***	0.0980***
	(7.84e-06)	(4.87e-06)	(5.80e-06)	(7.77e-06)
ESG Variable	-2.06e-05	1.25e-05	-5.14e-06	-2.15e-05
	(0.515)	(0.611)	(0.776)	(0.197)
Constant	0.00134	0.00326	0.00248	0.000470
	(0.973)	(0.934)	(0.950)	(0.990)
Observations	2,906	2,906	2,906	2,906
Number of bank_id	428	428	428	428
R-squared	0.420	0.420	0.420	0.420

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of deposits is denoted by cost_of_deposit2 expressed as interest expenses paid to customer deposits divided by total deposits. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

6.5.5 Panel regression with fixed effects for cost of deposit and lagged ESG scores relationship

In order to account for the fact that the impact of ESG reporting on cost of capital might come with a lag, I have also done panel regression with fixed effects specification in order to investigate the impact of lagged ESG variables on cost of deposit with lagged ESG variables as independent variables and cost of deposit as dependent variable. The results of this regression is summarized in Table 13.

Table 13. Panel Regression of Cost of Deposit and Lagged ESG Variables with Fixed Effect Specification

Variables	Lagged ESG	Lagged SOC	Lagged ENV	Lagged GOV
Size	0.00173	0.00163	0.00163	0.00167
	(0.269)	(0.298)	(0.292)	(0.288)
Capital Adequacy	-0.0237	-0.0248	-0.0249	-0.0241
	(0.234)	(0.219)	(0.214)	(0.220)
Asset Quality	0.00189***	0.00189***	0.00190***	0.00189***
	(2.46e-07)	(2.23e-07)	(2.08e-07)	(1.98e-07)
Inefficiency	0.491**	0.490**	0.491**	0.488**
	(0.0361)	(0.0363)	(0.0357)	(0.0369)
Profitability	0.115**	0.117**	0.118**	0.119**
	(0.0146)	(0.0125)	(0.0128)	(0.0111)
Liquidity	-0.0264***	-0.0265***	-0.0265***	-0.0261***
	(0.000114)	(0.000114)	(0.000112)	(0.000145)
GDP Per Capita	0.00279	0.00260	0.00256	0.00289
	(0.472)	(0.499)	(0.511)	(0.460)
Inflation	0.138***	0.138***	0.138***	0.137***
	(9.16e-11)	(7.39e-11)	(7.37e-11)	(7.60e-11)
ESG Variable	-2.99e-05	-3.79e-06	-2.62e-06	-2.18e-05
	(0.367)	(0.894)	(0.879)	(0.216)
Constant	0.00974	0.0114	0.0117	0.00902
	(0.813)	(0.780)	(0.776)	(0.828)
Observations	2,444	2,444	2,444	2,444
Number of bank_id	411	411	411	411
R-squared	0.437	0.437	0.437	0.438

Size is measured through natural logarithm of total assets. Capital Adequacy is measured through total equity to total assets. Asset Quality is measured through loan loss provisions to total loans. Inefficiency is measured through salaries and benefits to total assets. Profitability is net profits to total assets. Liquidity is measured through deposits to total assets. Gross domestic product per capita is natural logarithm of GDP per capita of the country in which bank is headquartered. Similarly, Inflation is annual % change in consumer prices in the country where the bank is headquartered. ESG Variable stands for four explanatory variables, full ESG score, ENV score, SOC score and GOV score of the individual bank. Cost of deposits is denoted by cost_of_deposit2 expressed as interest expenses paid to customer deposits divided by total deposits. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

As is shown in the Table 13, I could not find a significant relationship between any of the independent variables and cost of deposit. Though it is worth to note that the sign of all relationships are negative and GOV score has the lowest p

value (0.216) among four independent variables, implying that GOV has the most powerful association with cost of deposit.

6.6 Panel regression of subcomponents with fixed effects

In order to assess the ESG and cost of capital relationship at the subcomponents level, I have run panel regression with fixed effects. Of four subcomponents of Social pillar, which are human rights, product responsibility, workforce and community, human rights score and product responsibility score are positively associated with cost of equity whereas workforce and community scores are not related to the cost of equity. Of the sub pillars of Environmental score, which are resource use score, emissions score, and environmental innovation score, none of them are associated with cost of equity at any significance level. I also run regressions for sub subcomponents of social and environmental pillars, which gave the following results; trade union representation is positively correlated with cost of equity at 1% level, occupational diseases positively associated with cost of equity at 1% level, customer satisfaction is positively related to cost of equity at 1% level and estimated CO_2 Equivalents Emissions is positively correlated with cost of equity at 1% level. Of all the social score and environmental score sub subcomponents, quality management systems certified percentage is negatively associated with cost of equity at 10% level, community lending and investments are also negatively associated with 1% level, total donations to revenues are negatively associated with cost of equity at 1% level.

Regarding the social score and environmental score subcomponents' impact on the cost of deposit, product responsibility score is positively associated with cost

of deposits at 10% level however human rights score, workforce score and community score are not related to cost of deposits.

6.7 OLS regression for cost of equity and cost of deposits with development class of country variable

In order to see the behavior of cost of equity and cost of deposits with regard to development class of the country, I grouped the countries of banks as emerging and developed countries.My total sample is composed of 149 emerging countries' banks and 288 developed countries' banks. I conducted an OLS regression for cost of equity and cost of deposits on four pillars of ESG as well as subscores of main pillars of ENV and SOC scores.

The initial OLS regression provided me with a negative association for cost of equity and full score of ESG with coefficient of - 0.000118 and p value of 6.1% for emerging countries' banks whereas it indicated a positive association between cost of equity and ENV score with coefficient of 0.0001194 and p value of 1.8% for developed countries' banks, a negative association between GOV pillar and cost of equity with coeffcient of -0.0002233 and p value of 0.0% for emerging countries' banks. The rest of the relationships have been found to be insignificant.

Regarding the impact of ESG on the cost of deposits, regression analyses indicated a positive relationship between social score and cost of deposits for emerging countries' banks with coefficient of .0000312 and p value of 9.6%. In the meantime, analyses showed that cost of deposits and GOV score has a negative relationship for the emerging countries' banks with coefficient of -.0000582 and p value of 0.1%. The rest of the relationships have been found to be insignificant.

Lastly, I would like to summarize the relationship between sub pillars and cost of equity and cost of deposits for emerging banks and developed banks. Human rights score has a positive association with cost of equity with a coefficient of .0000936 and p value of 1.4% for the emerging countries' banks whereas product responsibility has a positive association with cost of equity with a coefficient of .0001956 and p value of 0% for the developed countries' banks, community score has a negative association with cost of equity with a coefficient of -.0000887 and p value of 1.8% for emerging countries' banks, resource use score has a positive association with cost of equity with coefficient of .000094 and p value of 4.6% for developed countries' banks, emissions score has a positive association with cost of equity with coefficient of .0001206 and p value of 1.1% for developed countries' banks and there is a positive association between environmental innovation score and cost of equity with coefficient of .0000822 and p value of 6.7% for developed countries' banks. Other relationships have been found to be insignificant.

Regarding the impact of subpillars on cost of deposits for the emerging and developed countries' banks, I have found that human rights score has a negative association with cost of deposits with a coefficient of -.0000269 and p value of 1.3% for the developed countries' banks whereas product responsibility score has a positive association with cost of deposits for emerging countries' banks, workforce score has a positive association with cost of deposits for developed countries' banks, resource use score has a positive association with cost of deposits for developed countries' banks and enviornmental innovation score has a positive association with cost of deposits for developed countries' banks.

In order to check for robustness and possible non-linearity, I included quadratic term of ESG variable into the regression equation as well as linear term of

ESG because for lower values of ESG, the relationship may be positive however for high values the association might be negative. The new regression equations are stated below.

Cost of Equity $_{it}$ = β_0 + β_1ESG$_{it}$ + β_2Size$_{it}$ + β_3CAR$_{it}$ + β_4Prov$_{it}$ + β_5Ineff$_{it}$ + β_6Prof$_{it}$ + β_7LIQ$_{it}$ + β_8GDP$_{it}$ + β_9Inf$_{it}$ + β_{10}ESG $^2_{it}$ + ε_{it}

Cost of Deposits $_{it}$ = β_0 + β_1ESG$_{it}$ + β_2Size$_{it}$ + β_3CAR$_{it}$ + β_4Prov$_{it}$ + β_5Ineff$_{it}$ + β_6Prof$_{it}$ + β_7LIQ$_{it}$ + β_8GDP$_{it}$ + β_9Inf$_{it}$ + β_{10}ESG $^2_{it}$ + ε_{it}

As a result of OLS regressions run with the inclusion of quadratic term and division of country development class, there is a negative relationship between cost of equity and full ESG score for the emerging countries' banks with the coefficient of the quadratic term being positive, meaning that this association does not decline with higher values of ESG. Nevertheless, the same association could not be said about the banks in developed countries as the association between cost of equity and full ESG score turned out to be positive with quadratic term's coefficient being negative, implying that for higher values of ESG the effect might be declining or reversed towards a negative association.

For the SOC score, the same effect as in the full ESG score has been observed. For emerging countries' banks, the association between SOC score and cost of equity has been found to be negative with 1% level of significance and the coefficient of quadratic term being positive, implying that the association has an increasing slope. For the banks in developed countries', the association between cost of equity and SOC score has been found to be positive with 1 % significance level and the coefficient of quadratic term being negative, implying that the relationship has a declining slope and might even mean that it might be reversed for higher values of SOC score.

For the ENV score, there is not a meaningful relationship between cost of equity and ENV score of banks in emerging countries. For the banks in developed countries, there is a significant positive relationship between cost of equity and ENV score with the coefficient of quadratic term being negative, meaning that the positive relationship might have a declining slope and be even reversed for higher values of ENV score.

For the GOV score, there is a negative association between cost of equity and GOV scores of banks in emerging countries with the coefficient of quadratic term being positive, implying that relationship has an increasing slope and the relationship becomes stronger for higher values of GOV score. For the banks in developed countries, there is a significant positive association between GOV scores and cost of equity with the coefficient of quadratic term being negative, implying that for the higher values of GOV scores, the strength of the relationship becomes weaker and might even reverse toward a negative association.

As for the relationship between cost of deposits and ESG scores, there is a positive association between ENV scores and cost of deposits of the banks in developed countries with the coefficient of quadratic term being negative, implying that the slope of association is a decreasing one and might even reverse towards a negative association. Meanwhile, there is a negative association between GOV scores and cost of deposits of both banks in emerging countries and in developed countries with the coefficient of the quadratic term being positive for both, implying that the relationship is an increasing one and higher values of GOV scores might have a stronger negative effect on cost of deposits. The rest of the relationships have been found to be insignificant.

CHAPTER 7

CONCLUSION

In this thesis, I examine whether there is an association between ESG and cost of capital for banks. Cost of capital is measured through cost of equity and cost of deposit while ESG variables are banks' score on each of the four dimensions of ESG. I started testing these relationships with Ordinary Least Squares (OLS) Regression. For the cost of equity, I found a positive relationship between ENV score and cost of equity, meaning that investors care less about this dimension considering the net benefits of environmental activities of a bank is less desirable for investors while I found a weak negative association between GOV score and cost of equity, indicating that investors might care slightly more about how good internal governance systems a bank has and reward these initiatives through demanding lower rate of return. As for the cost of deposit & ESG relationship, OLS regression did give a similar result. ENV pillar and cost of deposit relationship has been found to be positively associated while GOV and cost of deposit relationship has been found to be negatively associated, implying that in line with the shareholders expectations, customers also look for solid governance systems in a bank when they want to deposit their money rather than how environmentally responsible the activities of that bank are.

In order to check for the robustness and try out alternative regression settings, I have done panel regression analysis with fixed effects, IV regression with average country scores as instrumental variable and regression with lagged ESG scores as

independent variables for both cost of equity and cost of debt dependent variables. As a result of initial panel regression analysis with fixed effects, I have found no significant association neither between ESG variables and cost of equity nor between ESG variables and cost of deposit. IV regression for cost of equity and ESG relationship provided no significant association except ENV pillar and cost of equity, which is a positive association, meaning that investors do not take into account the environmental responsibility displayed by banks when they demand return for their investments. Regarding the cost of deposit and ESG relationship tested through IV regression, I have found strong positive relationship between each pillar and cost of deposit with p values less than 1%. Regarding the results of panel regression with fixed effects done on lagged ESG variables and cost of equity, I have found that full ESG score, and SOC score are positively associated with cost of equity with p values less than 5%. On the other hand, I could not find any relationship between each of the ESG pillars and cost of equity when lagged ESG variables regressed on cost of deposit.

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