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The effect of firms and banks higher ESG sustainability scores and the correlation to higher loan amounts and lower loan spreads in a pre- and post-Paris Environment Act of 2016.

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Abstract

This thesis investigates the whole and separate environmental, social and governmental (ESG) performance of banks and firms and tests whether they are association with companies their ability to access higher loans and lower loan spreads from banks. The data used in this research is based on 732 loans lent by 36 U.S. banks to 159 U.S. firms during the period of 2013-2018. The main idea of this analysis was to test whether higher ESG scoring banks rewarded higher ESG scoring firms with better loans and spreads in a pre- and post- Paris Environment Act scenario. As for the main findings, I could not find a positive and significant relationship for the association between banks and firms ESG and separate E, S, and G scores and the higher loan amounts and the loan spread provided. The main implication of this study is that, although there was no significant relationship between banks and firms higher ESG scores and the amount of loan and the lower loan spread provided, it is shown that firms with better performing ESG scores were provided with higher loans and lower loan spreads. this indicates that firms are trying to perform better after the Paris Environment Act went into force.

Key words: Sustainability; Environment, Social, and Governmental performance; loan amount; loan spread; banking; responsible bank lending; Paris Environment Act

1. Introduction

A lot of countries are focusing on the climate changes and the carbon production which are currently providing us with challenges for the planet. To prevent catastrophic consequences 196 countries have signed the Paris Environment Act of 2016. This Agreement amongst countries is a commitment to reduce carbon emissions (Scott et al., 2016). United States of America (U.S.) is one of the countries that has been committed to decarbonize and signed up for the Paris Agreement. Therefore, people are wondering how U.S. firms are doing in optimizing management strategies to follow this commitment (Chaudhry et al., 2021). However, on 1 June 2017, the U.S. president Donald Trump announced that they were withdrawing from the Paris Agreement. Their withdrawal would have great consequences in limiting the 1.5 degree Celsius increase target that the Paris Agreement is trying to achieve (Zhang et al., 2017).

In the 1990s, where it all started, the environment became a matter of great importance (Gray, 1992, p. 400). In those same years, banks had given increased responsibility towards the environment in their lending activities, this was due to banks signing the agreement of the United Nations Environment Programme's 'Statement by Banks on the Environment and Sustainable Development' (UNEP, 1992). Banks and their services play a significant role in social and economic developments of firms and countries. For this reason, banks are often left with a lot of criticism for contributing to global warming challenges, because they often failed to recognize the carbon neutrality consequences of loans that were given to companies (Ackerman, 2014; Richardson, 2009). As we know, Banks do not directly participate in global warming and substances such as pollution. However, banks are indirectly associated with companies that use activities or services that deteriorate the environment by giving them loans (Gray & Bebbington, 2001; Sarokin & Schulkin, 1991; Smith, 1994).

Since there has been some extensive research in social accounting literature about banks' lending decisions, there is little attention on the environmental, social and governmental aspects of banks and their lending decisions (Thompson & Cowton, 2004). This thesis will investigate whether environmental, social and governmental consciousness of firms and banks is reflected in the amount of loan lend/borrowed and in the pricing of the loan spread within a pre- and post – period of the Paris Environment Act of 2016. Thus, this paper offers a contribution to the literature on bank lending, in addition to the importance of environmental, social, and governmental (ESG) aspects within the social accounting literature. I therefore formulate the following research question: *How are banks and companies ESG sustainability scores correlated to the loan amount and loan spread in a pre- and post – period of the Paris Environment Act of 2016?*

To answer this research question, this thesis investigate by hypothesizing whether and how environmental, social and governmental (ESG) consciousness of firms and banks is reflected in the loan amount lent and the pricing of the loan spread. Using a U.S. based sample of syndicated loans, we find that more sustainable firms are indeed rewarded with higher loans

before and after the Paris Environment Act. But we cannot for sure say that sustainable banks reward more sustainable firms with higher loan amounts.

The second part of the thesis investigates whether sustainable firms are rewarded by sustainable banks by providing lower loan spreads to them. The estimation based on the period after the Paris Environment Act provides us with the results that sustainable firms are rewarded with a lower loan spreads of 1.65 bps. In other words we can say that when firms have an 1 unit increase in ESG scores, they are rewarded with 1.2% lower loan spread. For the interaction between sustainable banks and sustainable firms, the results turned out to be insignificant for both of the dependent variables. The evidence provided in the tables below do not support the four hypothesis, which then indicate that I cannot say that the actions taken before and after the Paris Agreement were linked to the changes brought about by the agreement. There could have been other factors affecting these result. One of these factors could have been that the sample size is too small and another is the fact that the U.S. stepped out of the Paris Environment Act in the year of 2017.

The remainder of the thesis is organized as follows. Section 2, 3, and 4 summarizes theoretical framework, prior literature and hypothesis, respectively. Section 5 and 6 presents the research design and methodology, respectively. Section 7 provides the results and discussion. Finally, Section 8 concludes.

2. Theoretical Framework

Natural environment concerns had dramatically increased during the 1990s and started becoming a matter of central importance. This is also when banks were asked to become more aware and responsible towards environmental aspects in their lending activities (Thompson & Cowton, 2004). Global warming to air, land and water pollution has become a devastating concern. Banks were not a suspected to be harmful towards the environment. However, that has changed over the years, because banks are linked to degrading the environment through their lending activities with firms who directly pollute land, air and water through their productions (Ahmed et al., 2018).

To prevent catastrophic consequences 196 countries have signed the Paris Environment Act in 2015, but went into force in 2016. This Agreement amongst countries is a commitment to reduce carbon emissions and limiting global warming to a maximum of 2-degree Celsius (UN, 2015). The Intergovernmental Panel on Climate Change (IPCC) informed in 2018 that global warming exceeding 1.5 degree Celsius could be catastrophic for the climate. United States (U.S.) is one of the countries that has been committed to decarbonize and signed up for the Paris Environment Act. Therefore, people are wondering how the U.S. firms are doing in optimizing management strategies to follow this commitment (Chaudhry et al., 2021). But on 1 June 2017, the former U.S. president Donald Trump announced that they were withdrawing from the Paris . Their withdrawal would create great consequences in reaching the 2-degree Celsius target that the Paris Environment Act was trying to achieve (Zhang et al., 2017). Failure to sufficiently decarbonize the economy will expose companies to physical risks that are disrupting their supply chains, due to having increased levels of greenhouse gas emissions

while producing and distributing their products and destructions and depreciation of assets, for example banks that take assets as mortgage because firms do not get an extension of a loan due to bad ESG performance (O'Dwyer & Unerman, 2020).

ESG factors were being considered in the banking industry from the 1990s. However, back then it was not called ESG. The term ESG is separated in the Environmental factor, Social factor and Governance factor. The banking industry is correlated to ESG for three reasons. First of all, to reduce environmental impact through excessive energy, water, heat, gasses, waste and air pollution. Second of all, through their lending and financing activities and lastly, considering the stakeholders benefits and needs. As the Paris Environment Act is being very active, we can say that climate change should be taken more seriously, but also more equality for women on the work floor(Bernardelli et al., 2022). Looking at the growing concern of climate change a lot of banks started incorporating environmental concerns in their lending decisions, which forces firms to perform better in ESG if they want to borrow from banks with higher ESG performance (Chava, 2014).
The section below will discuss different literature regarding ESG scores of firms and their access to bank loans and will give insights to the formulation of the hypothesis of this paper using former academic research.

3. Literature review

In the late 1980s interests increased on Environmental, Social and governance research. However, most of the researches (Mathews, 1997; Gray, 2002; Parker, 2005, 2011; Fifka, 2013; Parker, 2014) were merely focusing on environmental issues, rather than aggregate ESG (Environmental, Social and Governance) issues. This shows that research on this topic is still growing and makes it possible for this thesis to extend research on ESG.
As for banks, they have to fulfil two roles regarding sustainability. First of all, the internal role is based on the internal operations of the banks and their own ESG practices. Secondly, the external role is based on the inclusion of ESG risks in their lending and investment activities (Buallay et al., 2020). This means that the banking sector can be influence firms with negative ESG practices. The inclusion of environmental aspects in lending decisions officially started since many commercial banks all over the world signed the United Nations Environment Programme's (UNEP) Statement by Banks on the Environment and Sustainable Development (UNEP, 2012). The main goal of the UNEP is to work with financial institutions and use them to integrate and influence environmental matters and sustainable development in operations and services of themselves and firms they do business with (Nwoye, 2019).

Since the singing of the UNEP agreement, there has been many more researches on ESG activities of firms (Chava, 2014; Bhattacharya & Sharma, 2019; Gillan et al., 2021), ESG activities of the banking sector and correlation between ESG activities of firms and the banking sector (Gangi et al., 2019; Khattak & Saiti, 2021; Houston & Shan, 2022). The following prior literature has provided us with enough insights and results regarding the implications of including the ESG factors in banks their lending decisions.

Among many researchers, Chaudhry, Saeed, & Ahmed (2021) analysed U.S. banks with the SIC code 6000 to 6799 using three different databases with secondary data. The sample consisted out of 536 bank-year observations in the period of 2002-2017. So, Chaudhry et al (2021) studied environmental performance of U.S. banks and whether this performance reduces tail risk (chance of loss) of banks. They used a five-year rolling window to compute tail quantile, a measure of bank tail risk, which is comparable to value at risk. And the environmental performance is based on bank activities that benefit the environment through land, water and air. The findings of this research revealed that environmental performance of banks reduce tail risk, meaning that banks that are more eco-friendly orientated have significantly less tail risk.

Another paper conducted by Ahmed, Ahmed, & Hasan (2018) shows us if current status, practices and future prospects of ESG risk are incorporated in banks their lending activities. To specify the research Ahmed et al (2018) came up with the hypothesis of banks that consider ESG risk factors in their lending decision-making activities are rewarded with better financial performance. By using a sample of 30 commercial banks in Bangladesh they used an aggregate scores for each of the topics of E, S, and G factors with a 5-point Likert Scale and the dependent variable Return on Assets (ROA) as a proxy for financial performance to gather their results. For the main results they concluded that of the aggregate ESG risk factors, the governance section was significantly positive related to the financial performance of banks. And the environmental section came in third, meaning that the environmental aspect shows a weak relation to financial performance of banks, even though there are a lot of concerns regarding the climate.

Furthermore, more studies have investigated the correlation between ESG practices of borrowing firms and the cost of debt, by focusing on one country (e.g., Ge & Liu, 2015; Hasan et al., 2017; Erragragui, 2018) and by using ESG performance or ESG disclosure exchangeable as a measure of ESG practices. More specifically, Eliwa, Aboud, & Saleh (2021), believed that these two measures of ESG are different from each other and should be used separate. So, they conducted research by using the separate ESG performance and disclosure to test the effect on the cost of debt. By examining firms in 15 European Union (EU) countries for their ESG disclosure and ESG performance and whether the banking sector reward them through lending activities due to lowering their cost of debt they revealed the following results. Their findings suggest that for companies receive a lower cost of debt from banks when they have a high ESG performance. This is the same for ESG disclosure, when they have high ESG disclosure they receive lower cost of debt. To conclude, they found that banks can potentially improve the relevance and credibility of ESG performance and disclosure and impact environmental development. They also found that next to having an impact on cost of debt, ESG disclosure can also be used as a substitute for ESG performance, this shows that firms with low ESG performance can use a high ESG disclosure to still get a lower cost of debt. This means that Eliwa et al (2021) failed to distinguish between ESG performance and ESG disclosure, which then in return supports articles using ESG performance and disclosure exchangeable.

On the other hand, prior research shows complexity in gathering data over lending decisions of banks and borrowers in the loan indsutry. But a study in today's time conducted by Bernardelli, Korzeb, & Niedziółka (2022), tested whether banks financing coal industry affects ESG scores of 60 world's largest banks in a period before and after the Paris Environment Act. According to their results they found that financial funding was higher in the years after 2016, which means after the Paris Environment Act went into force. So, to tackle the problem that banks in reality did not fully commit to the Paris Environment Act, they used ESG ratings to determine which banks are in the higher ESG risk (e.g., human rights violation in banks, high carbon footprint produced by the bank or its clients, bribery or corruption, violation of business ethics) level. The results showed that in most cases the ESG ratings of the banks are consistent with the banks financing activities and try to stop working with firms that do not cooperate with climate change. But some concerns regarding banks was that they also look at their own financial performance and still work with companies that have a negative impact on the environment.

Looking at the previous literature we can say that the banking industry has incorporated ESG practices in their internal and external roles. Jeucken (2001) wrote that banks contribute to economic development (quantitative) and to the nature of economic development (qualitative) in his book. In 2019 a survey was conducted and 25 central banks responded their motivation to adopt socially responsible investments (SRI), which also can be referred to as sustainable investment, these are investments that promote environmental, social and governance factors. SRI is meant to reduce reputational risk and risk against climate change (Nițescu & Cristea, 2020). Although banks have been adopting and converting to more sustainable practices, they still receive a lot of criticism for their negative contribution towards climate changes. This is mostly due to their failure of understanding how their lending activities can affect CO2 and other gases (Richardson, 2009; Ackerman, 2014). However some other studies also show that banks incorporate climate considerations of borrowers into their lending decisions (e.g. Thompson and Cowton, 2004; Cogan et al., 2008; Goss and Roberts, 2011; Saunders and Potter, 2015; Jung et al., 2018). So, to conclude Hemingway & Maclagan (2004) found that not only profitability in the form of financial performance (e.g., ROA, revenue) was needed for financial institutions to make their lending decisions, but also firms their ESG performance came in consideration for banks to make their lending decision.

4. Hypotheses

Although the relationship between ESG activities of the firms and their access to loans has been investigated many times, none of them has so far done research on the direct effects of environmental, social and governance scores of borrowers and the lending activities of sustainable banks in the U.S. before and after the Paris Environment Act of 2016. The following thesis will focus on the 3 years before and 3 years after the Paris Environment Act went into force and will be partially following the research of Goss & Roberts (2011), Hauptmann (2017) and Shin (2021).

Goss & Robert (2011), did a study on CSR performance of firms and the effect of this performance on bank loan spreads. The study of Hauptmann (2017) revealed that high ESG performance of the firms can lead to a desired loan spreads from banks that are also focused on sustainable performance. Hauptmann (2017) is one of the first to show the relationship between sustainable firms and sustainable banks. However, opposite from Hauptmann (2017), the recent study by Shin (2021) found a causality and revealed that firms with high ESG scores have an increased chance of receiving bank loans with less yield spreads from banks that have a reduced ESG score. Furthermore, Shin (2021) found that firms are greenwashing by improving their ESG performance before accessing a loan and after acquiring it they go back to receding their ESG performance.

Considering the researches of Goss & Roberts (2011), Hauptmann (2017) and Shin (2021), this thesis is going to research the following hypotheses:

Climate change has been an ongoing concern, thus making it also relevant in the financial field, especially since the introduction and signing of the Paris Environment Act of 2015. The signing of the Paris Environment Act is the starting point to a new begin of public and private financial sectors to be more pro climate. The main problem that this Act is trying to solve is the prevention of global temperatures to rise above 1.5 degree Celsius. The 196 countries that signed the Act try to prevent temperature rising by reducing greenhouse gas emissions of companies and financial institutions. And by letting financial institutions be aware of sustainable growth in companies before financing them. However, exceeding the 1.5 degree Celsius could lead to catastrophic consequences, such as Storms, flooding due to higher sea levels (Mountford et al., 2021). Due to the Act companies and financial institutions have gotten more aware of climate changes, which then led these companies and financial institutions to enforce more stricter climate policies in their operations. Furthermore, banks reward sustainable firms with cheaper loans after the Paris Environment Act, because firms that have a better ESG performance have a reduced downside risk, which can be a reason for banks to trust these companies to repay them and boost the banks performance through ESG factors (Houston & Shan, 2021; Degryse et al., 2022). Provided with this information, I formulate the first two hypothesis:

H(1): the correlation between amount of loan lent and firms' ESG scores are stronger when banks are more sustainable before and after the Paris Environment Act.

H(2): The correlation between the amount of loan lent and the higher separate ESG scores of the firms is stronger when banks also have higher separate ESG scores after the adoption of the Paris Environment Act of 2016.

The highest risk that banks deal with in determining loan prices are credit risks. Thus, (sustainable) banks that work with low ESG performing borrowers, can have consequences for the banks reputation and credit. This means that (sustainable) banks can have a hard time in the future doing business with other (sustainable) borrowers or other type of clients (Homanen, 2018; Degryse et al., 2022). To deal with this, (sustainable) banks work better with more sustainable firms in order to keep their credit risk low and reputation high (Shin,

2021; He et al., 2021). Furthermore, prior research (Goss and Roberts, 2011; Chava, 2014; Hasan et al., 2017; Shin, 2021) found a significant association between ESG scores and loan prices. This association can confirm that sustainable banks reward sustainable firms with cheaper loans and lower credit spreads (Hauptmann, 2017; Degryse et al., 2022). Looking at the information provided, I formulate the following two hypotheses:

H(3): The correlation between loan spreads and firms ESG scores are stronger when banks are more sustainable before and after the Paris Environment Act.

H(4): The correlation between loan spreads and the higher separate ESG scores of the firms is stronger when banks also have higher separate ESG scores after the adoption of the Paris Environment Act of 2016.

5. Research Methodology

This section explores the different variables used in the research design and explains the methodology. This research tests whether there is a high correlation between the higher separate ESG scores of the firms and the amount of the loan and loan prices lent to them by banks with higher ESG scores before and after the adoption of the Paris Environment Act of 2016, by using the event studies of Goss & Roberts (2011), Hauptmann (2017) and Shin (2021).

5.1. Research Design

This thesis investigates the correlation between firms and banks their separate ESG performance (proxied by ESG scores) and the loan lend to the firms by the banks that are being studied. The theoretical part of the sample involves all publicly listed companies. Due to data availability of firms and banks in the U.S., I chose to look at the six-year period from 2013 to 2018, which also investigates the before and after the Paris Environment Act of 2016. The data for this research is obtained from multiple sources; Wharton Research Data Services (WRDS), Compustat, Refinitiv Dealscan and Refinitiv Asset4.

After going through each firm and bank and examining on the completeness of the independent, dependent and control variables, I am left with 195 companies from which 36 are banks. This left the research with a unit of analysis of total 732 firm- and bank- year observations. And the unit of observation is based on the facility ID level. After gathering data from Compustat for firms, I filtered the data on a specific country (U.S.) and was then left with 15363 firms. After this I gathered loan data from Refinitiv Dealscan and also filtered on the country U.S. which then left me with 435 banks and 4165 firms. And gathered ESG scores of companies (banks and firms) in the U.S. from the Refinitiv Asset4 database, which left me with 2965 companies. Furthermore, I merged the firms dataset of Compustat with the Refinitiv Asset4 dataset by ticker symbol of the firms and this provided me with 703 firms. Afterwards, I merged the combined Compustat-Asset4 dataset with the Refinitiv Dealscan by the ticker symbol of the firms, which provide me with 855 observations and I lastly removed

the firms and banks negative values for the control variables (e.g. ROA, size, and MTB), leaving me with 732 observations. All the databases were gathered with the period of 2013 until 2018.

Despite the fact that these sources provide a large data sample, I came across some restrictions in the variables. Not every firm in the Refinitiv Dealscan database had a ticker symbol and the banks did not even have an form of identifier to merge with. This led me to partly merging (as stated above) and partly hand-collecting the sample. Since banks did not have an indentifier to merge, I hand-collected the banks by individually searching for their company names in the Bank Compustat and the Refinitiv Asset4 databases. By doing this I was left with 36 banks. I also hand-collected the firms ESG scores, because I was provided with a dataset of firms ESG scores by PwC, that did not have ticker symbols and had to check for the names in the database by hand. This gives the research a limitation in terms of being completely representative of all publicly listed companies.

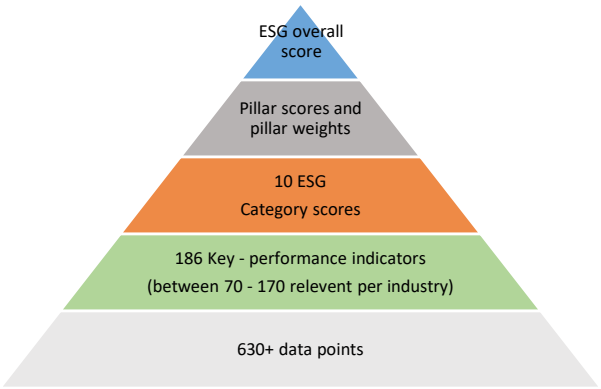
5.2. Variable Selection and Measurement

In order to provide an answer to the research question of this thesis, different variables and constructs are evaluated and chosen to measure the main concepts: ESG performance (proxied by ESG scores), bank loan amounts and prices, and financial information of banks and firms.

5.2.1. ESG performance (independent variable)

This thesis investigates firms and banks their separate ESG scores and their ability to implement these ESG factors in their borrowing and lending decisions. ESG performance data of borrowers and lenders (banks) is gathered from Refinitiv Asset4. Asset4 is a company based in Switzerland, with 186 key-performance indicators, and more than 630 individual data points (figure 1), to determine the environmental, social and governance performance of the borrowers and lenders (Hauptmann, 2017).

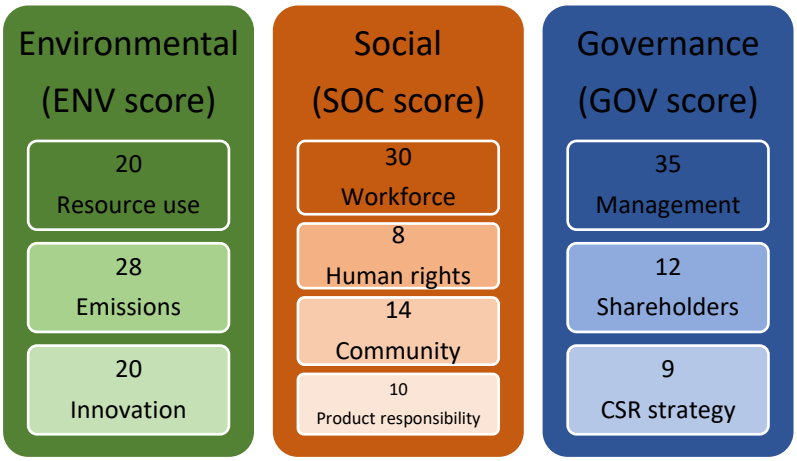
Figure 1. - ESG Metrics



When looking at the environmental, social and governance dimensions, Asset4 data dissects the 10 ESG category scores (figure 1, orange) into: 3 sub-categories for the environmental

dimension, 4 sub-categories for the social dimension and lastly 3 sub-categories for the governance dimension (figure 2). Figure 2 shows which sub-categories and how many key-performance indicators Asset4 uses to estimate companies their 10 sub-categories performance (Refinitiv, 2022). The colour coordination going from darker to brighter provides us with the importance of the sub-category.

Figure 2. - 10 ESG categories



The Asset4 data uses a ranking system to calculate the ESG scores. This means that Asset4 looks at how many companies are worse in comparison to another, how many of them have the same value, and how many companies even have a value. To test the ranking system they use the following equation (Refinitiv, 2022):

$$ESG\ score = \frac{Number\ of\ companies\ with\ worse\ value + \frac{Number\ of\ companies\ with\ the\ same\ value}{2}}{Total\ number\ of\ companies\ with\ a\ value} \quad (1)$$

after calculating the ESG scores, the same scores are then converted by Asset4 analyst to letter grades. I will be using the scores for this research, but to give insights, the table 1 below provides how the scores are converted into the grades and gives an explanation of what the letter grades interpret.

Table 1. - ESG ranking

Score range	Grade	Description
0.0 <= score <= 0.083333	D -	'D' score indicates poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly
0.083333 < score <= 0.166666	D	
0.166666 < score <= 0.250000	D +	
0.250000 < score <= 0.333333	C -	'C' score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.
0.333333 < score <= 0.416666	C	
0.416666 < score <= 0.500000	C +	
0.500000 < score <= 0.583333	B -	'B' score indicates good relative ESG performance and above average degree of transparency in reporting material ESG data publicly.
0.583333 < score <= 0.666666	B	
0.666666 < score <= 0.750000	B +	
0.750000 < score <= 0.833333	A -	'A' score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.
0.833333 < score <= 0.916666	A	
0.916666 < score <= 1	A +	

5.2.2. Loan Amount and Loan Spread (dependent variable)

This research analyses two dependent variables, known as the loan amount lend by banks to the individual companies and the loan spread charged to the borrowers by the lenders. These dependent variables are used to measure the favourableness of lenders' loan decisions. The loan-type data used for this research is collected from Refinitiv Dealscan. this database uses information from loan agreements, media and interviews with the lenders and borrowers to gather all of this data (Kim et al., 2022). The Refinitiv Dealscan database is known as "the world pre-eminent source for extensive and reliable information on the global commercial loan market" (Reuters, 2022). Dealscan provides detailed data on loan-level, for example; loan spread, loan size, loan purpose, tranche type, distribution method, maturity, industry, and covenants (Shin, 2021) . The dependent variable loan amount is known as the deal amount variable in Dealscan.

The dependent variable loan spread is used to measure the amount the borrowing firm pays in basis points (bps) over the London Interbank Offer Rate (LIBOR) for each loan dollar drawn down, which is known as the variable all in spread drawn (AISD) in Dealscan.

5.2.3. Control Variables

Based on prior literature (e.g. Hauptmann, 2017; Eliwa et al., 2021; He et al., 2021; Shin, 2021; Degryse et al., 2022), Loan amount and loan spreads are also correlated with several other variables other than ESG scores. These other variables can affect the relation between loans and ESG scores, by either strengthening or weakening it. To investigate the correlation between the dependent and independent variables, this research will apply the variables mentioned in the Alinea's below as control variables, to measure the strength or weakening of the correlation.

First of all, there are four control variables used for companies known as: firm size (Size), leverage (DTA), profitability (ROA), and Market to book ratio (MTB). Table 2 below provides the calculation and description of these variables.

Table 2. - Control Variables

Control Variables	Calculation	Description
Firm size (Size)	ln(TA)	Size is measured by taking the natural logarithm of total assets in year t.
Profitability (ROA)	NI (loss)/ TA	Profitability is measured by taking the net income (loss) in year t and dividing it by total assets in year t.
Leverage (DTA)	Debt/ TA	Leverage is calculated by taking the total long term debt in year t and dividing it by total assets in year t.
Market to book (MTB)	MKVLT/ BV	The market to book ratio is calculated by taking the total market value of equity and dividing it by the book value of equity.

Firms that have a large Size are expected to be more resourceful for external financing in comparison to smaller size firms according to Hasan et al. (2017) and Erragragui (2018). According to Jung et al. (2018) and Erragragui (2018), it is expected that firms have better solvency and reduced interest rates when having lower leverage. Furthermore, Ge & Lui (2015) and Arena (2018) say that firms who have higher profitability are in a better financial

position, which gives them a higher chance in acquiring loans with reduced interest. Market to book ratio is also used by researches to test the financial performance of companies and use it to determine these companies' access to loans (Chava, 2014; Hauptmann, 2017; Ahmed et al., 2018; Shin, 2021).

Second of all, there are also control variables used to measure the loan characteristics. This thesis uses: loan purpose (LP); which is measured by taking indicator variables for each loan purpose (acquisition, capital expenditure, general purpose, refinance, merger, real estate loan, spinoff, stock repurchase, takeover, and working capital), loan type (LT); uses an indicator variable for the types of loans (364-day facility, advance facility, bridge loan, CAPEX loan, delay draw term loan, revolver/line < 1 year, standby letter of credit, revolver/line >= 1 year, term loan, and term loan A & B), maturity (MTY); which is measured in months, and covenant (CNT), which is a dummy variable for if there is a covenant or not. These variables are all available in Dealscan.

6. Methodology

The methodology of this thesis consists of two parts. The first part consists of an empirical investigation, where the relation between sustainable firms and sustainable banks and the loan amount lend to these firms by the banks is tested through an OLS regression. To get to the bottom of this research, the thesis will provide several regression models.

To test this relation, the number of companies selected in this sample are based on ESG scores in the period of 2013 to 2018. So following the research of shin (2021) the baseline regression 2 & 3 are formulated for the first hypothesis (H1):

$$Log\ loan\ amount_{i,b,t} = \alpha + \beta_1\ F\_ESG_{\ i,t} + \beta_2\ B\_ESG_{i,b,t} + \beta_3 F\_ESG_{i,t} \times B\_ESG_{i,b,t} + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (2)$$

$$Log\ loan\ amount_{i,b,t} = \alpha + \beta_1\ F\_ESG_{\ i,t} + \beta_2\ B\_ESG_{i,b,t} + \beta_3 F\_ESG_{i,t} \times B\_ESG_{i,b,t} + PEA_t + \beta_4 F\_ESG_{i,t} \times PEA_t + \beta_5 B\_ESG_{i,b,t} \times PEA_t + \beta_6 F\_ESG_{i,t} \times B\_ESG_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (3)$$

Where log loan amount is the natural logarithm of the total loan amount per loan type (i) and average ESG score of syndicated banks (b) for firm in year (t), it represent the dependent variable. F_ESG is the proxy for firms overall ESG scores per year at the time the loan was borrowed. B_ESG is the proxy for the average syndicated banks ESG score per year at the time the loan was lent. The interaction term $F\_ESG_{i,t} \times B\_ESG_{i,b,t}$ investigates the effect that a sustainable bank is more likely to lend a (higher) loan amount to a sustainable firm. The PEA_t is a dummy variable which takes the value of 1 for loans provided after the Paris Environment Act, this means loans that are provided in the year 2016 until 2018 and takes the value of 0 otherwise. So the interaction terms $\beta_4 F\_ESG_{i,t} \times PEA_t$, $\beta_5 B\_ESG_{i,b,t} \times PEA_t$, $and\ \beta_6 F\_ESG_{i,t} \times B\_ESG_{i,b,t} \times PEA_t$ captures the firms ESG scores after the Paris Environment Act, the average ESG scores of the syndicated banks after the Paris Environment Act, and investigates the effect that sustainable banks are more likely to give (higher) loan amount to sustainable firms after the Paris Environment Act, respectively. The vector $X_{i,b,t}$ denotes the borrower country- and lender country-,borrower year- and lender year-fixed effects. The vector $Y_{i,b,t}$ denotes the loan-,borrower-, and lender-level control variables. The loan-level

controls for loan purpose (LP), loan type (LT), maturity (MTY), and covenant (CNT). The borrower-level controls for firm size (Size), profitability (ROA), leverage (DTA) and market to book ratio (MTB). Lastly, for the lender-level the controls, firm size, profitability and leverage are used.

Furthermore, the research will test the separate ESG scores for the firms and banks and the relation to the amount of loan provided to the firms by the banks. This will be done by 3 other regressions which test the second hypothesis (H2).

$$Log\ loan\ amount_{i,b,t} = \alpha + \beta_1 F\_E_{i,t} + \beta_2 B\_E_{i,b,t} + \beta_3 F\_E_{i,t} \times B\_E_{i,b,t} + PEA_t + \beta_4 F\_E_{i,t} \times PEA_t + \beta_5 B\_E_{i,b,t} \times PEA_t + \beta_6 F\_E_{i,t} \times B\_E_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (4)$$

$$Log\ loan\ amount_{i,b,t} = \alpha + \beta_1 F\_S_{i,t} + \beta_2 B\_S_{i,b,t} + \beta_3 F\_S_{i,t} \times B\_S_{i,b,t} + PEA_t + \beta_4 F\_S_{i,t} \times PEA_t + \beta_5 B\_S_{i,b,t} \times PEA_t + \beta_6 F\_S_{i,t} \times B\_S_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (5)$$

$$Log\ loan\ amount_{i,b,t} = \alpha + \beta_1 F\_G_{i,t} + \beta_2 B\_G_{i,b,t} + \beta_3 F\_G_{i,t} \times B\_G_{i,b,t} + PEA_t + \beta_4 F\_G_{i,t} \times PEA_t + \beta_5 B\_G_{i,b,t} \times PEA_t + \beta_6 F\_G_{i,t} \times B\_G_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (6)$$

The three regression above test the separate E, S and G scores of the lender and the borrower and the amount of loan lent before and after the Paris Environment Act. The main point of the of these regressions is to test the effect of the Paris Environment Act of 2016 on the lending activities of banks and borrowing activities of firms. So the main focus will be on the β_3 and β_6 of the regressions. This is because β_3 tests the loan amount that is borrowed and lent by sustainable firms and banks before the Paris Environment Act went into force. And β_6 tests whether the loan amount is correlated to firms and banks their higher separate ESG scores after the adoption of the Paris Environment Act of 2016.

The second part of the thesis investigates the relation between firms and banks their ESG scores and the loan spread provided to the firms by the banks. By following the paper of Hauptmann (2017), Goss & Roberts (2011) and Shin (2021), the following regression 7 & 8 are formulated to test the third hypothesis (H3).

$$Log\ loan\ spread_{i,b,t} = \alpha + \beta_1 F\_ESG_{i,t} + \beta_2 B\_ESG_{i,b,t} + \beta_3 F\_ESG_{i,t} \times B\_ESG_{i,b,t} + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (7)$$

$$Log\ loan\ spread_{i,b,t} = \alpha + \beta_1 F\_ESG_{i,t} + \beta_2 B\_ESG_{i,b,t} + \beta_3 F\_ESG_{i,t} \times B\_ESG_{i,b,t} + PEA_t + \beta_4 F\_ESG_{i,t} \times PEA_t + \beta_5 B\_ESG_{i,b,t} \times PEA_t + \beta_6 F\_ESG_{i,t} \times B\_ESG_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (8)$$

This regression is the same as the main OLS regression, but only the dependent variable changed from log loan amount to log loan spread. The loan spread is based on the all in spread drawn variable, which is measured in bps. By taking the lenders and borrowers ESG scores and the control and fixed variables, we can follow Goss & Roberts (2011) and Hauptmann (2017) and investigate that banks with higher ESG scores (grades A+ to C-) are less likely to lend loans with lower interest spread to firms with lower ESG scores (grades D+ to D-). Furthermore, this thesis is also testing whether banks with higher ESG scores are more likely to give loans with lower interest spread to firms with the same or higher ESG scores.

The last part of this thesis investigates the last hypothesis (H4) by formulating the following regressions:

$$Log\ loan\ spread_{i,b,t} = \alpha + \beta_1 F\_E_{i,t} + \beta_2 B\_E_{i,b,t} + \beta_3 F\_E_{i,t} \times B\_E_{i,b,t} + PEA_t + \beta_4 F\_E_{i,t} \times PEA_t + \beta_5 B\_E_{i,b,t} \times PEA_t + \beta_6 F\_E_{i,t} \times B\_E_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (9)$$

$$Log\ loan\ spread_{i,b,t} = \alpha + \beta_1 F\_S_{i,t} + \beta_2 B\_S_{i,b,t} + \beta_3 F\_S_{i,t} \times B\_S_{i,b,t} + PEA_t + \beta_4 F\_S_{i,t} \times PEA_t + \beta_5 B\_S_{i,b,t} \times PEA_t + \beta_6 F\_S_{i,t} \times B\_S_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (10)$$

$$Log\ loan\ spread_{i,b,t} = \alpha + \beta_1 F\_G_{i,t} + \beta_2 B\_G_{i,b,t} + \beta_3 F\_G_{i,t} \times B\_G_{i,b,t} + PEA_t + \beta_4 F\_G_{i,t} \times PEA_t + \beta_5 B\_G_{i,b,t} \times PEA_t + \beta_6 F\_G_{i,t} \times B\_G_{i,b,t} \times PEA_t + X_{i,b,t} + Y_{i,b,t} + \varepsilon_{F,B,i,t} \quad (11)$$

These three regression above test the separate E, S and G scores of the lender and the borrower and the loan spread provided before and after the Paris Environment Act. The regressions are the same as regression 4, 5 and 6. Only the main dependent variables changed to loan spread.

7. Results

This section provides deeper insight to how the data is distributed and discusses the results of the hypothesises presented in the previous part.

Table 3. - Summary Statistics

Summary Statistics	**Min**	**Max**	**Median**	**Mean**	**Std.Dev.**	**Observations**
Loan characteristics:						
Log loan amount	1.10	9.21	5.42	5.30	1.00	732
Loan amount	3.00	10000.00	225.00	322.90	494.03	732
Log loan spread	3.91	6.52	5.01	5.04	0.41	732
Loan spread	50.00	675.00	150.00	170.20	88.09	732
Maturity	3.00	120.00	60.00	50.45	18.50	732
Borrower characteristics:						
ESG score	0.00	92.34	28.21	25.74	21.13	732
E score	0.00	94.23	0.00	13.08	20.94	732
S score	0.00	93.33	31.33	27.68	23.17	732
G score	0.00	95.13	38.83	36.37	28.74	732
Firm Control variables:						
ROA	0.00	0.37	0.04	0.06	0.06	732
Leverage	0.00	0.67	0.29	0.28	0.16	732
Size	0.00	12.91	7.51	7.35	1.79	732
Market to book	0.00	171.91	1.90	3.64	13.30	732
Lender characteristics:						
ESG score	0.00	86.70	53.92	58.19	17.30	732
E score	0.00	94.97	55.98	49.41	29.53	732
S score	0.00	90.59	60.97	58.42	17.04	732
G score	0.00	93.97	68.06	65.11	20.60	732
Bank Control variables						
ROA	0.00	0.02	0.01	0.01	0.003	732
Leverage	0.00	0.15	0.07	0.06	0.04	732
Size	0.00	14.78	12.33	11.42	3.14	732

Note: table 3 does not include the fixed/factor variables (fixed effects), only the dependent, independent and control variables.

This research reports the summary statistics for all of the variables except the fixed variables (bank & firm fixed effects, year fixed effects, industry fixed effects, loan purpose fixed effects, loan type fixed effects, covenants fixed effects, Paris Environment Act (PEA) fixed effects). used in the main analysis using the minimum (min), maximum (max), mean, median, and standard deviation (Std.Dev.) in Table 3. The main dependent variable, loan amount, has a mean (median) value of approximately $323 million ($225 million) with a standard deviation of approximately $494 million. For the loan spread, this has a mean (median) size of approximately 170 (150) bps, with a standard deviation of approximately 88 bps. The loan spread and loan amount are consistent with previous literature (Goss et al., 2011; Hauptmann, 2017; He et al., 2021; Eliwa et al., 2021; Shin (2021); Kim et al., 2022; Degryse et al., 2022). The maturity of the loans has a mean (median) of 50 (60) months, with a standard deviation of approximately 19 months, the maturity is consistent with the previous literatures of Hauptmann (2017), He et al. (2021), Shin (2021). In terms of the borrower characteristics, the 159 firms in the sample have a mean (median) ESG score of approximately 26 (28), which belong to the grade of C-, indicating satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly, this is in line with previous literature (Hauptmann, 2017; Houston et al., 2021). Furthermore, the firm control variables have a mean (median) for ROA of 6% (4%), for the leverage ratio of 28% (29%), for asset size a mean of $12.448 million, and for the market to book ratio of 3.64 (1.90), this is in line with prior literature (Hauptmann, 2017; He et al., 2021; Eliwa et al., 2021). In terms of the lender characteristics, the 36 banks in the sample have a mean (median) of approximately 58 (54), which belong to the grade of B-, indicating good relative ESG performance and above average degree of transparency in reporting material ESG data publicly, this is in line with prior literature (Hauptmann, 2017; Houston et al., 2021). And the banks control variables have a mean (median) for ROA of 1% (1%), for the leverage ratio of 6% (7%), and for the asset size a mean of approximately of $159.365 million, this is in line with previous literature (He et al., 2021; Eliwa et al., 2021). Moreover, the separate E, S, and G scores of firms have a mean (median) of approximately 13 (0), 28 (31), and 36 (39), respectively. This shows us that the E scores indicate a poor relative ESG performance and the S and G a satisfactory relative ESG performance (grades D, C- and C). The separate E, S, and G scores of banks have a mean (median) of approximately 49 (56), 58 (61), and 65 (68), respectively. This provides us with the indication that the separate E, S, and G scores have a relative good ESG performance (grades B-, B and B+), this is in line with previous literature of Shin (2021).

7.1. Discussion of the ESG scores of borrower and lenders on the Loan Amount

To explore the first hypothesis of "banks loan amount increases as borrowers ESG scores and banks ESG scores are higher", I used a facility ID – level, which is a variable in the Dealscan database indicating the different types of loans a bank provides to a firms in the period of 2013-2018. This provides the following table 4 with the results of the first hypothesis instigating the before (column 1) and after (column 2) Paris Environment Act of 2016 and second hypothesis with the added dummy variable PEA for all the years of 2013 until 2018 (column 3). Since there has been no prior research based on the ESG scores and the loan amount in the U.S., this thesis will investigate the direct effect of the ESG scores and its

separate components (E, S, and G) using the before and after of the Paris Environment Act of 2016 (counterfactual method).

When looking at the first hypothesis and its equation (2) and (3), the second equation is meant to investigate the first hypothesis by studying firms and banks ESG scores in correlation to the loan amount in a before and after scenario of the Paris Environment Act. This regression has a main coefficient of interest and that is the interaction term β_3 (before and after Paris Environment Act). Furthermore, the column 3 provides the results of equation (3), which investigates the effect of the dummy variable PEA on the whole sample, for hypothesis one (H1). This is then done, by using the coefficient β_6 as the main coefficient of interest in equation (3).

Provided with the table 4 below, the results conclude over the 6 year period that when firms have high ESG scores (ESGscoresFIRM), they are on average rewarded with higher loan amounts. This is indicated by the 0.019 significant at the 1% level in column 3, this can also be interpreted as, when firms have high ESG scores, they are rewarded with a 1.9% higher average loan than those who have lower ESG scores. As for the columns 1 and 2, we are also provided with significant results for the variable ESGscoresFIRM. Only I expected that firms in the before sample should have had a lower or no significant results than the after sample. So, when looking at the before anf after sample, we get a significance of 0.019 (at the 1% level) and 0.017 (at the 5% level), respectively. When looking at these results, I can come to a conclusion that the after sample is lower in significance due to the fact that the U.S. stepped out of the Paris Environment Act in 2017. This could have maybe led to firms and banks also being less responsible for their ESG performance. when looking the results for the main coefficients of interest (β_3 and β_6) where the dummy variable PEA is added, we can see in the table below in all the three columns that when firms ESG score and banks ESG scores are on the high side, then the average loan amount provided stays the same or is even lower, but this is negative and not significant. I can say that I had even expected the results to be positive, but not significant in the columns 2 and 3, but this is not even the case. Due to the fact that the results are this worse, I need to reject the hypothesis, indicating that the sample is not supporting the main hypothesis. As last I can say that I do not reject the null hypothesis, meaning that there is no correlation between the higher ESG scores of banks and firms and the corresponding loan amount.

Moreover, the results of this table provide us with some interesting additional results. As we look at the size of a company in correlation to the loans, we see that for all columns the results are positive and significant. This means that when the company is bigger in size, they are also provided with higher loans. And when looking at the market to book ratio (MTB), we see that the columns 2 and 3 indicate that firms with a higher MTB ratio are also provided with higher loans.

Table 4. - The sample before and after the Paris Environment Act of the firms' and banks' ESG scores regressed against the logarithm of the dependent variable Loan Amount

Panel A: OLS regression before and after Paris Environment Act regressed against the loan amount						
	Dependent variable:					
	log(LOANAMOUNT)					
	(1) Before PEA 2013-2015		(2) After PEA 2016-2018		(3) PEA interaction	
	Coef.	T-value	Coef.	T-value	Coef.	T-value
PEA					-1.021**	(0.399)
ESGscoreFIRM	**0.019*** **	**(0.006)**	**0.017** **	**(0.008)**	**0.019*** **	**(0.007)**
ESGscoreBANK	-0.003	(0.010)	**0.028***	**(0.016)**	-0.001	(0.006)
ESGscoreFIRM × ESGscoreBANK	**-0.0001**	**(0.0001)**	**-0.00004**	**(0.0001)**	0.00001	(0.0001)
PEA × ESGscoreFIRM					**0.003**	**(0.010)**
PEA × ESGscoreBANK					**0.005**	**(0.005)**
PEA × ESGscoreFIRM × ESGscoreBANK					**-0.0001**	**(0.0002)**
MATURITY	-0.004*	(0.002)	-0.002	(0.003)	-0.006**	(0.003)
COVENANTS	0.010	(0.093)	-0.116	(0.102)	-0.075	(0.117)
ROAFIRM	0.711	(1.146)	0.065	(1.041)	2.071**	(0.968)
LeverageFIRM	0.701*	(0.397)	0.441	(0.431)	-0.485	(0.429)
SIZEFIRM	0.177***	(0.040)	0.133***	(0.028)	0.067*	(0.034)
MTBFIRM	-0.008	(0.006)	0.034**	(0.014)	0.018**	(0.007)
ROABANK	-29.977	(44.252)	7.848	(29.378)	-6.366	(19.192)
LeverageBANK	-2.134	(4.282)	1.123	(5.963)	-1.566	(1.951)
SIZEBANK	-1.628	(1.841)	0.076	(1.558)	-0.276	(0.679)
Constant	20.098	(18.764)	1.055	(15.947)	5.476	(7.053)
Borrower characteristics	Yes		Yes		Yes	
Lender characteristics	Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes	
Loan purpose fixed effects	Yes		Yes		Yes	
Loan type fixed effects	Yes		Yes		Yes	
Covenant fixed effects	Yes		Yes		Yes	
observations	308		424		732	
R^2	0.762		0.656		0.783	
Adjusted R^2	0.690		0.584		0.704	
Residual Std. Error	0.520		0.667		0.542	
F Statistic	10.644***		9.143***		9.963***	
Note: significance					*p<0.1; **p<0.05; ***p<0.01	

7.1.1. Discussion of the separate E, S, and G scores on the Loan Amount

In the following table, I investigate what the effect of the Paris Environment Act was on firms and banks their lending and borrowing behaviour in 2013-2018. It is believed that the Paris Environment Act helped raise public awareness about the risks associated with climate change and increased the commitment of policymakers to addressing these issues. So to investigate whether the Paris Environment Act had an impact on the separate E, S, and G

factors of firms and banks and their borrowing and lending behaviour, I provide the results in table 5.

To test the second hypothesis, the sample uses the E (column 1), S (column 2), and G (column 3) factors of firms and banks in correlation to the loan amount. The main coefficient of interest is now only the coefficient β_6, the interaction term in equation 4, 5, and 6. Table 5 discusses the result of the three equations (4, 5, and 6) for the whole sample. This is the part where the dummy variable PEA is added to interact with the separate E, S, and G scores.

The sub components environmental (E), social (S), and governance(G) of firms and banks in the U.S. are regressed against loan amount that is lent to them by banks in the U.S.

When looking at the results, I can see that the environmental, social and governmental aspect of firms (EscoreFIRM, SscoreFIRM, and GscoreFIRM) are significant at the 1% level with a coefficient of 0.023, 0.016, and 0.012, respectively. These positive significants indicate that when firms have higher overall E, S, and G scores, they are provided with average higher loans. The environmental aspect has a higher significance, which can indicate that this component is of higher importance if we look at all the sub-components. This actually makes sense since the environment is also the main concern of the Paris Environment Act.

Regarding the main coefficients (PEA x EscoreFIRM x EscoreBANK, PEA x SscoreFIRM x SscoreBANK, and PEA x GscoreFIRM x GscoreBANK), the table presents that the higher environmental scores of firms and banks are positive, but not significantly correlated to the loan amount. This can indicate that the environmental aspect is of importance, but it should be rejected since the data is not significantly supporting the hypothesis. The social and governmental aspects are negative and not significant, meaning that these are not even close to supporting the hypothesis. So I have to reject the hypothesis and establish that there is no relationship between the separate E, S, and G scores of firms and banks in correlation to the loan amount. Furthermore, as the size and MTB increases the loan amount provided is also higher in all the separate E, S, and G samples.

Table 5.- The before and after Paris Environment Act sample of the separate E, S, and G scores regressed against the logarithm of the dependent variable Loan Amount

Panel B: OLS regression separate E, S, G scores in correlation to the loan amount						
	Dependent variable:					
	log(LOANAMOUNT)					
	(1) PEA interaction E-score		(2) PEA interaction S-score		(3) PEA interaction G-score	
	Coef.	T-value	Coef.	T-value	Coef.	T-value
PEA	-0.314	(0.250)	-0.954**	(0.408)	-0.877**	(0.411)
EscoreFIRM	**0.023*** **	**(0.005)**				
EscoreBANK	-0.0002	(0.004)				
SscoreFIRM			**0.016*** **	**(0.006)**		
SscoreBANK			-0.003	(0.007)		
GscoreFIRM					**0.012*** **	**(0.005)**
GscoreBANK					-0.0004	(0.004)
EscoreFIRM × EscoreBANK	-0.0001	(0.0001)				
PEA × EscoreFIRM	-0.006	(0.006)				
PEA × EscoreBANK	0.001	(0.002)				
PEA × EscoreFIRM × EscoreBANK	**0.0001**	**(0.0001)**				
SscoreFIRM × SscoreBANK			0.00003	(0.0001)		
PEA × SscoreFIRM			0.004	(0.009)		
PEA × SscoreBANK			0.006	(0.005)		
PEA × SscoreFIRM × SscoreBANK			**-0.0001**	**(0.0001)**		
GscoreFIRM × GscoreBANK					0.00002	(0.0001)
PEA × GscoreFIRM					-0.003	(0.007)
PEA × GscoreBANK					0.003	(0.004)
PEA × GscoreFIRM × GscoreBANK					**-0.00002**	**(0.0001)**
MATURITY	-0.004	(0.003)	-0.006**	(0.003)	-0.006**	(0.003)
COVENANTS	-0.106	(0.115)	-0.150	(0.122)	-0.046	(0.117)
ROAFIRM	1.693*	(0.965)	1.738*	(0.975)	1.579	(0.978)
LeverageFIRM	-0.552	(0.432)	-0.430	(0.436)	-0.588	(0.435)
SIZEFIRM	0.071**	(0.034)	0.062*	(0.034)	0.081**	(0.034)
MTBFIRM	0.021***	(0.007)	0.017**	(0.007)	0.020***	(0.007)
ROABANK	-11.968	(17.908)	-7.427	(18.708)	-9.450	(19.470)
LeverageBANK	-1.900	(1.981)	-1.663	(1.954)	-1.703	(2.068)
SIZEBANK	-0.415	(0.695)	-0.264	(0.694)	-0.270	(0.682)
Constant	7.064	(7.223)	5.684	(7.163)	5.683	(7.102)
Borrower characteristics	Yes		Yes		Yes	
Lender characteristics	Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes	
Loan purpose fixed effects	Yes		Yes		Yes	
Loan type fixed effects	Yes		Yes		Yes	
Covenant fixed effects	Yes		Yes		Yes	
Observations	732		732		732	
R^2	0.780		0.779		0.776	
Adjusted R^2	0.700		0.699		0.696	
Residual Std. Error	0.545		0.547		0.549	
F Statistic	9.797***		9.738***		9.612***	
Note: significance					*p<0.1; **p<0.05; ***p<0.01	

7.2. Discussion of the ESG scores on the Loan Spread

in this section, I will examine the before and after effect of the Paris Environment Act of both firms and banks ESG scores and their correlation to the loan spread. According to the agency view, it is argued that firms with high ESG performance are charged with higher loan spreads. However, Shin (2021) states that firms with high ESG performance are provided with a favourable loan spread. So to test this, the equations (7) and (8) are used to investigate hypothesis 3. When testing this hypothesis, the ESG scores of firms and banks are regressed against the logarithm of the dependent variable loan spread. The equation (7) is there to test the pre- and post- Paris Environment Act, it also has β_3 (ESGscoresFIRM*ESGscoresBANK), the interaction term as the main coefficient of interest. The equation 8 is there to test the dummy variable on the whole sample using the main coefficient β_6 (ESGscoresFIRM*ESGscoresBANK*PEA). The dependent variable loan spread is tested in the same way as how we tested the dependent variable loan amount.

Following the prior literatures of Goss & Roberts (2011), Hauptmann (2017), and Shin (2021), I investigate whether lenders with high ESG performance provide borrowers with high ESG performance a lower loan spread in a pre- and post- Paris Environment Act period. The table 6 below provides us with the results, which are discussed further.

After generating the results, I can interpret that the dependent variable ESG scores of firms (ESGscoreFIRM) in column 1 (before PEA) is positive, but not significant (Coef.: 0.001; T-value: 0.003). This coefficient shows us that before the Paris Environment Act went into force, the firms with high ESG scores, would receive the same as all the other firms with the same or even lower ESG scores. In other words, I can also say that the higher ESG scores is not correlated to a higher or lower loan spread, due to the fact that the coefficient is insignificant. For the column 2 (after PEA) and column 3 (PEA interaction on the whole sample), the results are negative, for the amounts of -0.012 and -0.004 and significant at the 1% and 5% level, respectively. These numbers indicate that after the Paris Environment went into force, the firms with higher ESG scores, were rewarded with an average lower loan spread. These results are actually in line with prior literature (Goss & Roberts, 2011; Hauptmann, 2017; Shin, 2021; Degryse et al., 2022).

To give a better view of a lower rewarded loan spread, I calculate how much this is in bps, for the columns 2 and 3. I use the median loan spread of 150 bps (provided in table 3) and the median firms ESG score of 27 (provided in table 3 with a grade of C-). So the results indicate that the average loan spread is provided with a decrease of 1.80 bps (=150*-0.012) when the firms have a higher ESG score with an increases of 2.7 (= 27*0.1 (10% benchmark)). According to column 3, I can interpret that with the dummy variable PEA added in the equation, the loan spread provided to firms with an increase of 2.7 in their ESG scores, receive a average lower amount of 0.6 bps (=150*-0.004).

Moreover, the main coefficient of equation 7 (ESGscoreFIRM*ESGscoreBANK), have the results provided in column 2 and 3. To interpret the results for these two columns, I can say that the results for the before and after Paris Environment Act are also in line with prior literature, positive for the before period and negative for the after period, but they are not

significant. This indicates that the results are not supporting the data. And the equation 8, which uses the PEA dummy variable to test the main coefficient β_6 (ESGscoresFIRM*ESGscoresBANK*PEA) in column 3 for the whole sample. This column also provides a result similar to column 2, where the main coefficient is β_3 (ESGscoresFIRM*ESGscoresBANK). These results are also negative and insignificant, meaning that it does not support the data, thus I need to reject the hypothesis.

Furthermore, we can interpret some interesting additional result. As the size of the firms increased the average loan spread provided was also higher, this is shown in the table below in columns 2 (coef.: 0.280, significant at the 1% level) and column 3 (coef.: 0.118, significant at the 10% level).

Table 6. - The sample before and after the Paris Environment Act of the firms' and banks' ESG scores regressed against the logarithm of the dependent variable Loan Amount

Panel C: OLS regression before and after Paris Environment Act regressed against the loan spread						
					Dependent variable:	
					log(LOANSPREAD)	
	(1) Before PEA 2013-2015		(2) After PEA 2016-2018		(3) PEA interaction	
	Coef.	T-value	Coef.	T-value	Coef.	T-value
PEA					-0.104	(0.091)
ESGscoreFIRM	**0.001**	**(0.003)**	**-0.012*** **	**(0.004)**	**-0.004** **	**(0.002)**
ESGscoreBANK	-0.002	(0.002)	-0.0004	(0.003)	-0.001	(0.001)
ESGscoreFIRM × ESGscoreBANK	**0.00001**	**(0.00002)**	**-0.00000**	**(0.00002)**	0.000	(0.00002)
PEA × ESGscoreFIRM					-0.002	(0.002)
PEA × ESGscoreBANK					0.001	(0.001)
PEA × ESGscoreFIRM × ESGscoreBANK					**-0.00000**	**(0.00003)**
MATURITY	0.0004	(0.002)	0.002	(0.001)	-0.0004	(0.001)
COVENANTS	-0.071	(0.045)	0.023	(0.037)	-0.064***	(0.024)
ROAFIRM	0.590	(0.688)	-0.110	(0.605)	-0.607**	(0.301)
LeverageFIRM	1.061	(0.853)	-0.044	(0.273)	-0.330*	(0.174)
SIZEFIRM	-0.155	(0.225)	0.280***	(0.098)	0.118*	(0.063)
MTBFIRM	0.026	(0.088)	-0.039	(0.035)	-0.018	(0.014)
ROABANK	0.370	(6.651)	-0.507	(6.405)	-3.204	(3.747)
LeverageBANK	-0.057	(0.652)	-0.186	(1.057)	-0.283	(0.384)
SIZEBANK	0.002	(0.275)	-0.088	(0.282)	-0.022	(0.132)
Constant	7.230**	(3.639)	7.043**	(2.899)	6.127***	(1.350)
Borrower characteristics	Yes		Yes		Yes	
Lender characteristics	Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes	
Loan purpose fixed effects	Yes		Yes		Yes	
Loan type fixed effects	Yes		Yes		Yes	
Covenant fixed effects	Yes		Yes		Yes	
Observations	308		424		732	
R^2	0.984		0.951		0.951	
Adjusted R^2	0.974		0.928		0.932	
Residual Std. Error	0.071		0.103		0.106	
F Statistic	98.314***		40.299***		51.855***	
Note: significance					*p<0.1; **p<0.05; ***p<0.01	

7.2.1. Discussion of the separate E, S, and G scores and their correlation to the Loan Spread

Lastly, the table 7 below investigates the equations 9, 10, and 11, which then tests the hypothesis 4 (H4). This is almost the same as the equations 4, 5, and 6, where the separate E,

S, and G scores are regressed against the dependent variable loan amount, but in this case the dependent variable is the loan spread.

To test the last hypothesis, the table provides us with the results for the separate E (column 1), S (column 2), and G (column 3) factors of firms and banks in correlation to the loan spread. The main coefficient of interest is also the coefficient β_6, the interaction term in equation 9, 10, and 11. Table 7 discusses the result of these three equations for all the 732 observations. This is the part where the dummy variable PEA is added to interact with the separate E, S, and G scores of firms and banks and test how it is correlated to the loan spread provided.

When looking at the results, I can interpret that the environmental and social aspects of firms (EscoreFIRM and SscoreFIRM) are both negative and significant. Only is the environmental factor significant at the 10% level with a coefficient of -0.003 and the social factor is significant at the 1% level with a coefficient of -0.006. These significant coefficients indicate that firms with a higher environmental and social score, are rewarded with an average lower loan spread. However, the governmental aspect of firms (GscoreFIRM) are also negative, but not significant. Thus meaning that the governmental factor is not correlated to the higher or lower loan spread provided. Another thing to add, is that the social factor plays a more important role in comparison to the environmental and governmental factors for banks to make a decision in what kind of loan spread firms receive.

Regarding the main coefficients β_6 (PEA x EscoreFIRM x EscoreBANK, PEA x SscoreFIRM x SscoreBANK, and PEA x GscoreFIRM x GscoreBANK), the table presents us with insignificant results. However the environmental aspect has a positive coefficient (0.00001) and the social and governmental aspects have a negative coefficient. If the social and governmental factors were significant the results would have been interesting, but they are not, so I also have to reject the hypothesis 4. It does not support the data, meaning that when also adding the dummy variable PEA in interaction with the E, S, and G aspects of firms and banks they are also not correlated to loan spread provided.

To end with some interesting additional information, I can interpret that if the maturity is higher for firms with better environmental performance, then the loan spread provided is also lower. Secondly, added covenants result in lower loan spreads for firms with better environmental, social and governmental performance. Thirdly, as a firm has higher leverage, then even if the firm has a good environmental, social and governmental score, they are provided with a higher loan spread. Lastly, if a firm has a lot of assets and they perform good on all the separate E, S, and G factors then they are also getting lower loan spreads.

Table 7.- The before and after Paris Environment Act sample of the separate E, S, and G scores regressed against the logarithm of the dependent variable Loan Spread

Panel D: OLS regression separate E, S, G scores in correlation to the loan spread						
					Dependent variable:	
					log(LOANSPREAD)	
	(1) PEA interaction E-score		(2) PEA interaction S-score		(3) PEA interaction G-score	
	Coef.	T-value	Coef.	T-value	Coef.	T-value
PEA	0.025	(0.031)	0.106*	(0.060)	0.011	(0.062)
EscoreFIRM	**-0.003***	**(0.002)**				
EscoreBANK	0.001	(0.001)				
SscoreFIRM			**-0.006*****	**(0.002)**		
SscoreBANK			-0.001	(0.001)		
GscoreFIRM					-0.001	(0.001)
GscoreBANK					-0.0005	(0.001)
EscoreFIRM × EscoreBANK	-0.000	(0.00001)				
PEA × EscoreFIRM	-0.0001	(0.001)				
PEA × EscoreBANK	-0.0004	(0.0003)				
PEA × EscoreFIRM × EscoreBANK	**0.00001**	**(0.00002)**				
SscoreFIRM × SscoreBANK			0.000	(0.00002)		
PEA × SscoreFIRM			0.0002	(0.002)		
PEA × SscoreBANK			-0.0001	(0.001)		
PEA × SscoreFIRM × SscoreBANK			**-0.00000**	**(0.00002)**		
GscoreFIRM × GscoreBANK					-0.00000	(0.00001)
PEA × GscoreFIRM					0.0004	(0.001)
PEA × GscoreBANK					0.0003	(0.001)
PEA × GscoreFIRM × GscoreBANK					**-0.00001**	**(0.00001)**
MATURITY	-0.001*	(0.001)	-0.001	(0.001)	-0.001	(0.001)
COVENANTS	-0.081**	(0.032)	-0.092***	(0.031)	-0.098***	(0.032)
ROAFIRM	-0.310	(0.277)	-0.406	(0.271)	-0.586**	(0.297)
LeverageFIRM	0.374**	(0.176)	0.304*	(0.172)	0.307*	(0.178)
SIZEFIRM	-0.205***	(0.066)	-0.145**	(0.062)	-0.147**	(0.068)
MTBFIRM	0.014	(0.017)	0.025*	(0.015)	0.028*	(0.015)
ROABANK	-2.972	(2.724)	-2.351	(2.746)	-2.905	(2.878)
LeverageBANK	-0.304	(0.310)	-0.259	(0.304)	-0.157	(0.323)
SIZEBANK	-0.027	(0.108)	0.022	(0.105)	-0.023	(0.104)
Constant	6.807***	(1.205)	5.813***	(1.163)	6.260***	(1.185)
Borrower characteristics	Yes		Yes		Yes	
Lender characteristics	Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes	
Loan purpose fixed effects	Yes		Yes		Yes	
Loan type fixed effects	Yes		Yes		Yes	
Covenant fixed effects	Yes		Yes		Yes	
Observations	732		732		732	
R^2	0.971		0.972		0.971	
Adjusted R^2	0.958		0.959		0.958	
Residual Std. Error	0.084		0.083		0.084	
F Statistic	71.561***		73.280***		71.562***	
Note: significance			*p<0.1; **p<0.05; ***p<0.01			

8. Conclusion

This thesis has two aims, first of all, to gain deeper knowledge of the consequences of ESG performance and the separate E, S and G factors in correlation to the amount of loan borrowed. Second of all, this thesis also provides a better understanding in how ESG scores and the separate E, S, and G scores are correlated to loan spreads. Both of these aims are hypothesized in context of a before and after effect of when the Paris Environment Act went into force. I use a sample of 732 firm- and bank-year observations filtered on the facility ID level and lead banks in the U.S.

After running the regressions on the hypothesis, I conclude the following:

Based on prior literature, there are four objectives of this paper. Firstly, we address whether firms and banks their higher ESG scores are related to a higher loan amount provided. To specify, we examine whether 159 borrowers and 36 lenders with higher ESG scores in the U.S. are correlated to a higher loan amount and better loan spread in a before and after setting of the Paris Environment Act.

Following the first hypothesis, the regression provided significant results for the before, after and PEA interaction sample, stating that firms with higher ESG scores received an average higher loan. However, when looking at the main coefficient of interest in table 4, the β_3 (ESGscoreFIRM x ESGscoreBANK) and the β_6 (PEA x ESGscoreFIRM x ESGscoreBANK) I find that the results are negative and insignificant for both of the coefficients in all of the samples. This led to the conclusion that the hypothesis should be rejected, indicating that it does not support the data. Secondly, using the sample of 735 firm-year observations I regress the separate E, S, and G factors of firms and banks against the loan amount. This provided the results for the second hypothesis. As seen in table 5, the results indicate a positive and significant result for firms with higher separate E, S, and G scores, but when testing on the main coefficient of interest the β_6 (PEA x E -, S -, and GscoreFIRM x E-, S -, GscoreBANK) I found that the results were insignificant. To be specific, the environmental score was positive and the social and governmental score were negative and all three were insignificant, thus indicating that the second hypothesis should also be rejected.

As for the second part of the thesis, I test the dependent variable loan spread in the same way as how I did the dependent variable loan amount. First of all, provided with the same sample, I investigate whether Banks with higher ESG scores reward a lower loan spread to firms with higher ESG scores in a before and after setting of the Paris Environment Act. To test the results, I use hypothesis 3. According to the results in table 6, it is possible to see that firms with higher ESG scores are rewarded with lower loan spreads after the Paris Environment Act went into force. However, when looking at the coefficients β_3 (ESGscoreFIRM x ESGscoreBANK) and β_6 (PEA x ESGscoreFIRM x ESGscoreBANK), they indicate promising results, but they are not significant. Thus, leading me again to a rejection of another hypothesis, H3. And lastly, the hypothesis 4, which tested the separate E, S, and G scores of banks and firms in correlation to the loan spread also had some interesting results. The table 7 provides us with the information that firms with higher E and S scores are on average provided with higher loans. But, when looking at the main coefficient of interest β_6 (PEA x E

-, S -, and GscoreFIRM x E-, S -, GscoreBANK), the coefficients in the table are really interesting and would have been in line with previous literature if they turned out significant. This has led to the rejection of hypothesis 4.

To conclude, there is no hard and significant evidence that firms and banks with higher ESG scores and their separate E, S, and G scores are provided and are providing higher loan amounts and lower loan spreads. Some evidence can imply that the Paris Environment Act, represented by banks and firms in countries that signed the agreement, can be of huge importance in improving the relevance and credibility of ESG performance in firms and other banks, thus creating a more sustainable environment. This is in line with the Paris Environment Act, which is trying to reduce the effect of climate change.

Although this study sheds more knowledge on the association between ESG practices, loan amounts and loan spreads, it has a limitations. This study employed secondary data obtained from specialised databases (Thomson Reuters Asset4, Dealscan, Compustat), which led to not having a huge sample due to limited ticker symbols. This leads to having a small sample size with listed companies and they cannot be fully representative of the whole population. Furthermore, future research could use a more extensive sample based on companies in the U.S. And could investigate research of a before and after of when the U.S stepped out the Paris Environment Act.

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