International Journal of Management and Sustainability
2025 Vol. 14, No. 4, pp. 1163-1188
ISSN(e): 2306-0662
ISSN(p): 2306-9856
DOI: 10.18488/11.v14i4.4643

Do managerial abilities matter? Evidence from U.S. bank loans and corporate sustainability

Imane Ibariouen[1]
Abdelmajid Hmaittane[2+]
Jean-Pierre Gueyie[3]
Mohamed Mnasri[4]

[1,2]*National School of Trade & Management (ENCG), Ibn Zohr University, Agadir, Morocco.*
[1]*Email: imane.ibariouen@edu.uiz.ac.ma*
[2]*Email: a.hmaittane@uiz.ac.ma*
[3]*School of Management, University of Quebec in Montréal, Canada.*
[3]*Email: gueyie.jean-pierre@uqam.ca*
[4]*Canada Research Chair in Risk Management, HEC Montreal, Canada.*
[4]*Email: mohamed.mnasri@hec.ca*


(+ Corresponding author)

Article History
Received: 18 July 2025
Revised: 20 October 2025
Accepted: 4 December 2025
Published: 31 December 2025

Keywords
Corporate sustainability
Cost of bank loan
Credit quality
Managerial abilities.

ABSTRACT

This study examines how managerial abilities affect the link between the cost of bank loans and corporate sustainability. We contend that sustainability activities reduce the cost of bank loans, and that this effect depends on managerial abilities and the company's credit quality. Using a U.S. dataset of 3,537 bank loan facilities, we conduct different multivariate regressions to test our predictions. Our findings reveal that corporate sustainability significantly decreases the cost of bank loan financing for firms with high managerial abilities relative to those with low managerial abilities. Furthermore, we found that corporate sustainability significantly decreases the bank loan financing cost for high-quality borrowers with high managerial abilities relative to low-quality borrowers with low managerial abilities. Overall, this research contributes to the literature by showing that the impact of corporate sustainability practices on the cost of bank loans does not only depend on the borrower's credit quality, as shown in prior empirical studies, but also on managerial abilities. Firms with both high credit quality and high managerial abilities enjoy lower bank loan costs. Our results have important implications. In particular, they provide valuable insights for firms seeking to improve their borrowing conditions, bankers aiming to assess borrowers' quality, and policymakers looking to promote corporate sustainable behavior.

Contribution/Originality: We contribute to the literature by demonstrating that the impact of corporate sustainability practices on the cost of bank loans is influenced not only by the borrower's credit quality, as shown in previous empirical studies, but also by managerial abilities. Firms with both high credit quality and strong managerial abilities tend to benefit from lower bank loan costs.

1. INTRODUCTION

Businesses are increasingly aware of the importance of sustainable activities, such as the transition to renewable energy and low-carbon alternatives, and are devoting significant financial resources to them (Fligstein & Huang, 2025). This growing awareness is also shared by banks, which are becoming increasingly involved in financing sustainable practices (Fard, Javadi, & Kim, 2020; Hauptmann, 2017). Given these trends among businesses and banks, one might expect banks to favor borrowers with strong sustainability activities when granting corporate loans. However, the existing empirical literature shows that the financial outcomes of such activities remain questionable. In this study, we add to this ongoing literature by addressing the following research questions: Do managerial abilities

matter when investigating the impact of corporate sustainability on the cost of bank loans? And more specifically, do managerial abilities matter depending on the firm's credit quality?

From a theoretical perspective, two competing views can help predict how corporate sustainability commitment may affect the bank loan cost.

The first viewpoint considers sustainability activities as an expression of agency problems between the managers and the shareholders of a company. Managers may use the costly sustainability activities to their advantage (Barnea & Rubin, 2010; Bénabou & Tirole, 2010). According to this viewpoint, one could predict that the bank might charge higher (lower) interest rates for companies with high (low) sustainability activities.

The second theoretical perspective posits that sustainability activities mitigate the firm's risk exposure (Khorilov & Kim, 2024; Liu & Song, 2025), hence reducing its probability of experiencing adverse financial repercussions in the future. Consequently, a lending bank is expected to charge higher (lower) interest rates for firms with low (high) corporate sustainability practices.

Empirically, there are several studies that investigate how corporate sustainability affects a company's bank loan cost. Overall, the results are mixed, with two main streams of studies.

The first stream has reported a negative impact (e.g. (Chava, 2014; Eliwa, Aboud, & Saleh, 2021; Ge & Liu, 2015; Goss & Roberts, 2011; Oikonomou, Brooks, & Pavelin, 2014)) and the second has found an insignificant effect (e.g. (Gigante & Manglaviti, 2022; Girerd-Potin, Jimenez-Garcès, & Louvet, 2014; Hoepner, Oikonomou, Scholtens, & Schröder, 2016; Magnanelli & Izzo, 2017)). An important limitation of this empirical literature is the underlying assumption of uniform managerial abilities across firms and over time. This means that managerial abilities are perceived to have an equal impact on business decisions. Nevertheless, an extensive literature provides strong evidence of the important role of managerial abilities as a determinant of firms' decisions and behavior, including investment efficiency (Chemmanur, Paeglis, & Simonyan, 2010; Gan, 2019) investment opportunity (Lee, Wang, Chiu, & Tien, 2018) innovation (Qian, Liang, & Liu, 2023; Ting, Tebourbi, Lu, & Kweh, 2021) research and development efficiency (Hao, Wen, & Wan, 2025) and others (e.g. (Andreou, Karasamani, Louca, & Ehrlich, 2017; Atawnah, Eshraghi, Baghdadi, & Bhatti, 2024; Cornaggia, Krishnan, & Wang, 2017; Curi & Lozano-Vivas, 2020; Demerjian, Lev, Lewis, & McVay, 2013; Gong, Yan, & Ho, 2021; Khurana, Moser, & Raman, 2018; Koester, Shevlin, & Wangerin, 2016; Yung & Chen, 2018)). Accordingly, we contend that when assessing the value of corporate sustainability initiatives in relation to the bank loan cost, bankers are more likely to take managers' abilities into account. In other words, managerial abilities' heterogeneity has the potential to help in understanding the influence of a firm's commitment to sustainability on its bank loan financing cost. Managers with high abilities are better positioned to undertake material sustainable investments (Welch & Yoon, 2023). They may also have incentives, such as through ESG targets linked to compensation, to initiate certain sustainability activities and communicate them to stakeholders, including loan providers. Therefore, we predict that when managerial abilities are high, the corporate sustainability of high-quality borrowers may reduce the cost of bank credits.

In order to test our expectations, we merged sustainability scores data from MSCI ESG STATS with information on bank loan facilities obtained from the Dealscan database, and managerial ability scores from the Demerjian database, as well as financial and accounting data from Compustat. The resulting dataset spans the years 2006 to 2012 and contains 3,537 U.S. bank credit facilities. Our econometric analysis supports the following results. First, using the whole and undifferentiated sample, we find that sustainable practices lead to lower bank loan financing costs. This finding aligns with previous research findings, which also indicated a negative relationship between a firm's engagement in sustainable activities and its cost of bank loans. Second, when we separate subsamples based on their managerial abilities levels, we find that corporate sustainability only lowers bank loan costs for high managerial abilities borrowers. Third, using the entire sample and distinguishing firms according to their levels of managerial abilities (high versus low), we confirm our second result.

Then, we additionally differentiate between high- and low-quality borrowers and confirm that the reducing impact of sustainability activities on the bank loan cost is obtained only for high-credit-quality borrowers. We subject these findings to different robustness checks, and our inferences remain unchanged.

This study contributes to and complements the existing literature by demonstrating that the influence of sustainability initiatives on a firm's bank loan cost depends not only on the firm's credit quality, as suggested by previous studies (i.e., Goss and Roberts (2011)), but also on managerial abilities. The findings indicate that sustainability practices result in lower bank loan costs for borrowers with strong managerial abilities and high credit quality. Additionally, these findings provide empirical evidence that banks evaluate corporate sustainability initiatives alongside borrowers' credit quality when determining loan pricing.

The findings of this paper can serve as a compelling incentive for high-quality borrowers led by highly capable managers to increase their commitment to sustainability. By doing so, they stand to benefit from reduced costs of bank financing, thus reinforcing the importance of integrating sustainable practices into their business strategies.

The remainder of this paper is arranged as follows: A thorough assessment of the pertinent literature is provided in Section 2. The research methodology, including data, variables, and models employed in the study, is described in detail in Section 3. The empirical results are presented in Section 4. Finally, the discussion of these results and the conclusion are provided in Section 5.

2. RELATED LITERATURE AND RESEARCH HYPOTHESES

2.1. Impact of Corporate Sustainability on a Firm's Cost of Bank Loan

Nowadays, corporate sustainability requires managers to expand their focus beyond mere compliance with legal and regulatory obligations to proactively address sustainability issues such as employee relations and climate change concerns (Khan, Serafeim, & Yoon, 2016). From the bankers' perspective, corporate sustainability activities mobilize significant resources with questionable financial outcomes. In theory, there are two opposing viewpoints that can help to understand how sustainability initiatives can impact the cost of bank loans.

The first viewpoint considers corporate sustainability commitment as a manifestation of a firm's agency problems between its shareholders, debtholders, and its managers. Firm's managers may exploit the information asymmetry (Jensen & Meckling, 1976) to their advantage through such costly activities (García-Sánchez, Hussain, Khan, & Martínez-Ferrero, 2020). Their incentive is to gain personal benefits by enhancing their own reputation or image (Barnea & Rubin, 2010; Bénabou & Tirole, 2010). For instance, the implementation of sustainability activities allows them to establish, maintain, and improve their relationships with the firm's network of stakeholders, and therefore to make themselves necessary persons to address stakeholders' issues. Consequently, they reduce the likelihood of their replacement (Cespa & Cestone, 2007). Based on this view, one would predict that the bank may require higher (lower) interest rates for firms with high (low) corporate sustainability activities. The second theoretical view suggests that incorporating sustainability activities into a company's overall strategy has the potential to reduce the firm's risk (Khorilov & Kim, 2024; Liu & Song, 2025). By initiating and implementing such activities, a firm can avoid facing and dealing with future social, environmental, and governance concerns, along with all the negative legal and financial consequences they might generate (Kumar, 2018; Ventouri, Chortareas, & Kou, 2023). As such, firms maintaining lower or poor (higher) corporate sustainability activities are riskier (less risky). Under this view, the bank is expected to charge higher (lower) interest rates for firms with low (high) corporate sustainability practices.

Overall, building on the agency problems and the risk reduction perspectives, it is anticipated that sustainability initiatives will have either a positive or negative effect on a company's bank loan financing cost. Consequently, our initial two alternative hypotheses are as follows:

Hypothesis 1a: High corporate sustainability positively affects the cost of bank loans.

Hypothesis 1b: High corporate sustainability negatively affects the cost of bank loans.

2.2. Corporate Sustainability, Cost of Bank Loan and Managerial Abilities

Various empirical studies have investigated the influence of corporate sustainability on bank loan costs; nevertheless, the findings are inconclusive. While one stream of studies has found a negative effect (e.g. (Chava, 2014; Eliwa et al., 2021; Ge & Liu, 2015; Goss & Roberts, 2011; Oikonomou et al., 2014)), a second one has reported an insignificant impact (e.g. (Gigante & Manglaviti, 2022; Girerd-Potin et al., 2014; Hoepner et al., 2016; Magnanelli & Izzo, 2017)). Therefore, the debate on this effect is still open and evolving.

One important limitation of the previous literature is the failure to consider the potential effects of differences in managerial abilities when assessing the impact of corporate sustainability commitment on a firm's bank loan cost. We refer to managerial abilities as the extent to which corporate managers effectively employ resources to generate revenues compared to their peers within the same industry. Managers with high abilities can produce higher revenues with the same resources or achieve the same revenues with fewer resources (Demerjian et al., 2013).

The underlying assumption of prior studies on the influence of sustainability practices on a company's bank loan cost is the firms' homogeneity in terms of managerial abilities. This suggests that corporate managers are perceived as having minimal or no impact on the decisions of their organizations. However, there is extensive empirical research providing evidence of the important role of managerial abilities in shaping firms' decisions and behavior. For instance, previous literature finds that more able managers favorably impact a firm's investment efficiency (Chemmanur et al., 2010; Gan, 2019; Khurana et al., 2018) investment opportunities (Lee et al., 2018) innovation (Qian et al., 2023; Ting et al., 2021) research and development efficiency (Hao et al., 2025) earnings quality (Demerjian et al., 2013) financial constraints (Andreou et al., 2017; Huang, Xiong, & Xiao, 2022) tax efficiency (Koester et al., 2016) credit risk (Cornaggia et al., 2017) risk taking (Curi & Lozano-Vivas, 2020) and the overall value of the firm (Atawnah et al., 2024; Gong et al., 2021; Yung & Chen, 2018).

In this research article, we argue that considering heterogeneity in managerial abilities can help understand the impact of corporate sustainability activities on bank loan financing costs. This is because managerial abilities are crucial for a company to select, implement, and integrate positive NPV investments into its operations and strategies (Andreou et al., 2017; Bertrand & Schoar, 2003; Demerjian et al., 2013). This is particularly the case for corporate sustainability initiatives. By launching such selected activities, managers with higher abilities drive the financial performance of the firm compared to managers with lower abilities.

Additionally, managers are incentivized to improve not only corporate financial performance but also ESG outcomes (Cunbo, Jindong, Haoxiang, & Ying, 2025).[1] Increasingly, companies are linking compensation to ESG targets. According to a PwC (2022) study, 92% of large American firms have already linked compensation to environmental, social, and/or governance measures. Given the discussion above, it is more likely that when bankers assess the worth of corporate sustainability efforts in terms of the bank loan cost, they will pay particular attention to managers' abilities. Consequently, we adjust our earlier predictions to take into account the importance of managerial abilities. Accordingly, if the agency problems view holds, then it will be the case in the worse situation where managerial abilities are low. Thus, the following is our third hypothesis:

Hypothesis 2a: High corporate sustainability positively affects the bank loan cost for firms with low managerial abilities.

In contrast, if the risk reduction view holds, then it will be the case in the best situation of firms with high managerial abilities. Therefore, the following is our fourth hypothesis:

Hypothesis 2b: High corporate sustainability negatively affects the bank loan cost for firms with high managerial abilities.

Moreover, since the bankers have a preference for dealing with high-credit-quality borrowers, as highlighted in the literature, the above predictions need to be more specific. Accordingly, we build on this previous literature (e.g. (Booth & Booth, 2006; Goss & Roberts, 2011)) and include the borrower's credit quality as a key determinant when

[1] Flammer, Hong, and Minor (2019) found that firms using ESG targets in their executive pay have better business and ESG performance.

studying the bank loan cost. Therefore, we expect to observe a positive effect, if any, in the worst-case scenario involving low-quality borrowers with low managerial abilities, and our fifth hypothesis is:

Hypothesis 3a: High corporate sustainability positively affects the bank loan cost for low-quality borrowers with low managerial abilities.

Conversely, if the risk reduction view holds, then it will be the case in the best situation of high credit quality and strong managerial abilities of firms. Thus, our sixth hypothesis is as follows:

Hypothesis 3b: High corporate sustainability negatively affects the bank loan cost for firms with high credit quality and high managerial abilities.

In sum, the literature reveals inconclusive empirical results regarding the impact of corporate sustainability practices on the cost of bank loans. Interestingly, these studies do not take into consideration the important role of managerial abilities. We fill this important research gap by studying this link while differentiating between firms with high and those with low managerial abilities. Building on Goss and Roberts (2011) study, we additionally control for the borrower' credit quality.

3. METHODOLOGY

3.1. Data

Our dataset is formed by merging information from MSCI ESG STATS, Compustat, DealScan, and Demerjian, Lev, and McVay (2012) databases. MSCI ESG STATS offers yearly binary data on environmental, social, and governance attributes for U.S. public companies. These attributes are divided into seven qualitative categories, namely community, diversity, employee relations, environment, product, human rights, and governance. Each of these categories is evaluated using strengths and concerns scores. DealScan provides data on all-in-drawn bank loan spreads, and Compustat offers accounting and financial information, while Demerjian et al. (2012) database provides firms' managerial abilities scores.

Following established research practices, we remove financial firms, identified by SIC codes 6000 to 6999, from our dataset. The final sample spans the years 2006 to 2012 and contains 3,537 U.S. bank credit facilities.[2]

3.2. Methodology

Building on previous literature, we use the two models below to assess how a company's sustainability efforts affect its cost of bank loans:

$$Spread_{i,t}=\alpha_0+\alpha_1 Sus_{i,t}+\sum_{j=1}^{k}\alpha_{1+j}CV_{j,i,t}+\varepsilon_{i,t} \quad (1)$$

$$Spread_{i,t}=\alpha_0+\alpha_1 Sus_{i,t}+\alpha_2 MA_{i,t}+\alpha_3 Sus_{i,t}*MA_{i,t}+\sum_{j=1}^{k}\alpha_{3+j}CV_{j,i,t}+\varepsilon_{i,t} \quad (2)$$

Where $Spread_{i,t}$ is the natural logarithm of a company's bank loan spread. $Sus_{i,t}$ is a dummy variable that is set to one (zero) for firms with high (low) sustainability activities' scores. $MA_{i,t}$ is the managerial abilities dummy variable, with a value of one (zero) for companies with high (low) managerial abilities' scores. Both $Sus_{i,t}$ and $MA_{i,t}$ are computed around the industry median for each year. CV refers to the k control variables, $\varepsilon_{i,t}$ denotes the error term.

With the first model, we can test our hypotheses about how corporate sustainability initiatives affect a company's bank loan cost *H1a* and *H1b*.

This effect is captured by the coefficient of interest α_1. The second model allows us to examine the influence of sustainability efforts on a firm's cost of bank loan depending on the level of managerial abilities as predicted in our hypotheses *H2a*, *H2b*, *H3a* and *H3b*. The coefficient of interest α_3 captures the differential effect of firms with high sustainability activities and high managerial abilities on the bank loan financing cost.

[2] Due to restricted data availability and access, the sample is limited to the US context and the years 2006–2012.

3.3. Variables

3.3.1. Cost of A Bank Loan

Our dependent variable, the bank loan cost, represents the all-in-drawn spread obtained from the DealScan database. It includes any facility fees the borrower may have incurred in addition to the interest rate over LIBOR. We follow past studies and use the natural logarithm of this variable.

3.3.2. Managerial Abilities

Using Demerjian et al. (2012) scores, we calculate our managerial abilities variable. Basically, Demerjian et al. (2012) rely on data envelopment analysis in the first step of their approach to calculate how effectively a company generates revenue and income from a set of inputs such as labor and capital. This enables them to determine a firm's efficiency compared to its peers in the industry. However, the computed efficiency measure is the result of both the firm's performance and the managers' abilities. Hence, in the second step, they perform a Tobit regression with various characteristics (i.e., size, cash availability, age, operational complexity, and life cycle) to distinguish between the two components. The estimated managerial abilities scores are the residuals obtained from this regression.

For the purposes of this study, managerial abilities scores (*MA_score*) are transformed into a binary variable, *MA*. *MA* equals one (zero) for companies with high (low) managerial abilities scores. A firm is classified as having high (low) managerial abilities for a given year if its *MA_score* is above (below) the industry median.

3.3.3. Corporate Sustainability

Following the existing literature, we rely on CSR scores to measure corporate sustainability. These scores are collected from the MSCI ESG STATS database, which provides binary data for various attributes reflecting CSR strengths and concerns. Based on seven dimensions, the data is provided annually for public companies in the United States. These dimensions are community, employee relations, diversity, environment, product, governance, and human rights.

We follow previous literature and sum all the CSR strengths (concerns) and obtain the strengths (concerns) index *STR_index* (*CON_index*). Then, we calculate an aggregated sustainability score variable, *Sus_index*, by subtracting the *CON_index* score from the corresponding *STR_index*. For ease of interpretation, we transform the variable *Sus_index* into a dummy variable, *Sus*. If the firm's sustainability score is higher than the industry median for a particular year, this dummy takes on a value of one; if not, it takes on a value of zero.

3.3.4. Control Variables

Following Goss and Roberts (2011), we control in all our regressions for the borrower and loan characteristics as determinants of the bank loan cost. The borrower characteristics are the following variables: size, as determined by calculating the logarithm of a company's total assets; market-to-book ratio; leverage ratio, which is calculated by dividing long-term debt by equity's market value.

Profitability, measured by a company's earnings before interest and taxes to its total assets ratio; Altman (1968) Z-score reflecting the firm risk; S&P is the credit rating dummy variable. If the firm's long-term debt has an S&P rating at the time of the loan contract signature, the value of this dummy variable is one; if not, it is zero. Additionally, we incorporate the following loan characteristics into our different regressions: maturity (we used the natural logarithm of this variable), type, purpose, as well as concentration.

Furthermore, the 3-month USD LIBOR rate at the loan period is included in all of our regression models to account for the impact of macroeconomic conditions. Similarly, we consider years and industries fixed effects. For industry definitions, we rely on the Fama and French (1997) 48-industry classification. All the continuous variables are winsorized at the 1st and 99th percentiles.

4. RESULTS

4.1. Descriptive Statistics

The descriptive statistics for our metrics of bank loan financing cost, corporate sustainability, and managerial abilities, as well as our control variables, are presented in Table 1.

The mean (median) of the dependent variable, *Spread*, is 5,014 (5,165), and its values range from 2,140 to 7,131. The sustainability measure *Sus_index* ranges from -10,000 to 15,000, with a mean (median) of -1,037 (-1,000). The managerial abilities score *MA_score* has a mean (median) of -0.017 (-0.045) and a range of -0.304 to 0.684. The control variables' statistics align with those found in earlier research.

Table 1. Descriptive statistics.

Variables	N	Mean	Median	SD	Min.	Max.
Spread	3,537	5.014	5.165	0.815	2.140	7.131
Sus_index	3,537	-1.037	-1.000	2.929	-10.000	15.000
MA_score	3,537	-0.017	-0.045	0.131	-0.304	0.684
Maturity	3,537	3.888	4.094	0.520	0.000	5.481
Concentration	3,537	-0.020	-0.005	0.048	-0.335	0.000
ALTZ	3,537	4.804	4.607	0.696	4.142	15.580
Market_Book	3,537	2.547	2.015	6.468	-42.100	51.450
Debt_Equity	3,537	0.679	0.306	1.270	0.000	11.370
Size	3,537	7.862	7.718	1.394	3.925	11.570
EBIT_TA	3,537	0.091	0.087	0.094	-1.658	1.021

The Pearson correlation coefficients of all variables are given in Table 2. With a coefficient of -0.124, there is a significant and negative correlation between *Spread*, the bank loan cost, and *Sus_index*, the aggregated sustainability score. This negative correlation supports our first hypothesis *H1b*. Additionally, Table 2 shows a positive correlation between *MA_score* and *Sus_index*. Thus, higher (lower) *MA_score* is associated with higher (lower) *Sus_index*.

All the remaining correlations of the bank loan cost, *Spread*, with the control variables are highly significant and show the predicted signs based on prior literature. The variables *Concentration*, *Market_Book*, *ALTZ*, *Size*, *and EBIT_TA (Maturity*) and *Debt_Equity*) are negatively (positively) associated with the bank loan financing cost *Spread*.

Finally, there are no particularly high correlations between our independent variables; therefore, multicollinearity cannot be a concern for our econometric analysis.

Table 2. Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Spread **(1)**	1.000								
Sus_index **(2)**	-0.128 (0.000)	1.000							
MA_score **(3)**	-0.167 (0.000)	0.088 (0.000)	1.000						
Maturity **(4)**	0.099 (0.000)	-0.048 (0.003)	-0.081 (0.000)	1.000					
Concentration **(5)**	-0.050 (0.002)	0.004 (0.799)	-0.072 (0.000)	0.063 (0.000)	1.000				
ALTZ **(6)**	-0.215 (0.000)	0.113 (0.000)	0.242 (0.000)	-0.040 (0.013)	-0.554 (0.000)	1.000			
Market_Book**(7)**	-0.141 (0.000)	0.060 (0.000)	0.045 (0.006)	-0.035 (0.033)	-0.067 (0.000)	0.140 (0.000)	1.000		
Debt_Equity **(8)**	0.283 (0.000)	-0.092 (0.000)	-0.112 (0.000)	0.071 (0.000)	0.157 (0.000)	-0.265 (0.000)	-0.111 (0.000)	1.000	
Size **(9)**	-0.344 (0.000)	0.121 (0.000)	0.113 (0.000)	-0.119 (0.000)	0.358 (0.000)	-0.173 (0.000)	0.019 (0.231)	0.050 (0.002)	1.000
EBIT_TA **(10)**	-0.296 (0.000)	0.070 (0.000)	0.256 (0.000)	0.045 (0.006)	-0.098 (0.000)	0.329 (0.000)	0.132 (0.000)	-0.250 (0.000)	0.007 (0.664)

Note: P-values are provided in parentheses.

Using different subsamples, defined based on managerial abilities scores and firms' credit quality, we computed the means along with the mean differences of the dependent variable, *Spread*. The results are reported in Table 3.

In panel A, the entire sample with all borrowers is used. The findings indicate that firms with high managerial abilities pay lower interest rates (4,953) compared to firms with low managerial abilities (5,063), and the mean difference is highly significant and negative.

In panel B, the entire sample with all managerial ability scores and all borrowers is used. The results reveal that firms with high sustainability scores *Sus_index* (*STR_index*) pay a lower cost of bank loans relative to firms with low sustainability scores. The mean difference is -0.244 (-0.396) and is highly significant. These results are consistent with the risk reduction effect view of corporate sustainability as predicted in our hypothesis *H1b*.

In panel C, we consider firms with all possible managerial abilities scores but with high quality credit. The findings show that high sustainability activities *Sus_index* (*STR_index*) firms enjoy lower interest rates compared to those with weaker corporate sustainability. Both mean differences are negative and significant at the 1% statistical level. These results are supportive to our hypothesis *H1b*.

In Panel D, we rerun the same analysis as in Panel C but focus on low-quality borrowers. The findings indicate that the two mean differences using *Sus_index* and *STR_index*, respectively, are statistically insignificant.

In panel E, we restrict our subsample to firms with high managerial ability scores and high-quality credit. The results show that high-quality borrowers with high managerial ability scores and high corporate sustainability, measured either by *Sus_index* or *STR_index*, pay lower interest rates than high-quality borrowers' firms with high managerial ability but low *sustainability* activities. The mean differences are negative and highly significant. These results are consistent with our risk reduction effect-based hypotheses *H2b* and *H3b*.

In panel F, our subsample consists of all firms with low managerial ability scores and low-quality credit. The findings indicate that the two mean differences in bank loan costs, using *Sus_index* and *STR_index*, are statistically insignificant.

Table 3. Mean differences of the cost of bank loan variable.

Variables	High	Low	Mean Differences
Panel A: All borrowers			
MA_score	4.953	5.063	-0.110***
Panel B: All Managerial abilities scores and all borrowers			
Sus_index	4.822	5.066	-0.244***
STR_index	4.837	5.232	0.396***
Panel C: All Managerial abilities scores and high-quality borrowers			
Sus_index	4.520	4.760	-0.240***
STR_index	4.506	5.031	-0.525***
Panel D: All Managerial abilities scores and low-quality borrowers			
Sus_index	5.404	5.354	0.050
STR_index	5.343	5.378	-0.035
Panel E: High Managerial abilities scores and high-quality borrowers			
Sus_index	4.331	4.683	-0.352***
STR_index	4.353	5.043	-0.690***
Panel F: Low Managerial abilities scores and low-quality borrowers			
Sus_index	5.383	5.333	0.050
STR_index	5.314	5.361	-0.047

Note: High and low scores are determined by comparing values to the industry median for each year, with scores classified as above or below the median. Statistical significance levels are indicated with *** for 1%.

Overall, our descriptive statistics results support our risk mitigation effect hypotheses *H1b*, *H2b*, and *H3b*.

4.2. Multivariate Regressions

This research examines whether managerial abilities mitigate the influence of corporate sustainability on a company's bank loan cost. To do this, we regress our dependent variable, *Spread*, on the corporate sustainability variable *Sus*, and the explanatory variables. The findings are provided in Table 4.

The first regression uses Equation 1 and the whole sample. The estimated coefficient of the corporate sustainability variable is negative at the 5% significance level. Thus, consistent with prior literature (Goss & Roberts, 2011; La Rosa, Liberatore, Mazzi, & Terzani, 2018) and with our risk mitigation effect hypothesis *H1b*, corporate sustainability practices reduce the bank loan costs.

Then, when we divide the sample into low versus high managerial abilities, we find that the coefficient of interest α_1 is insignificant for the low managerial abilities subsample (model 2), while it is negative and significant at the 1% level for the high managerial abilities subsample (model 3).

In the following regression (model 4), we consider the whole sample and the Equation 2. Our coefficient of interest, α_3, is the interaction term which represents the difference in the impact of corporate sustainability on bank loan costs for companies with high relative to those with low managerial abilities.

The estimate of α_3 is negative and highly significant at the 1% level. Consequently, corporate sustainability initiatives have a negative and significant impact on the company's bank loan cost only when managerial abilities are high. These results support our risk mitigation impact hypothesis *H2b* and do not support the overinvestment hypotheses *H1a* and *H2a*.

In order to test our hypotheses *H3a* and *H3b*, we define two subsamples according to firms' credit quality (high versus low). Using these two subsamples, we rerun regressions (1) to (4).

The findings, when the low-quality borrowers subsample is considered, are reported in regressions (5) to (8). All the estimates of the coefficients of interest (α_1 and α_3) are insignificant, and therefore, we reject our hypothesis *H3a*.

When we focus on high-quality borrowers, the results reported in regressions (9) to (12) differ. These findings are qualitatively comparable to those from regressions (1) to (4). Therefore, the impact of corporate sustainability on the bank loan cost is negative and significant but only for borrowers with both high credit quality and high managerial abilities. This result supports our prediction of risk reduction effect in *H3b*.

Table 4. Results of multivariate regressions using the aggregate sustainability score.

	All borrowers				Low-quality borrowers				High-quality borrowers			
	All	Low managerial abilities	High managerial abilities	High & low managerial abilities	All	Low managerial abilities	High managerial abilities	High & low managerial abilities	All	Low managerial abilities	High managerial abilities	High & low managerial abilities
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Interaction				-0.149***				-0.058				-0.200***
				(0.000)				(0.290)				(0.000)
Sus	-0.049**	0.003	-0.107***	0.024	0.033	0.059	0.016	0.057	-0.061**	0.008	-0.162***	0.035
	(0.021)	(0.926)	(0.001)	(0.408)	(0.215)	(0.124)	(0.679)	(0.139)	(0.028)	(0.828)	(0.000)	(0.349)
MA				0.008				0.047**				0.045
				(0.687)				(0.039)				(0.119)
Maturity	0.080***	0.114***	0.042	0.081***	0.066	0.118*	0.025	0.068	0066*	0.112**	-0.009	0.066*
	(0.005)	(0.001)	(0.356)	(0.005)	(0.144)	(0.050)	(0.730)	(0.131)	(0085)	(0.011)	(0.886)	(0.085)
Concentration	-1.511***	-1.910***	-1.082***	-1.464***	-0.401	-0.308	-0.335	-0.369	-2.719***	-3.094***	-2.309***	-2.668***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.121)	(0.371)	(0.373)	(0.153)	(0.000)	(0.000)	(0.000)	(0.000)
ALTZ	-0.145***	-0.241***	-0.105***	-0.137***	-0.080***	-0.187***	-0.053*	-0.082***	-0.160***	-0.250***	-0.113***	-0.149***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.058)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)
Market_Book	-0.003**	-0.004**	-0.002	-0.003***	-0.001	-0.001	0.001	-0.001	-0.003	-0.004	-0.003	-0.004*
	(0.012)	(0.035)	(0.203)	(0.006)	(0.478)	(0.345)	(0.821)	(0.404)	(0.105)	(0.199)	(0.212)	(0.060)
Debt_Equity	0.086***	0.097***	0.082***	0.086***	0.055***	0.064***	0.050***	0.053***	0.157***	0.125***	0.282***	0.158***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
EBIT_TA	-1.053***	-0.819***	-1.188***	-1.019***	-0.643***	-0.456**	-0.840***	-0.668***	-1.560***	-1.601***	-1.453***	-1.545***
	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	(0.029)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Libor	-0.124***	-0.079	-0.147**	-0.121***	-0.066	-0.011	-0.069	-0.062	-0.155***	-0.080	-0.230***	-0.151***
	(0.001)	(0.101)	(0.014)	(0.001)	(0.111)	(0.836)	(0.291)	(0.139)	(0.007)	(0.282)	(0.006)	(0.008)
Syndicated	0.196**	0.148	0.404*	0.207**	0.178	0.168	-0.096	0.171	0.188	0.196	0.357*	0.198*
	(0.048)	(0.136)	(0.061)	(0.033)	(0.238)	(0.263)	(0.453)	(0.258)	(0.105)	(0.128)	(0.078)	(0.077)
Size	-0.179***	-0.148***	-0.213***	-0.179***	-0.083***	-0.087***	-0.087***	-0.082***	-0.224***	-0.193***	-0.247***	-0.224***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SP_rat	-0.144***	-0.121***	-0.163***	-0.144***	-0.102***	-0.065*	-0.132***	-0.103***	-0.174***	-0.174***	-0.167***	-0.174***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.061)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secured	0.296***	0.283***	0.301***	0.298***								
	(0.000)	(0.000)	(0.000)	(0.000)								
Constant	6.714***	6.568***	6.860***	6.634***	5.843***	5.868***	6.232***	5.796***	7.324***	6.893***	7.789***	7.221***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3537	1958	1579	3537	1714	980	734	1714	1823	978	845	1823
R-squared	0.647	0.632	0.679	0.649	0.456	0.475	0.474	0.457	0.692	0.686	0.720	0.694
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Sus is a dummy variable computed based on the Sus_index variable. It takes a value of one if the firm's corresponding score, Sus_index, exceeds the industry median for a given year and zero otherwise. MA is a dummy variable equals to 1 (0) for firm-year observations with high (low) managerial ability scores. High and low scores are determined by comparing them to the industry median for each respective year, with scores classified as above or below the median. Interaction is MA*Sus. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% levels, respectively.

In summary, these findings support the risk reduction effect of sustainability activities on a firm's bank loan cost when managerial abilities are high, particularly when the credit quality of the borrower is also high.

4.3. Robustness Checks

This section presents further regressions that we run to test the robustness of our findings. Typically, we test different measures of corporate sustainability and managerial abilities, and we rely on a propensity score matching sample.

4.3.1. Alternative Measures of Corporate Sustainability

In Table 5, we rerun our regressions on the same samples but using the sustainability strengths variable, *STR*, instead of the aggregated measure *Sus*. The findings align with those in Table 4. These findings show that corporate sustainability decreases the bank loan cost for firms with high managerial abilities and high-quality credit, both when the analysis is conducted on separate subsamples and on the whole sample that differentiates between firms with high and those with low managerial abilities. Thus, our earlier inferences remain unchanged.

Table 5. Results of multivariate regressions using the sustainability strengths measure.

Variables	All borrowers				Low-quality borrowers				High-quality borrowers			
	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Interaction				-0.069**				0.040				-0.142***
				(0.049)				(0.348)				(0.004)
STR	-0.038**	-0.036	-0.058*	-0.008	0.003	-0.015	0.031	-0.014	-0.057**	-0.023	-0.096**	0.005
	(0.038)	(0.132)	(0.053)	(0.719)	(0.894)	(0.574)	(0.349)	(0.605)	(0.044)	(0.537)	(0.026)	(0.891)
MA				0.003				0.019				0.059*
				(0.871)				(0.426)				(0.089)
Maturity	0.026	0.079**	0.019	0.025	-0.007	0.060	-0.066	-0.005	0.019	0.082*	-0.087	0.018
	(0.329)	(0.026)	(0.612)	(0.350)	(0.880)	(0.316)	(0.336)	(0.916)	(0.611)	(0.070)	(0.138)	(0.647)
Concentration	-1.394***	-1.809***	-1.159***	-1.377***	-0.244	-0.358	-0.121	-0.251	-2.646***	-2.799***	-2.380***	-2.658***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.352)	(0.328)	(0.747)	(0.339)	(0.000)	(0.000)	(0.000)	(0.000)
ALTZ	-0.138***	-0.208***	-0.140***	-0.134***	-0.073***	-0.150***	-0.054**	-0.076***	-0.150***	-0.199***	-0.132***	-0.145***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.043)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)
Market_Book	-0.003**	-0.003*	-0.001	-0.003**	-0.001	-0.002	0.001	-0.001	-0.003	-0.002	-0.003	-0.003*
	(0.018)	(0.053)	(0.558)	(0.018)	(0.438)	(0.265)	(0.633)	(0.408)	(0.102)	(0.530)	(0.184)	(0.090)
Debt_Equity	0.085***	0.095***	0.077***	0.085***	0.054***	0.065***	0.048***	0.053***	0.163***	0.125***	0.287***	0.163***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
EBIT_TA	-1.197***	-0.983***	-1.110***	-1.176***	-0.692***	-0.479**	-0.942***	-0.713***	-1.901***	-2.224***	-1.644***	-1.871***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.026)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Libor	-0.168***	-0.167***	-0.172***	-0.168***	-0.116***	-0.117***	-0.112***	-0.115***	-0.206***	-0.205***	-0.206***	-0.207***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Syndicated	0.216**	0.156	0.295	0.221**	0.142	0.129	-0.143	0.126	0.230*	0.202	0.466*	0.228*
	(0.044)	(0.159)	(0.131)	(0.037)	(0.374)	(0.439)	(0.255)	(0.431)	(0.064)	(0.145)	(0.050)	(0.063)
Size	-0.182***	-0.151***	-0.228***	-0.181***	-0.097***	-0.093***	-0.103***	-0.096***	-0.218***	-0.196***	-0.242***	-0.215***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SP_rat	-0.150***	-0.134***	-0.167***	-0.149***	-0.123***	-0.082**	-0.157***	-0.123***	-0.170***	-0.190***	-0.135***	-0.169***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.023)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)
Secured	0.326***	0.302***	0.331***	0.326***								
	(0.000)	(0.000)	(0.000)	(0.000)								
Constant	7.047***	6.984***	7.887***	7.012***	6.522***	6.576***	7.019***	6.535***	7.541***	7.441***	7.773***	7.480***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3537	1958	1579	3537	1714	980	734	1714	1823	978	845	1823
R-squared	0,647	0,632	0,676	0,647	0,456	0,474	0,476	0,458	0,691	0,686	0,715	0,692
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: STR is a dummy variable computed based on the STR_index variable. It takes a value of one if the firm's corresponding score, STR_index, exceeds the industry median for a given year and zero otherwise. All variables and models are described in the notes accompanying Table 4. Statistical significance is represented by ***, **, and * at the 1%, 5%, and 10% levels, respectively.

Table 6. Regressions results using an alternative measure of managerial abilities.

	All borrowers				Low-quality borrowers				High-quality borrowers			
	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Interaction				-0.125*** (0.002)				-0.075 (0.178)				-0.105** (0.046)
Sus	-0.049** (0.021)	-0.010 (0.715)	-0.124*** (0.000)	0.006 (0.825)	0.033 (0.215)	0.052 (0.152)	-0.014 (0.751)	0.057 (0.112)	-0.061** (0.028)	-0.028 (0.453)	-0.124*** (0.003)	-0.008 (0.824)
MA2				-0.010 (0.619)				0.026 (0.262)				-0.003 (0.926)
Maturity	0.080*** (0.005)	0.067** (0.044)	0.089* (0.068)	0.077*** (0.007)	0.066 (0.144)	0.106* (0.083)	0.025 (0.743)	0.067 (0.139)	0.066* (0.085)	0.035 (0.425)	0.083 (0.240)	0.064* (0.097)
Concentration	-1.511*** (0.000)	-1.795*** (0.000)	-0.840** (0.031)	-1.394*** (0.000)	-0.401 (0.121)	-0.276 (0.372)	-0.416 (0.338)	-0.321 (0.207)	-2.719*** (0.000)	-3.119*** (0.000)	-2.064*** (0.001)	-2.711*** (0.000)
ALTZ	-0.145*** (0.000)	-0.205*** (0.000)	-0.098*** (0.000)	-0.131*** (0.000)	-0.080*** (0.003)	-0.139*** (0.001)	-0.058** (0.049)	-0.074*** (0.006)	-0.160*** (0.000)	-0.222*** (0.000)	-0.114*** (0.000)	-0.152*** (0.000)
Market_Book	-0.003** (0.012)	-0.003** (0.032)	-0.004* (0.073)	-0.003*** (0.007)	-0.001 (0.478)	-0.003* (0.071)	0.002 (0.318)	-0.001 (0.393)	-0.003 (0.105)	-0.004 (0.139)	-0.005 (0.125)	-0.004* (0.072)
Debt_Equity	0.086*** (0.000)	0.083*** (0.000)	0.087*** (0.000)	0.084*** (0.000)	0.055*** (0.000)	0.052*** (0.000)	0.056*** (0.000)	0.054*** (0.000)	0.157*** (0.000)	0.131*** (0.000)	0.206*** (0.000)	0.157*** (0.000)
EBIT_TA	-1.053*** (0.000)	-1.224*** (0.000)	-1.038*** (0.001)	-1.111*** (0.000)	-0.643*** (0.000)	-0.784*** (0.000)	-0.594** (0.019)	-0.703*** (0.000)	-1.560*** (0.000)	-1.443*** (0.000)	-1.663*** (0.000)	-1.523*** (0.000)
Libor	-0.124*** (0.001)	-0.076* (0.096)	-0.190*** (0.008)	-0.132*** (0.001)	-0.066 (0.111)	-0.035 (0.469)	-0.103 (0.229)	-0.071* (0.093)	-0.155*** (0.007)	-0.083 (0.262)	-0.248*** (0.007)	-0.153*** (0.008)
Syndicated	0.196** (0.048)	0.253** (0.020)	0.172 (0.318)	0.206** (0.037)	0.178 (0.238)	0.116 (0.576)	0.408 (0.104)	0.185 (0.221)	0.188 (0.105)	0.251* (0.067)	0.079 (0.689)	0.170 (0.144)
Size	-0.179*** (0.000)	-0.144*** (0.000)	-0.200*** (0.000)	-0.175*** (0.000)	-0.083*** (0.000)	-0.094*** (0.000)	-0.057*** (0.004)	-0.081*** (0.000)	-0.224*** (0.000)	-0.181*** (0.000)	-0.243*** (0.000)	-0.220*** (0.000)
SP_rat	-0.144*** (0.000)	-0.133*** (0.000)	-0.146*** (0.000)	-0.142*** (0.000)	-0.102*** (0.000)	-0.096*** (0.004)	-0.096** (0.042)	-0.103*** (0.000)	-0.174*** (0.000)	-0.164*** (0.000)	-0.147*** (0.001)	-0.169*** (0.000)
Secured	0.296*** (0.000)	0.274*** (0.000)	0.313*** (0.000)	0.296*** (0.000)								
Constant	6.714*** (0.000)	6.469*** (0.000)	6.937*** (0.000)	6.643*** (0.000)	5.843*** (0.000)	5.907*** (0.000)	5.695*** (0.000)	5.796*** (0.000)	7.324*** (0.000)	6.962*** (0.000)	7.727*** (0.000)	7.250*** (0.000)
Observations	3,537	1,972	1,500	3,472	1,714	1,031	641	1,672	1,823	941	859	1,800
R-squared	0.647	0.630	0.682	0.652	0.456	0.500	0.446	0.462	0.692	0.672	0.732	0.696
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: All variables and models are described in the notes accompanying Table 4. Statistical significance is represented by ***, **, and * at the 1%, 5%, and 10% levels, respectively.

4.3.2. Alternative Measure of Managerial Abilities

Instead of using the annual managerial abilities scores to compute the dummy variable *MA*, we rely on the three-year mean and calculate an alternative dummy *MA2*. We re-perform the regressions in Table 4 using *MA2* and the findings are provided in Table 6. The twelve regression estimates are qualitatively comparable to those of Table 4. Thus, our earlier findings are robust to using this alternative measure of managerial abilities.

4.3.3. A Second Alternative Measures of Managerial Abilities

In addition to the above two robustness tests, we re-run the regressions in Table 4 employing another alternative measure of the managerial abilities variable. Using the industry median of the return on assets (ROA) for a given year, we create a binary variable with a value of 1 (0) if the company's ROA is above (below) this median.

The findings, provided in Table 7, show that all the regression estimates are qualitatively similar to those of our baseline regressions in Table 4. Therefore, our earlier inferences remain unchanged when using this additional alternative measure of managerial abilities.

4.3.4. Propensity Score Matching Sample

Endogeneity issues pertaining to the possibility of a non-random assignment of the treatment (i.e., firms with high managerial abilities) and the control (i.e., firms with low managerial abilities) groups might affect our findings. In such a situation, the findings are likely to be driven by existing differences in firms' characteristics. To address these endogeneity concerns, we perform a propensity score matching (PSM) approach to define our sample. An additional advantage of this approach is to rule out unobserved explanatory variables between the treatment and the control groups (Abdurakhmonov, Elgin, & Loungani, 2021).

Practically, we use the psmatch2 command in STATA, with the nearest-neighbor and one-to-one options for matching our observations. For each treated firm with high managerial abilities, we find the closest matched control firm with low managerial abilities based on a set of borrower covariates, which include: Size, Market-to-book ratio, Leverage ratio, Profitability, and Altman's Z-score.

Using the obtained PSM sample, we replicate the regressions in Table 4. The findings estimates are reported in Table 8. These results align with our baseline findings in Table 4. Thus, our conclusions remain unchanged.

Table 7. Regressions results using a second alternative measure of managerial abilities.

	All borrowers				Low-quality borrowers				High-quality borrowers			
	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Interaction				-0.212***				-0.098*				-0.160**
				(0.000)				(0.093)				(0.024)
Sus	-0.049**	0.063	-0.086***	0.108***	0.033	0.075*	-0.019	0.088**	-0.061**	0.019	-0.083***	0.067
	(0.021)	(0.123)	(0.000)	(0.008)	(0.215)	(0.088)	(0.574)	(0.048)	(0.028)	(0.782)	(0.005)	(0.308)
MA3				-0.103***				-0.097***				-0.087**
				(0.000)				(0.001)				(0.030)
Maturity	0.080***	0.099	0.054*	0.081***	0.066	0.059	0.069	0.035	0.066*	0.111	0.006	0.068*
	(0.005)	(0.103)	(0.098)	(0.004)	(0.144)	(0.539)	(0.166)	(0.399)	(0.085)	(0.136)	(0.887)	(0.077)
Concentration	-1.511***	-1.991***	-1.163***	-1.451***	-0.401	-0.970	-0.194	-0.294	-2.719***	-2.896***	-2.758***	-2.701***
	(0.000)	(0.003)	(0.000)	(0.000)	(0.121)	(0.108)	(0.487)	(0.284)	(0.000)	(0.009)	(0.000)	(0.000)
ALTZ	-0.145***	-0.294***	-0.105***	-0.135***	-0.080***	-0.343***	-0.039*	-0.068***	-0.160***	-0.312**	-0.143***	-0.158***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.003)	(0.003)	(0.086)	(0.009)	(0.000)	(0.024)	(0.000)	(0.000)
Market_Book	-0.003**	-0.000	-0.002	-0.003**	-0.001	-0.002	-0.000	-0.002	-0.003	-0.019***	-0.001	-0.003
	(0.012)	(0.870)	(0.153)	(0.021)	(0.478)	(0.626)	(0.794)	(0.238)	(0.105)	(0.008)	(0.552)	(0.109)
Debt_Equity	0.086***	0.045***	0.127***	0.082***	0.055***	0.027***	0.086***	0.040***	0.157***	0.109***	0.218***	0.153***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EBIT_TA	-1.053***	-0.258	-1.238***	-0.751***	-0.643***	0.121	-0.736***	-0.429***	-1.560***	-1.505***	-1.512***	-1.253***
	(0.000)	(0.266)	(0.000)	(0.000)	(0.000)	(0.462)	(0.000)	(0.005)	(0.000)	(0.009)	(0.000)	(0.000)
Libor	-0.124***	-0.105	-0.112***	-0.123***	-0.066	-0.020	-0.079	-0.107***	-0.155***	-0.167	-0.117**	-0.152***
	(0.001)	(0.148)	(0.009)	(0.001)	(0.111)	(0.803)	(0.116)	(0.000)	(0.007)	(0.234)	(0.046)	(0.008)
Syndicated	0.196**	0.368***	0.192	0.239**	0.178	-0.035	0.468***	0.175	0.188	0.338***	0.178	0.222*
	(0.048)	(0.004)	(0.202)	(0.018)	(0.238)	(0.772)	(0.001)	(0.198)	(0.105)	(0.008)	(0.332)	(0.061)
Size	-0.179***	-0.109***	-0.210***	-0.180***	-0.083***	-0.024	-0.118***	-0.101***	-0.224***	-0.184***	-0.237***	-0.224***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.306)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SP_rat	-0.144***	-0.098**	-0.150***	-0.145***	-0.102***	0.112**	-0.159***	-0.129***	-0.174***	-0.303***	-0.130***	-0.171***
	(0.000)	(0.024)	(0.000)	(0.000)	(0.000)	(0.034)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secured	0.296***	0.230***	0.295***	0.288***								
	(0.000)	(0.000)	(0.000)	(0.000)								
Constant	6.714***	6.746***	6.819***	6.685***	5.843***	6.480***	5.675***	6.397***	7.324***	7.495***	7.380***	7.307***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,537	927	2,610	3,537	1,714	550	1,164	1,714	1,823	377	1,446	1,823
R-squared	0.647	0.602	0.677	0.654	0.456	0.583	0.470	0.462	0.692	0.624	0.716	0.695
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: All variables and models are described in the notes accompanying Table 4. Statistical significance is represented by ***, **, and * at the 1%, 5%, and 10% levels, respectively.

Table 8. Regression results using the PSM samples.

	All borrowers				Low-quality borrowers				High-quality borrowers			
	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities	All	Low Managerial abilities	High Managerial abilities	High & Low Managerial abilities
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Interaction				-0.109**				-0.026				-0.177***
				(0.012)				(0.656)				(0.001)
Sus	-0.057***	-0.014	-0.107***	0.001	0.027	0.039	0.016	0.037	-0.069**	0.001	-0.162***	0.023
	(0.009)	(0.665)	(0.001)	(0.983)	(0.349)	(0.393)	(0.679)	(0.409)	(0.017)	(0.981)	(0.000)	(0.577)
MA				0.008				0.044*				0.044
				(0.702)				(0.062)				(0.140)
Maturity	0.075**	0.119***	0.042	0.076**	0.069	0.140**	0.025	0.071	0.054	0.113**	-0.009	0.054
	(0.014)	(0.003)	(0.356)	(0.012)	(0.142)	(0.040)	(0.730)	(0.134)	(0.194)	(0.024)	(0.886)	(0.193)
Concentration	-1.436***	-1.810***	-1.082***	-1.404***	-0.429	-0.344	-0.335	-0.403	-2.801***	-3.406***	-2.309***	-2.754***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.108)	(0.297)	(0.373)	(0.131)	(0.000)	(0.000)	(0.000)	(0.000)
ALTZ	-0.126***	-0.191***	-0.105***	-0.121***	-0.068***	-0.141***	-0.053*	-0.069***	-0.151***	-0.247***	-0.113***	-0.143***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)	(0.001)	(0.058)	(0.008)	(0.000)	(0.000)	(0.000)	(0.000)
Market_Book	-0.002*	-0.002	-0.002	-0.003**	-0.001	-0.001	0.001	-0.001	-0.002	-0.001	-0.003	-0.002
	(0.061)	(0.346)	(0.203)	(0.039)	(0.546)	(0.409)	(0.821)	(0.482)	(0.285)	(0.831)	(0.212)	(0.188)
Debt_Equity	0.089***	0.102***	0.082***	0.089***	0.059***	0.070***	0.050***	0.057***	0.170***	0.128***	0.282***	0.171***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
EBIT_TA	-1.345***	-1.539***	-1.188***	-1.322***	-0.911***	-1.049***	-0.840***	-0.927***	-1.686***	-1.927***	-1.453***	-1.678***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Libor	-0.119***	-0.072	-0.147**	-0.116***	-0.060	-0.010	-0.069	-0.055	-0.163***	-0.081	-0.230***	-0.157***
	(0.003)	(0.190)	(0.014)	(0.004)	(0.177)	(0.881)	(0.291)	(0.219)	(0.007)	(0.312)	(0.006)	(0.008)
Syndicated	0.257**	0.230**	0.404*	0.264**	0.405***	0.461***	-0.096	0.390***	0.214*	0.236	0.357*	0.219*
	(0.015)	(0.040)	(0.061)	(0.011)	(0.001)	(0.000)	(0.453)	(0.001)	(0.086)	(0.104)	(0.078)	(0.071)
Size	-0.191***	-0.163***	-0.213***	-0.190***	-0.097***	-0.110***	-0.087***	-0.096***	-0.228***	-0.199***	-0.247***	-0.228***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SP_rat	-0.153***	-0.138***	-0.163***	-0.152***	-0.129***	-0.128***	-0.132***	-0.131***	-0.156***	-0.141***	-0.167***	-0.156***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)
Secured	0.290***	0.278***	0.301***	0.291***								
	(0.000)	(0.000)	(0.000)	(0.000)								
Constant	6.690***	6.395***	6.860***	6.624***	5.658***	5.510***	6.232***	5.618***	7.391***	6.920***	7.789***	7.293***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,183	1,604	1,579	3,183	1,495	761	734	1,495	1,688	843	845	1,688
R-squared	0.661	0.655	0.679	0.662	0.475	0.500	0.474	0.476	0.699	0.701	0.720	0.701
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: All variables and models are described in the notes accompanying Table 4. Statistical significance is represented by ***, **, and * at the 1%, 5%, and 10% levels, respectively.

5. DISCUSSION AND CONCLUSION

This paper investigates whether managerial abilities moderate the effect of corporate sustainability initiatives on a company's bank loan cost. Our sample consists of 3,537 United States bank loan facilities. The descriptive and multivariate analysis results provide evidence of such an effect for high-quality borrowers.

Initially, in our analysis, we conducted regressions on the full sample. The findings reveal that corporate sustainability practices reduce the bank loan cost, supporting the risk mitigation hypothesis. This finding is consistent with earlier research, including studies by Attig, El Ghoul, Guedhami, and Suh (2013); Cheng, Ioannou, and Serafeim (2014) and Chava (2014) which similarly highlighted the beneficial financial effects of high sustainability initiatives in lowering firms' borrowing costs.

Proceeding, we split our sample into two separate subsamples based on high and low managerial ability scores. The regression results using these subsamples reveal that firms with high managerial abilities experience lower interest rates, further indicating that managerial abilities enable socially responsible firms to secure loans at a lower cost.

Finally, following Goss and Roberts (2011) we differentiate between high and low-quality borrowers. We focused on the interaction between corporate sustainability and managerial abilities and found a significant negative effect of corporate sustainability practices on loan cost, but only for high-quality borrowers. Conversely, the findings, when a low-quality borrowers subsample is used, are not significant. These findings emphasize the importance of managerial abilities in shaping the relationship between corporate sustainability practices and bank loan cost for firms with high credit quality.

Overall, high-quality borrowers with high managerial abilities are the ones who benefit from the reduction effect of corporate sustainability on loan interest rates. This underscores the critical role of managerial abilities and credit quality as prerequisites to ensure the positive financial consequences of corporate sustainability in terms of loan financing costs.

The paper's findings offer significant empirical contributions. In particular, this paper advances the literature by exploring how managerial abilities and borrower quality interact with corporate sustainability practices to influence the bank loan cost. It extends prior research by highlighting the crucial role of managerial abilities in benefiting from sustainability investments for high-quality borrowers.

The results of our study carry important implications for bankers and for corporate managers. Bankers are shown to value not only a firm's corporate sustainability but also the quality of its management and overall borrower standing, suggesting that banks may adjust risk assessments based on these factors when determining loan terms. For firms' managers, the results indicate that adopting high sustainability practices while having high managerial abilities can result in more favorable loan terms. This positions corporate sustainability as a key component of a firm's strategy rather than merely a simple social or environmental initiative.

There are certain limitations to our work that allow for further research investigations. First, even if this study accounts for industry-specific effects, certain industries, including energy and manufacturing, face higher environmental risks and could experience a stronger relationship between sustainability practices and loan costs, while other industries, such as services, might see less pronounced effects. Such differences deserve further contextual investigations. Second, this study examines a specific sample of U.S. loan facilities spanning the years 2006 to 2012. While the dataset offers useful insights into the relationship between corporate sustainability practices and the cost of bank loans, the relatively limited geographic focus and timeframe may restrict its ability to capture global trends or reflect more recent advancements in sustainability initiatives. Future research could broaden the dataset by considering a wider range of geographical regions and extending the time period to include more recent data. Furthermore, cross-country comparisons could offer deeper insights into how varying regulatory environments and financial markets influence the impact of sustainability on lending conditions.

Funding: This study received no specific financial support.
Institutional Review Board Statement: Not applicable.
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

REFERENCES

Abdurakhmonov, I., Elgin, C., & Loungani, P. (2021). Do energy subsidies undermine the effectiveness of environmental tax reforms? *Energy Policy*, *156*, 112409.

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, *23*(4), 589–609. https://doi.org/10.1111/j.1540-6261.1968.tb00843.x

Andreou, P. C., Karasamani, I., Louca, C., & Ehrlich, D. (2017). The impact of managerial ability on crisis-period corporate investment. *Journal of Business Research*, *79*, 107-122. https://doi.org/10.1016/j.jbusres.2017.05.022

Atawnah, N., Eshraghi, A., Baghdadi, G. A., & Bhatti, I. (2024). Managerial ability and firm value: A new perspective. *Research in International Business and Finance*, *67*, 102133. https://doi.org/10.1016/j.ribaf.2023.102133

Attig, N., El Ghoul, S., Guedhami, O., & Suh, J. (2013). Corporate social responsibility and credit ratings. *Journal of Business Ethics*, *117*(4), 679-694. https://doi.org/10.1007/s10551-013-1714-2

Barnea, A., & Rubin, A. (2010). Corporate social responsibility as a conflict between shareholders. *Journal of Business Ethics*, *97*(1), 71-86. https://doi.org/10.1007/s10551-010-0496-z

Bénabou, R., & Tirole, J. (2010). Individual and corporate social responsibility. *Economica*, *77*(305), 1-19. https://doi.org/10.1111/j.1468-0335.2009.00843.x

Bertrand, M., & Schoar, A. (2003). Managing with style: The effect of managers on firm policies. *The Quarterly Journal of Economics*, *118*(4), 1169-1208. https://doi.org/10.1162/003355303322552775

Booth, J. R., & Booth, L. C. (2006). Loan collateral decisions and corporate borrowing costs. *Journal of Money, Credit and Banking*, *38*(1), 67-90.

Cespa, G., & Cestone, G. (2007). Corporate social responsibility and managerial entrenchment. *Journal of Economics & Management Strategy*, *16*(3), 741-771. https://doi.org/10.1111/j.1530-9134.2007.00156.x

Chava, S. (2014). Environmental externalities and cost of capital. *Management Science*, *60*(9), 2223-2247. https://doi.org/10.1287/mnsc.2013.1863

Chemmanur, T. J., Paeglis, I., & Simonyan, K. (2010). Management quality and equity issue characteristics: A comparison of SEOs and IPOs. *Financial Management*, *39*(4), 1601-1642. https://doi.org/10.1111/j.1755-053X.2010.01124.x

Cheng, B., Ioannou, I., & Serafeim, G. (2014). Corporate social responsibility and access to finance. *Strategic Management Journal*, *35*(1), 1-23. https://doi.org/10.1002/smj.2131

Cornaggia, K. J., Krishnan, G. V., & Wang, C. (2017). Managerial ability and credit ratings. *Contemporary Accounting Research*, *34*(4), 2094-2122. https://doi.org/10.1111/1911-3846.12334

Cunbo, Y., Jindong, W., Haoxiang, H., & Ying, L. (2025). ESG performance and executive compensation levels: An empirical study. *Data Science and Management*, *8*(4), 403-413. https://doi.org/10.1016/j.dsm.2025.06.002

Curi, C., & Lozano-Vivas, A. (2020). Managerial ability as a tool for prudential regulation. *Journal of Economic Behavior & Organization*, *174*, 87-107. https://doi.org/10.1016/j.jebo.2020.03.023

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management Science*, *58*(7), 1229-1248. https://doi.org/10.1287/mnsc.1110.1487

Demerjian, P. R., Lev, B., Lewis, M. F., & McVay, S. E. (2013). Managerial ability and earnings quality. *The Accounting Review*, *88*(2), 463-498. https://doi.org/10.2308/accr-50318

Eliwa, Y., Aboud, A., & Saleh, A. (2021). ESG practices and the cost of debt: Evidence from EU countries. *Critical Perspectives on Accounting*, *79*, 102097. https://doi.org/10.1016/j.cpa.2019.102097

Fama, E. F., & French, K. R. (1997). Industry costs of equity. *Journal of Financial Economics*, *43*(2), 153–193. https://doi.org/10.1016/S0304-405X(96)00896-3

Fard, A., Javadi, S., & Kim, I. (2020). Environmental regulation and the cost of bank loans: International evidence. *Journal of Financial Stability*, *51*, 100797. https://doi.org/10.1016/j.jfs.2020.100797

Flammer, C., Hong, B., & Minor, D. (2019). Corporate governance and the rise of integrating corporate social responsibility criteria in executive compensation: Effectiveness and implications for firm outcomes. *Strategic Management Journal*, *40*(7), 1097-1122. https://doi.org/10.1002/smj.3018

Fligstein, N., & Huang, J. Z. (2025). Finance in sustainable transition: A comparative review across institutional investors, asset managers, venture capital, insurance, and bonds. *Wiley Interdisciplinary Reviews: Climate Change*, *16*(4), e70012. https://doi.org/10.1002/wcc.70012

Gan, H. (2019). Does CEO managerial ability matter? Evidence from corporate investment efficiency. *Review of Quantitative Finance and Accounting*, *52*(4), 1085-1118. https://doi.org/10.1007/s11156-018-0737-2

García-Sánchez, I.-M., Hussain, N., Khan, S. A., & Martínez-Ferrero, J. (2020). Managerial entrenchment, corporate social responsibility, and earnings management. *Corporate Social Responsibility and Environmental Management*, *27*(4), 1818-1833. https://doi.org/10.1002/csr.1928

Ge, W., & Liu, M. (2015). Corporate social responsibility and the cost of corporate bonds. *Journal of Accounting and Public Policy*, *34*(6), 597-624. https://doi.org/10.1016/j.jaccpubpol.2015.05.008

Gigante, G., & Manglaviti, D. (2022). The ESG effect on the cost of debt financing: A sharp RD analysis. *International Review of Financial Analysis*, *84*, 102382. https://doi.org/10.1016/j.irfa.2022.102382

Girerd-Potin, I., Jimenez-Garcès, S., & Louvet, P. (2014). Which dimensions of social responsibility concern financial investors? *Journal of Business Ethics*, *121*(4), 559-576. https://doi.org/10.1007/s10551-013-1731-1

Gong, Y., Yan, C., & Ho, K.-C. (2021). The effect of managerial ability on corporate social responsibility and firm value in the energy industry. *Corporate Social Responsibility and Environmental Management*, *28*(2), 581-594. https://doi.org/10.1002/csr.2070

Goss, A., & Roberts, G. S. (2011). The impact of corporate social responsibility on the cost of bank loans. *Journal of Banking & Finance*, *35*(7), 1794-1810. https://doi.org/10.1016/j.jbankfin.2010.12.002

Hao, X., Wen, S., & Wan, Q. (2025). How does managerial ability affect R&D efficiency of emerging-economy high-tech enterprises. *Technology Analysis & Strategic Management*, *37*(10), 1175–1189. https://doi.org/10.1080/09537325.2024.2306611

Hauptmann, C. (2017). *Corporate sustainability performance and bank loan pricing: It pays to be good, but only when banks are too.* Saïd Business School WP No. 2017-20.

Hoepner, A., Oikonomou, I., Scholtens, B., & Schröder, M. (2016). The effects of corporate and country sustainability characteristics on the cost of debt: An international investigation. *Journal of Business Finance & Accounting*, *43*(1-2), 158-190. https://doi.org/10.1111/jbfa.12183

Huang, Q., Xiong, M., & Xiao, M. (2022). Does managerial ability affect corporate financial constraints? Evidence from China. *Economic Research-Ekonomska Istraživanja*, *35*(1), 3731-3753. https://doi.org/10.1080/1331677X.2021.2004186

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360. https://doi.org/10.1016/0304-405x(76)90026-x

Khan, M., Serafeim, G., & Yoon, A. (2016). Corporate sustainability: First evidence on materiality. *The Accounting Review*, *91*(6), 1697-1724. https://doi.org/10.2308/accr-51383

Khorilov, T. G., & Kim, J. (2024). ESG and firm risk: Evidence in Korea. *Sustainability*, *16*(13), 5388. https://doi.org/10.3390/su16135388

Khurana, I. K., Moser, W. J., & Raman, K. (2018). Tax avoidance, managerial ability, and investment efficiency. *Abacus*, *54*(4), 547-575. https://doi.org/10.1111/abac.12142

Koester, A., Shevlin, T., & Wangerin, D. (2016). The role of managerial ability in corporate tax avoidance. *Management Science*, *63*(10), 3285-3310. https://doi.org/10.1287/mnsc.2016.2510

Kumar, A. (2018). Environmental reputation: Attribution from distinct environmental strategies. *Corporate Reputation Review*, *21*(3), 115-126. https://doi.org/10.1057/s41299-018-0047-6

La Rosa, F., Liberatore, G., Mazzi, F., & Terzani, S. (2018). The impact of corporate social performance on the cost of debt and access to debt financing for listed European non-financial firms. *European Management Journal*, *36*(4), 519-529. https://doi.org/10.1016/j.emj.2017.09.007

Lee, C.-C., Wang, C.-W., Chiu, W.-C., & Tien, T.-S. (2018). Managerial ability and corporate investment opportunity. *International Review of Financial Analysis*, *57*, 65-76. https://doi.org/10.1016/j.irfa.2018.02.007

Liu, E. X., & Song, Y. (2025). ESG performance, environmental uncertainty, and firm risk. *Journal of International Financial Management & Accounting*, *36*(2), 292-322. https://doi.org/10.1111/jifm.12227

Magnanelli, B. S., & Izzo, M. F. (2017). Corporate social performance and cost of debt: The relationship. *Social Responsibility Journal*, *13*(2), 250-265. https://doi.org/10.1108/SRJ-06-2016-0103

Oikonomou, I., Brooks, C., & Pavelin, S. (2014). The effects of corporate social performance on the cost of corporate debt and credit ratings. *Financial Review*, *49*(1), 49-75. https://doi.org/10.1111/fire.12025

PwC. (2022). *Paying for good for all: Global research into ESG and reward beyond the boardroom.* London, United Kingdom: PricewaterhouseCoopers.

Qian, K., Liang, X., & Liu, X. (2023). Managerial ability, managerial risk taking and innovation performance. *Finance Research Letters*, *57*, 104193. https://doi.org/10.1016/j.frl.2023.104193

Ting, I. W. K., Tebourbi, I., Lu, W.-M., & Kweh, Q. L. (2021). The effects of managerial ability on firm performance and the mediating role of capital structure: Evidence from Taiwan. *Financial Innovation*, *7*(1), 89. https://doi.org/10.1186/s40854-021-00320-7

Ventouri, A., Chortareas, G., & Kou, F. (2023). Firm pollution and reputational risk: where do we stand?. In New challenges for the banking industry: Searching for balance between corporate governance, sustainability and innovation. In (pp. 119-143). Cham: Springer.

Welch, K., & Yoon, A. (2023). Do high-ability managers choose ESG projects that create shareholder value? Evidence from employee opinions. *Review of Accounting Studies*, *28*(4), 2448-2475. https://doi.org/10.1007/s11142-022-09701-4

Yung, K., & Chen, C. (2018). Managerial ability and firm risk-taking behavior. *Review of Quantitative Finance and Accounting*, *51*(4), 1005-1032. https://doi.org/10.1007/s11156-017-0695-0