Erasmus University Rotterdam – Erasmus School of Economics

MSc Accounting, Auditing & Control (Accounting & Control track)

The moderating effect of corporate governance on the relationship between financial disclosure readability and borrowing costs

Name: Mathijs Beuk

Student number: 410641

Supervisor: Yijun Li

Second assessor: Nico Lehmann

Abstract

This study examines the moderating effect of corporate governance on the relationship between financial disclosure readability and borrowing costs. Previous empirical research shows consistent evidence that better readable financial disclosures lead to lower borrowing costs. This suggests that creditors price information risk. I investigate whether the relationship between readability and borrowing costs is more negative for strong corporate governance firms than for weak corporate governance firms. I measure readability with the Bog Index, borrowing costs with the All-in Spread Drawn and corporate governance with an index which consist of 15 corporate governance variables and three subindices. Using firms from the S&P 500 index in the period 2014-2017, I also find a negative relationship between readability and borrowing costs. The relationship is, although at a low significance level, more negative for strong than for weak corporate governance firms. Results should be treated with caution, as the concept of corporate governance is not easy to proxy.

Keywords: financial disclosure readability, borrowing costs, corporate governance, information risk

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1. Introduction

Shareholders, creditors, financial analysts and other stakeholders consider financial disclosures as the most important source of information (Ertugul, Lei, Qiu & Wan, 2017). Financial disclosures are used to make capital allocation decisions by shareholders, making debt financing decisions by creditors and are used by financial analysts for company valuation. Therefore, readability and textual properties of financial disclosures have a major impact on the communication of information that is value-relevant for stakeholders (Loughran & McDonald, 2014). Surprisingly, most prior empirical research focuses on quantitative information in their judgment of disclosure quality, instead of the narrative in these disclosures (Boubaker, Ding, Rjiba & Saadi, 2021). Empirical studies have examined the effect of financial disclosure readability on earnings persistence (Li, 2008), bond ratings (Bonsall & Miller, 2016) and the cost of equity (Boubaker, Ding, Rjiba & Saadi, 2021). Boubaker et al. (2021) find that more complex financial disclosures lead to a higher cost of equity. The reasoning is that more complex financial disclosures are less readable, which makes it harder for investors to process the disclosure, which leads to higher information risk and a higher cost of equity.

How do creditors react to complex financial disclosures? Previous empirical research finds consistent evidence that less readable financial disclosures increases a firm's cost of borrowing (Bonsall & Miller, 2016; Ertugul et al., 2017; Hoffmann & Kleimeier, 2019). The reasoning here is the same: more complex disclosures are less readable, which makes it harder for creditors to process the disclosure, leading to higher information risk and a higher cost of borrowing. In addition, Bonsall & Miller (2016) find that less readable disclosures lead to less favorable bond ratings and more disagreement among bond rating agencies. The fact that less readable disclosures lead to a higher cost of equity and higher cost of borrowing suggests that both investors and creditors price information risk; investors demand higher return on their investments and creditors charge higher interest rates.

This research focuses exclusively on the debt market. From previous research, it is known that less readable financial disclosures lead to higher borrowing costs and that information risk is priced in these borrowing costs. The next question that can be asked is whether information risk pricing (the amount of borrowing costs as a result of financial disclosure readability) depends on another variable, which moderates the relationship between financial disclosure readability and borrowing costs, like corporate governance. Bhojray & Sengupta (2003) state that corporate governance is a mechanism to reduce information risk. Corporate governance mechanisms, including institutional ownership and outsider control of the board, can reduce information risk. Information risk occurs when managers have private information that has a negative influence on default risk.

Firms with strong corporate governance are forced to disclose private information more timely than firms with weak governance, suggesting that weak governance firms bear more information risk than strong governance firms. Firms with relatively weak corporate governance can see an additional increase in information risk, as compared to firms with relatively strong corporate governance. In this case, the negative relationship between financial disclosure readability and borrowing costs is weaker for firms with strong corporate governance than for firms with weak corporate governance. This leads to the formulation of the research question:

Does corporate governance moderate the relationship between financial disclosure readability and borrowing costs?

This research is divided into three sub-questions:

1. Does a better readable financial disclosure reduce a firm's borrowing costs?
2. Does a firm with strong corporate governance face lower borrowing costs than a firm with weak corporate governance?
3. Does corporate governance moderate the relationship between readability and borrowing costs?

The first sub-question tries to replicate what earlier studies have already found. In order to find a possible moderation of corporate governance in the relationship between readability and borrowing costs, I first check whether I also find a negative relationship between readability and borrowing costs.

Previous empirical studies have adopted different measures of financial disclosure readability. Li (2008) and Lo, Ramos & Rogo (2017) use the Fog Index to measure financial disclosure readability. Loughran & McDonald (2014) argue against the use of the Fog Index for measuring the readability of financial disclosures, because one of its inputs is the percentage of complex words. A complex word is defined as a word that has more than two syllables. However, many words in financial disclosures that have more than two syllables are easily understood by readers. Loughran & McDonald (2014) use file size to measure readability. Bonsall, Leone & Miller (2017) argue against the use of file size, mentioning that the file size is a noisy proxy. Bonsall et al. (2017) opt for using the Bog Index, which incorporates several aspects of readability deemed important by the SEC in its *1998 Plain English Guidebook.* This study adopts the Bog Index to measure financial disclosure readability.

This research contributes to existing research in two ways. Firstly, I investigate whether corporate governance strength is a determinant of borrowing costs. This expands on Bhojray & Sengupta (2003), who find that stronger governance lead to more favorable

bond ratings. Secondly, I investigate whether corporate governance moderates the impact of financial disclosure readability on the cost of borrowing.

The remainder of this research is structured as follows. The literature review presents existing research on readability measures, the association between readability and the cost of borrowing and the role of corporate governance. The literature review then presents two hypotheses. The data and methodology section describes the data, variables and methodological techniques used to answer the hypotheses. The next section is the result section, where I present the results and answer the hypotheses. I end with a conclusion, followed by research limitations and avenues for future research.

2. Literature review and hypothesis development

2.1. Readability measures

Researchers have used different measures to assess the readability of a financial disclosure. The Fog Index[1] is the most used readability measure and is calculated as a combination of sentence length and the amount of complex words (Loughran & McDonald, 2014). The lower the Fog Index, the more readable the text is. However, as Loughran & McDonald (2014) point out, the Fog Index is a poor measure of readability. This is because the Fog Index defines complex words as a word that has more than two syllables. Words like *financial*, *management* and *consolidated* would then be identified as complex words. However, these words are easy to understand for readers of financial disclosures, like financial analysts and lenders. Moreover, readability is more than word choice and sentence length, as readability also entails the composition and structure of a text and how well a text is able to communicate its message effectively to the reader (Loughran & McDonald, 2016). Loughran & McDonald (2014) opt for using file size as a measure of readability. However, file size also increases with firm complexity, which can it make harder to separate a firm's fundamental complexity from its language complexity.

However, Bonsall et al. (2015) find that file size causes significant measurement error when it is used as a proxy to measure readability. This is primarily caused by the growth in non-textual components which are unrelated to the textual components. Instead, Bonsall et al. (2015) use the Bog Index, which is *StyleWriter's*[2] measure of readability. The index measures how the text "bogs down" to the readers; the more a text bogs down to readers, the harder the text is to understand. It then impedes the ability of a text to effectively communicate its message to the reader. Therefore, a higher Bog Index score is associated with a less readable text. The Bog Index is a summary measure of mainly negative plain English measures, which relate to sentences and words, but also on aspects of good writing. The definition of Plain English and elements of good and bad Plain English are explained in the SEC's *1998 Plain English Guidebook*.

2.2. The effect of financial disclosure readability on the cost of borrowing

The amount of studies investigating the relationship between disclosure readability and the cost of borrowing is limited. The most extensive study is conducted by Bonsall & Miller (2016), whose objective is to investigate whether financial disclosure readability impacts various outcomes on the bond market, such as bond ratings and the cost of borrowing.

[1] The Fog Index is calculated as follows: $Fog\ Index = 0.4 \times (average\ number\ of\ words\ per\ sentence + percent\ of\ complex\ words)$

[2] StyleWriter is a software program that lets you analyze texts, giving recommendations on how the readability of the text can be improved.

They state that prior research has focused solely on the effect of quantitative information in disclosures on bond market outcomes, whereas the effect of qualitative information (textual attributes) on bond market outcomes remains unclear.

Ertugul et al. (2017) contribute to the literature by not only focusing on the effect of readability on borrowing costs, but also on specific textual attributes, like weak modal and uncertain words. Ambiguous words in disclosures increase uncertainty about the firm's risk profile, therefore increasing a firm's perceived credit and default risk, which is priced by lenders. Hoffmann & Kleimeier (2019) state that, apart from quantitative information, the role of qualitative information in disclosures is expected to be an important determinant of borrowing costs and default risk. Hoffmann & Kleimeier (2019) investigate the role financial disclosure readability plays in reducing information asymmetry and uncertainty around the fundamentals of innovative firms and how readability can lower borrowing costs for these firms. Innovative firms are characterized by volatile cash flows and uncertain R&D payoffs, which form risks that affects lenders' opinions about the creditworthiness of these firms and borrowing costs. Regarding the readability measure, both Bonsall & Miller (2016) and Hoffmann & Kleimeier (2019) make use of the Bog Index. Ertugul et al. (2017) use the Fog Index.

Bonsall & Miller (2016) find that lower disclosure readability is associated with lower bond ratings and increases the cost of borrowing. The argument behind this finding is that lower readability causes readers to have more difficulty with processing the disclosure, causing them to have more uncertainty about the firm's fundamentals. Out of this uncertainty, rating agencies like Moody's Investor Services and Standard & Poor's lower the bond ratings of these firms. Out of risk aversion, lenders (e.g., banks) come with stricter loan terms (e.g., higher interest rates) leading to higher borrowing costs. Ertugul et al. (2017) find that the ambiguous tone of financial disclosures, measured by the amount of weak modal and uncertain words, causes borrowing costs to increase. The ambiguous tone of financial disclosures is said to be related to managers' tendency to conceal information. Hoffmann & Kleimeier (2019) also find that more readable financial disclosures lower the cost of borrowing. However, improving readability of financial disclosures is even more advantageous (i.e. lowers credit spreads even more) when information asymmetries between innovative firms and lenders are a result of no previous lending agreement. This means that the absence or presence of a previous lending agreement between innovative firms and lenders moderates the relationship between readability and borrowing costs.

2.3. Corporate governance

The Chartered Governance Institute UK & Ireland describes corporate governance as follows:

“Corporate Governance refers to the way in which companies are governed and to what purpose. It identifies who has power and accountability, and who makes decisions. It is, in essence, a toolkit that enables management and the board to deal more effectively with the challenges of running a company. Corporate governance ensures that businesses have appropriate decision-making processes and controls in place so that the interests of all stakeholders (shareholders, employees, suppliers, customers and the community) are balanced” (CGI, n.d.).

Bhojray & Sengupta (2003) investigate the relation between corporate governance elements (institutional ownership and outside control of the board) and bond ratings. Bond ratings are determined by default risk; the higher the default risk, the less favorable the bond rating. Governance affects the perceived default risk in two dimensions. Agency risk means that management deviates from maximizing shareholder value by pursuing self-interest. This could be mitigated by attracting (more) outside directors who are independent and thus not have the same interests as insiders (Rao, 1995). Information risk means that information asymmetry is present; managers have private information that has a negative influence on default risk (Bhojray & Sengupta, 2003).

Bhojray & Sengupta (2003) find that firms with relatively strong corporate governance (relatively high institutional ownership and relatively strong outside control of the board) face more favorable bond ratings than firms with relatively with weak corporate governance. Bonsall & Miller (2016) investigate the impact of financial disclosure readability on two bond market outcomes: cost of borrowing and bond ratings. The question remains whether strong corporate governance is also associated with lower borrowing costs, just like it is associated with more favorable bond ratings. This makes sense, as bond ratings and borrowing costs are also likely to be related; more favorable bond ratings issued by rating agencies are likely to lead to lower borrowing costs faced by firms. Bonsall & Miller (2016) also suggest that the relationship between readability and borrowing costs is likely to be mediated by bond ratings. This leads to the first hypothesis:

H1: Firms with strong corporate governance face lower borrowing costs, compared to firms with weak corporate governance

Bhoray & Sengupta (2003) state that governance mechanisms help to reduce information risk. Firms with relatively high institutional ownership and relatively strong outside control of the board are induced to disclose information more timely than firms with relatively low institutional ownership and boards of with a relatively high amount of insiders. This means that weak governance firms bear more information risk than strong governance firms, suggesting a negative association between corporate governance and information risk.

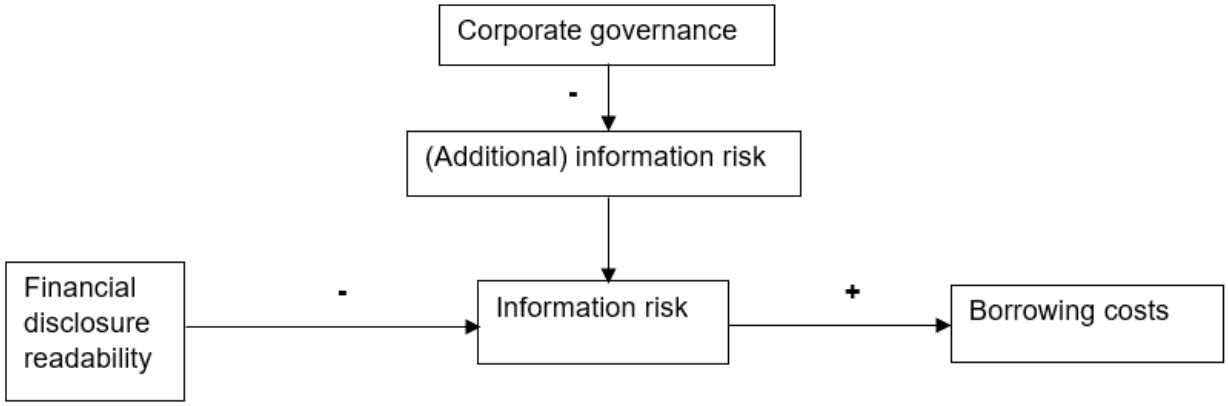

Figure 1: An overview of the (expected) signs between the variables of interest

Previous empirical research already finds a negative relationship between financial disclosure readability and borrowing costs (Bonsall & Miller, 2016; Ertugul et al., 2017; Hoffmann & Kleimeier, 2019), which suggests that creditors price information risk in financial disclosures. Less readable disclosures increase the information risk as perceived by creditors, which increase borrowing costs. Information risk decreases with governance strength. In this way, firms with relatively weak corporate governance see an additional increase in information risk, which moderates the negative relationship between financial disclosure readability and borrowing costs. I speak of an additional information risk here, because every financial disclosure has already some form of information risk, which decreases with better readability, regardless of whether a firm has a strong or weak governance structure.

In the same way, stronger corporate governance is associated with lower additional information risk. The relationship between financial disclosure readability and borrowing costs could therefore depend on corporate governance strength (figure 1). Because the relationship between readability and borrowing costs is negative, weak corporate governance firms would then see an additional increase in borrowing costs as compared to strong corporate governance firms. In this case, the negative relationship between financial disclosure readability and borrowing costs is weaker for firms with strong corporate governance than for firms with weak corporate governance. This leads to the second hypothesis:

H2: The negative relationship between financial disclosure readability and borrowing costs is weaker (i.e., less negative) for firms with strong corporate governance, compared to firms with weak corporate governance

If corporate governance indeed moderates the relationship, then creditors take into account additional information risk associated with weak corporate governance firms.

3. Data & Methodology

I use firms from the S&P 500 index during the years 2014-2017. I specifically choose for this sample period, because cost of borrowing data is missing for more recent periods. For the readability measure, the Bog Index, I use the dataset made available by Bonsall et al. (2017)[3]. Bonsall et al. (2017) acknowledge that measuring a Bog Index for each 10-K annual report can be time-consuming, compared to using the file size as a proxy for measuring readability. To address this, Bonsall et al. (2017) provide Bog Index scores for 10-K annual reports since 1994. I exclude firms that belong to the financial and utility sector. Financial firms are often highly leveraged, which is normal for these firms. For non-financial firms, a high leverage ratio is often associated with financial distress (Fama & French, 1992). Firms belonging to the utilities sector are often linked to the state and are not profit-oriented. These firms have a public task, are heavily influenced by governmental decisions, unlike the sample firms, which are profit-oriented. Unfortunately, due to the high amount of missing data, the final sample consists of only 463 observations.

3.1. Dependent variable: cost of borrowing

To measure the cost of borrowing, I make use of the All-in Spread Drawn (AISD) variable in the Loan Price Corporation (LPC) Dealscan database on WRDS. This variable measures how much a borrower pays over the London Inter-bank Offered Rate (LIBOR) in basis points. LIBOR is an average interest rate that is calculated based on the submitted interest rates of banks in London. LIBOR is said to be a benchmark interest rate. The higher the interest rate that is charged to a firm, the larger the discrepancy between that rate and LIBOR, which leads to a higher spread and cost of borrowing.

Each observation is a loan agreement, a *Facility*. Each loan has a unique identifier, a *FacilityID*. The AISD of each loan is measured at the start of the loan agreement. When a firm has multiple loan agreements that start in a given year, I include them all in my sample. This means that some firms have multiple observations in a given year. FacilityIDs are found in a link file[4] that can be used to merge Dealscan database data and Compustat data. This file links FacilityIDs to ticker symbol. The next step is to find the AISD for each FacilityID on Dealscan. The last step is to match each AISD value in a given year with the ticker symbol.

[3] The dataset can be found on Samuel Bonsall's personal website: https://host.kelley.iu.edu/bpm/activities/bogindex.html

[4] The link file can be found at:http://finance.wharton.upenn.edu/~mrrobert/styled-9/styled-12/index.html

3.2. Independent variable: financial disclosure readability

The Bog Index is a multifaceted metric of (financial disclosure) readability created by *Stylewriter*, a computational linguistics program. The Bog Index is an improvement relative to the Fog Index in that it measures readability with a graded word list instead of using the amount of syllables or word length. The Bog Index also takes into account the *Writing Task* and *Audience*. This means that the program does not penalize you when the amount of complex words and jargon is relatively high, in case you choose the audience to be a *Specialist Audience*. The Bog Index can be seen as a reaction to the SEC's *1998 Plain English Guidebook*, where important attributes of Plain English are mentioned.

The Bog Index consists of three elements (*Sentence Bog*, *Word Bog* and *Pep*) and is calculated as follows:

$$Bog\ Index = Sentence\ Bog + Word\ Bog - Pep$$

The Bog Index increases in Sentence Bog and Word Bog and decreases in Pep. The Sentence Bog deals with the problem of lengthy sentences, which is calculated as follows:

$$Sentence\ Bog = \frac{(Average\ Sentence\ Length)^2}{Long\ Sentence\ Length}$$

The Word Bog deals with word difficulty and style problems. The Bog Index uses a dictionary containing 200.000 words. Each word is graded on its difficulty based on the frequency of use and understandability. It also classifies each word to a category. Categories include difficult versus easy, formal versus informal, jargon versus non-jargon, poor style versus good style, technical versus non-technical and unusual versus common. Stylewriter assigns a penalty to difficult words based on its frequency and complexity. Penalties range from a one-point penalty to a four-point penalty[5]. The Word Bog also includes style problems (passive voice), abbreviations and specialist words (jargon). Note that the penalty associated with difficult words and jargon depends on the targeted audience; penalties are lower when the audience is a specialist audience instead of the general public. The Word Bog is calculated as follows:

$$Word\ Bog = \frac{(Style\ Problems + Heavy\ Words + Abbreviations + Specialist\ Words) \times 250}{Number\ of\ Words}$$

The Pep counts the amount of features that represent good writing. These features include proper names/nouns, interesting words and a conversational style. Proper nouns include America, China, Japan and Tiananmen Square (Wright, 2010), because these are essential to the context of the text. Interesting words include corrupt, diamond, staggering

[5] The word "variance" has a one-point penalty, whereas the word "pulchritudinous" has a four-point penalty.

and grim. These words can make a text more clear by adding to the imagination in readers' minds. The conservational style includes short sentences and direct questions. The Pep is calculated as follows:

$$Pep = \frac{(Names + Interesting\ Words + Conversational) \times 25}{Number\ of\ Words} + Sentence\ Variety$$

The Sentence Variety is calculated as follows:

$$Sentence\ Variety = \frac{Standard\ Deviation\ \times 10}{Average\ Sentence\ Length}$$

As mentioned in the literature review, higher Bog Index scores indicate that readers have more difficulty in understanding the message of the text, which is associated with lower readability. As earlier mentioned, I use the Bog Index dataset made available by Bonsall et al. (2017). Firms are identified by Central Index Keys (CIKs). CIKs are used by the SEC to identify firms that have filings available on the SEC website. I match these CIKs with the corresponding ticker symbols. The next step is to match the ticker symbols with the Bog Index score. The last step is to match Bog Index scores with AISD values by ticker symbol[6].

3.3. Moderating variable: governance index

To measure corporate governance strength of the sample firms, I follow Khanchel's (2007) ranking methodology. I define four indices that reflect corporate governance decisions within firms: the board of directors index, board committees index, audit index and the overall governance index. The board of directors index is composed of the following variables (relation with the subindex is given in parentheses):

- *Board Size* (-): Yermack (1996) finds evidence that large boards are less effective because of the poor communication and decision-making processes of such large boards. Yermack (1996) finds an inverse relationship between board size and firm value in which the relationship has a convex shape; most firm value is lost when growing from a small to a medium board size. Therefore, larger boards decrease the board of directors index.
- *Separate chair* (+): It is not necessarily clear whether the positions of Chairman and CEO should be separated or not. Jensen (1993) states that the Chairman should run board meetings and protect shareholder interests. He is also responsible for the process involving the hiring, firing, evaluation and compensation of the CEO. If the CEO is also Chairman, then the CEO cannot the perform the

[6] Matching CIKs with ticker symbols is done with the following data file: **http://rankandfiled.com/#/data/tickers**

function of Chairman apart from his self-interest. Therefore, Board operate more effectively when it has an independent Chairman. This is a dummy variable which is equal to 1 if the positions of chairman and CEO are separated and zero otherwise.

- *Outside directors* (+): Outside directors play a significant role in minimizing the agency problem between a firm's management and the firm's shareholders (Rao, 1995). The agency problem entails a conflict of interest where shareholders (principals) want managers (agents) to maximize shareholder value. However, often times, managers want to maximize their own wealth. Outside directors mitigate the problem, because they do not share the same incentives as managers do. Research has shown that outsider-dominated boards are more responsive than insider-dominated boards: outsider-dominated boards fire and replace CEO that perform poorly relatively quickly (Weisbach, 1988). This variable is defined as the ratio of outside or independent directors to the board size.
- *Board meetings*: In general, more frequent board meetings improve the flow of communication (Shivdasani & Zenner, 2004). However, each firm should make a trade-off between the costs and benefits of meeting frequency. More frequent board meetings may indicate problems within the firm that require frequent meetings to take play. Despite this, I assume that more frequent meetings are better, so the board of directors index increases in the frequency of board meetings.

Following Khanchel (2007), I use percentile rankings on each of the board of directors variables. This means that I assign a rank to each value, which represents the percentage of values that are less than this value (considering the distribution of this particular value). The higher the rank, the higher the firm scores on this particular corporate governance aspect. Then, for each firm in my sample, I average the percentile rankings of each of the board of directors variables to calculate the board index. The board committees index is composed of the following variables (relation with the subindex is given in parentheses):

- *Compensation committee* (+) and *CEO not in compensation committee* (+): The existence of a compensation committee enhances governance quality (Khanchel, 2007). Similar to Jensen's (1993) argument about the separation of the roles of CEO and chairman, I assume that a compensation committee functions better when the CEO is not in the committee. If the CEO would have been a compensation committee member, the CEO would basically have a saying over his own compensation. Both variables are dummy variables. *Compensation committee* equals 1 if the firm has a compensation committee and zero otherwise. *CEO not in compensation committee* equals 1 if the CEO is not a member of the compensation committee and zero otherwise.
- *Nominating committee* (+) and *CEO not in nominating committee* (+): Shivdasani & Yermack (1999) find that firms tend to hire less outside directors if the CEO is in

the nominating committee or is at least involved in the nomination process, or even when no nominating committee exists. These firms hire more affiliated outside directors that have the potential to bring conflicts of interest to the table, increasing agency problems within the firm. Both variables are dummy variables. *Nominating committee* equals 1 if the firm has a nominating committee and zero otherwise. *CEO not in nominating committee* equals 1 if the CEO is not a member of the nominating committee and zero otherwise.

- *Compensation committee meetings* (+) and *Nominating committee meetings* (+): Similar to meetings of the overall board, more frequent meetings of the compensation and nominating committee improve the flow of communication. I assume that more frequent meetings are better, so the board committees index increases in the frequency of board meetings.

Similar to the board of directors variables, I use percentile rankings on all board committee variables. I average the percentile rankings of each of the board committee variables to calculate the board committees index. The audit index is composed of the following variables (relation with the subindex is given in parentheses):

- *Auditor is Big 4* (+): Choosing a Big 4 firm as the independent auditor might improve audit quality. Che, Hope & Langli (2020) find that Big 4 auditors deliver audits of higher quality than other auditing firms. This is due to the fact that Big 4 auditors are able to attract more talent than other (medium and small-sized) auditing firms, Big 4 partners learn more that their non-Big 4 counterparts and Big 4 firms stronger monitoring and incentive systems than other auditing firms. Improved audit quality lead to better disclosure practices. Therefore, choosing a Big 4 firms as the independent auditor strengthen the corporate governance structure of a firm. This is a dummy variable which is equal to 1 if the independent auditor of the firm is a Big 4 auditor and zero otherwise.
- *Audit committee* (+): Following Khanchel (2007), I assume that the existence of an audit committee enhances the strength of a corporate governance system. This is because this committee is specialized in making sure that disclosures reach a given standard. This is a dummy variable which is equal to 1 if the firm has an audit committee and zero otherwise.
- *Financial expert*: Audit committee members are responsible for the quality of financial reporting and choosing an independent auditor (Khanchel, 2007). It is therefore important that audit committee members have financial expertise. Bédard, Chtourou & Courteau (2004) find that aggressive earnings management (i.e. deflating expenses to inflate profits) decreases as the financial expertise of audit committee members increase. Therefore, I assume that the existence of expertise within the audit committee increases corporate governance strength. This

is a dummy variable which is equal to 1 if the audit committee of the firm has at least one member with financial expertise.

- *Audit committee meetings* (+): Similar to meetings of the overall board, more frequent meetings of the audit committee improve the flow of communication. I assume that more frequent meetings are better, so the board committees index increases in the frequency of board meetings.
- *Audit size* (+): Following Khanchel (2007), I assume that larger audit committees enhance the strength of a corporate governance system.

Similar to the previous subindices, I use percentile rankings on all audit index variables. Again, the next step is to average the percentile rankings of the audit index variables to calculate the audit index. The last step is to divide the sample firms into two subsamples: one subsample of firms with relatively strong corporate governance and one subsample of firms with relatively weak corporate governance. I make the division based on the median value of the corporate governance index. I create a binary variable called *StrongGov* with value 1 if the corporate governance index is higher or equal to the median value and zero otherwise. The division of sample firms into subsamples allows me to investigate a possible interaction effect of corporate governance strength and readability on the cost of debt.

3.4. Control variables

To investigate the relation between readability and the cost of debt and the interference of corporate governance strength, I make use of several control variables related to loan and firm characteristics. I include the expected sign of the association with AISD in parentheses.

- *Age* (-): I include age as a control variable, because older firms might have established a well-known track record when it comes to their liquidity and solvency. Older firms often already proved themselves to be able to pay off their debt. Younger firms are associated with a higher default risk to creditors, because these firms have yet to prove themselves. Firm age is found by looking into its annual report or proxy statement and is denoted in years.
- *Firm growth* (-): Following Ertugul et al. (2017), I use the Market-to-Book (MTB) ratio to proxy for firm growth. The MTB ratio is calculated by dividing a firm's market value by its book value or common equity. MTB ratios larger than 1 indicate high growth firms, indicating that shareholders earn excessive positive returns. MTB ratios lower than 1 indicate low growth firms, indicating that shareholders earn excessive negative returns. Firms with high growth opportunities also have high revenue growth opportunities and may experience high profit growth, which might

translate into a lower default risk to creditors. This ultimately leads to a lower cost of borrowing. I retrieve both variables to calculate the MTB ratio from Compustat.

- *Leverage* (+)*:* Leverage measures the capital structure of a firm and shows the amount of debt a firm has in relation to its assets or equity. Firms that are highly leveraged have a relatively high default risk compared to low leveraged firms (Ertugul et al., 2017). Firms with a relatively high default risk face more stringent loan terms from lenders and are therefore expected to have higher borrowing costs than firms with lower borrowing costs. I calculate a firm's leverage by dividing its total liabilities by its total assets. Both variables are retrieved from Compustat.
- *Loan maturity* (-): Wittenberg-Moerman (2008) states that loans with a relatively long duration reflects trust from the lender in the borrower's ability to pay back the loan. Long maturity loans are also seen in agreements between parties that have had relations and experiences with each other in the past, therefore reducing information asymmetries. I therefore assume that longer loan maturities are associated with lower borrowing costs. Loan maturity is reflected in months and is retrieved from LPC Dealscan.
- *Loan size* (-)*:* Berger & Udell (1990) account for of economies of scale in lending by stating that borrowing cost decline when the loan size and/or number of loans increase. This suggests an inverse relationship between loan size and borrowing costs. This variable is retrieved from LPC Dealscan.
- *Profitability* (-)*:* Following Ertugul et al. (2017), I include profitability as a control variable because more profitable firms can pay off their debt relatively ease, which leads to a lower default risk and therefore lower borrowing costs. I proxy for firm profitability by dividing a firm's net income by its total assets. Both variables are retrieved from Compustat.
- *Size* (-)*:* Larger firms are often more open with sharing information with investors and creditors to acquire capital, which reduces information asymmetry (Ertugul et, 2017). Larger firms are also often more stable than smaller firms, like startups firms. I proxy for firm size by taking the total assets of the firm. This variable is retrieved from Compustat.
- *Tangibility* (-): I calculate a firm's tangibility by dividing a firm's earnings before interest, taxes, depreciation and amortization (EBITDA) by its total assets. Both variables are retrieved from WRDS Compustat. The reason to include this variable is that firms with a relatively high amount of tangible assets is able to liquidate more tangible assets into cash when it defaults compared to firms with a relatively low amount of tangible assets (Ertugul et al., 2017). The recovery rates of high tangibility firms should therefore reduce the borrowing costs charged by creditors.

I first investigate the effect of financial disclosure readability on the cost of debt. I estimate a linear regression model where the disclosure readability, measured by the Bog Index,

is the independent variable. The cost of borrowing, measured by AISD, is the variable of interest. This corresponds to the following regression model specification (model 1):

$$AISD_t = \beta_0 + \beta_1 BogIndex_{t-1} + +\beta_2 LoanSize_t + \beta_3 LoanMaturity_t + \beta_4 FirmSize_{t-1} + \beta_5 Age_{t-1} + \beta_6 Leverage_{t-1} + \beta_7 ROA_{t-1} + \beta_8 PTB_{t-1} + \beta_9 Tangibility_{t-1} + \varepsilon_t \quad (1)$$

The first hypothesis investigates the relation between corporate governance strength and the cost of borrowing, which corresponds to the following regression model (model 2):

$$AISD_t = \beta_0 + \beta_1 BogIndex_{t-1} + \beta_2 StrongGov_{t-1} + \beta_3 LoanSize_t + \beta_4 LoanMaturity_t + \beta_5 FirmSize_{t-1} + \beta_6 Age_{t-1} + \beta_7 Leverage_{t-1} + \beta_8 ROA_{t-1} + \beta_9 PTB_{t-1} + \beta_{10} Tangibility_{t-1} + \varepsilon_t \quad (2)$$

Because the first hypothesis states that firms with strong corporate governance face lower borrowing costs than firms with weak corporate governance, I expect β_2 to be negative.

The second hypothesis investigates the moderating effect of corporate governance strength on the relationship between financial disclosure readability and borrowing costs. It tests whether the relationship between financial disclosure readability and the cost of borrowing is more pronounced for firms with weak corporate governance than for firms with strong corporate governance. I test whether the association between readability and borrowing costs depends on whether a firm has a strong corporate governance structure or not. For this hypothesis, I add a moderating variable $StrongGov$ to the regression model. Because the second hypothesis states that the negative relationship between readability and borrowing costs is weaker for firms with strong corporate governance, compared to weak corporate governance, I expect β_3 in model 3 to be negative. The third hypothesis corresponds to the following regression model (model 3):

$$AISD_t = \beta_0 + \beta_1 BogIndex_{t-1} + \beta_2 StrongGov_{t-1} + \beta_3 BogIndex_{t-1} \times StrongGov_{t-1} + \beta_4 LoanSize_t + \beta_5 LoanMaturity_t + \beta_6 FirmSize_{t-1} + \beta_7 Age_{t-1} + \beta_8 Leverage_{t-1} + \beta_9 ROA_{t-1} + \beta_{10} PTB_{t-1} + \beta_{11} Tangibility_{t-1} + \varepsilon_t \quad (3)$$

Table 1 in the Appendix shows the descriptive statistics of all variables excluding the governance index. Interesting statistics include the skewness and kurtosis of a variable, which give an indication of the degree of Normality of a distribution. Kim (2013) states that for larges samples (N > 300), testing for Normality can be done by checking histograms and absolute values of skewness and kurtosis. According to Kim (2013) a substantial deviation from Normality is reached when either the absolute skewness is larger than two or when the absolute kurtosis is larger than seven. To account for substantial non-Normality, I take the natural logarithm of the following variables: $AISD$, $LoanSize$, $FirmSize$, $Leverage$, PTB and $Tangibility$. The next step is to account for outliers by winsorizing each variable at the 1 and 99 percentile level.

Table 1: Descriptive statistics of all variables excluding governance variables

Variable	N	Mean	Min.	Max.	Median	Std. Dev.	Skew.	Kurtosis
AISD	463	135.90	4.50	900.00	125.00	85.70	4.36	26.82
BogIndex	463	86.69	64.00	106.00	87.00	6.66	-0.02	0.07
LoanSize	463	3.37E+7	1.72E+10	1.68E+9	1.00E+9	2.22E+9	3.89	19.57
LoanMaturity	463	52.67	2.00	120.00	60.00	18.67	-1.17	1.41
FirmSize	463	32901.56	573.98	402672.00	12177.00	61248.00	3.66	14.794
Age	463	62.90	1.00	209.00	47.00	41.45	0.67	-0.33
Leverage	463	0.64	0.11	8.19	0.59	0.51	11.83	164.38
ROA	463	0.07	-0.26	0.50	0.07	0.06	0.64	9.63
PTB	463	3.84	-198.91	74.24	3.28	12.63	-9.24	150.18
Tangibility	463	0.50	0.03	12.17	0.36	0.76	11.12	154.94

This table shows the descriptive statistics of all variables, excluding the governance related variables (which are shown in table 2). The sample consists of 463 observations. Skewness and kurtosis statistics are used to determine whether a variable is Normally distributed A substantial deviation from Normality is reached when either the absolute value is larger than two or when the absolute kurtosis is larger than seven.

Table 2: Descriptive statistics of all governance related variables

Variable	N	Mean	Min.	Max.	Median	Std. Dev.
Panel A: Board of Directors						
Board Size	463	10.58	5.00	16.00	10.00	2.07
Outside chair dummy	463	0.50	0.00	1.00	1.00	0.05
Outside directors	463	0.86	0.86	0.93	0.89	0.08
Board meetings	463	7.65	7.65	21.00	7.00	3.17
Board of directors index	463	50.11	13.44	73.06	50.08	11.76
Panel B: Compensation and nominating committee						
Existence of a compensation committee	463	1.00	1.00	1.00	1.00	0.00
Existence of a nominating committee	463	1.00	0.00	1.00	1.00	0.07
CEO not on the compensation committee	463	1.00	1.00	1.00	1.00	0.00
CEO not on the nominating committee	463	1.00	1.00	1.00	1.00	0.00
Compensation committee meetings	463	6.15	2.00	23.00	6.56	2.41
Nominating committee meetings	463	4.44	0.00	23.00	4.44	1.88
Board committees index	463	50.11	34.25	66.49	49.62	7.87
Panel C: Internal control and auditing system						
Existence of an audit committee	463	1.00	1.00	1.00	1.00	0.00
Audit committee size	463	4.21	3.00	8.00	4.00	2.89
Auditor is a Big 4	463	1.00	0.00	1.00	1.00	0.07
Members' financial expertise	463	1.00	0.00	1.00	1.00	0.00
Audit committee meetings	463	8.62	3.00	21.00	8.00	2.903
Audit index	463	50.11	23.59	67.39	50.60	8.03
Panel D: Governance index	463	50.11	29.99	66.74	50.40	6.29

This table gives the descriptive statistics of all corporate governance variables. The sample consists of 463 observations. Subindices (*board of directors index*, *board committees index* and *audit index*) are calculated with the percentile ranking methodology. The governance index for each firm is the average of these subindices.

Table 2 shows the descriptive statistics of corporate governance variables, governance subindices and the overall corporate governance index. The most important value here is the median value of the corporate governance index, which is 46.36. We define firms with a corporate governance index greater or equal than 46.36 as firms with a relative strong corporate governance. In this case, indicator variable $StrongGov$ is equal to 1. Firms with a value lower than 46.36 have a relatively weak governance structure. In this case, indicator variable $StrongGov$ is equal to 0.

I account for multicollinearity among the independent variables by checking the Variance Inflation Factor (VIF) of each variable. The VIF value measures the degree of multicollinearity among the independent variables. The reasoning behind the VIF value being an indicator for multicollinearity is that when independent variables are highly correlated, the standard errors will increase and variances are inflated (Daoud, 2017). Daoud (2017) provides a table which indicates that VIF values equal to 1 indicate no correlation, VIF values between 1 and 5 indicate moderate correlation and VIF values above 5 indicate high correlation among variables. I follow these guidelines in determining whether To account for multicollinearity problems in the interaction effect between $BogIndex$ and $StrongGov$, I mean center both variables as well as the interaction effect.[7] Next to the possible advantage that mean centering reduces multicollinearity, mean centering also does not affect the statistical power of the model in detecting moderating effects (Shieh, 2011). To calculate the mean centered variable, I subtract the mean value from the observed value. Minimizing the influence of multicollinearity overcomes one of the problems that OLS regressions might encounter. It is also likely to significantly to reduce the VIF value of the interaction effect. I check for reduction of multicollinearity by comparing the correlation between the individual variables and the interaction effect before and after the mean-centering transformation as well as the VIF value. A reduction of the correlation means a reduction of the multicollinearity problem.

[7] In contrast to its goal, it is noteworthy that mean centering can also raise the degree of multicollinearity (Shieh, 2011).

4. Results

Before heading to the hypothesis testing section, I check for reduction of multicollinearity by comparing the correlation between the individual variables and the interaction effect before and after the mean-centering transformation. Table A1 (Appendix) shows the Pearson correlations between $BogIndex$, $StrongGov$ and the interaction term ($BogIndex \times StrongGov$) before and after mean-centering.

I find a significant positive correlation between $BogIndex$ and the interaction term (r = 0.264, $p < 0.001$) before mean-centering and a significant negative correlation after mean-centering (r = -0.148, $p < 0.001$). I find a significant positive correlation between $StrongGov$ and the interaction term (r = 1.000, $p < 0.001$) before mean-centering, but a non-significant positive correlation after mean-centering (r = 0.000, p = 0.993). As a result, mean-centering ensures that the (absolute) values of the correlations between the variables and the interaction term decreases, which means that the influence of multicollinearity issues is reduced. Table A2 (Appendix) shows that the VIF-values of all variables is less than five and close to one. This suggests that there is only a very small amount of multicollinearity in the model, which also confirms that mean-centering the interaction term helps solving multicollinearity issues.

I also take a brief look at the effect of financial disclosure readability on borrowing costs. Table 3 shows the regression results of borrowing costs of financial disclosure readability with unstandardized regression coefficients. Model (1) in table 3 is a significant regression model (R^2 = 0.175, $F(9,440)$ = 10.386, $p < 0.010$). A one-point increase of the Bog Index is associated with a 0.8% increase of a firm's borrowing costs (t = 2.266, p = 0.024). This is in line with Bonsall & Miller's (2016) findings, who report a highly significant coefficient of 0.010[8]. The higher the Bog Index, the lower the readability of a financial disclosure. This means that less readable financial disclosures are associated with higher borrowing costs, holding the remaining variables constant. In the same way, better readability is associated with lower borrowing costs. Table 3 confirms the negative relationship between financial disclosure readability and borrowing costs.

Comparing the coefficient estimates cannot be done with table 3, as this table includes only includes unstandardized regression coefficients. Some variables are denoted in years (Age), while other are expressed in months, ($LoanMaturity$), monetary amounts ($FirmSize$) or ratios ($Leverage$).Standardizing regression coefficients (table 4) allows for comparison of coefficient estimates.

[8] Significant at the 0.01 level

Table 3: Regression results of borrowing costs on financial disclosure readability with unstandardized regression coefficients

Variable	**Model**		
	(1)	**(2)**	**(3)**
$BogIndex_{t-1}$	0.008**	0.008**	0.006*
	(2.266)	(2.211)	(1.849)
$StrongGov_{t-1}$		-0.001	0.006
		(-0.025)	(0.150)
$BogIndex_{t-1} \times StrongGov_{t-1}$			-0.012*
			(-1.867)
$\ln(LoanSize_t)$	0.021	0.021	0.020
	(0.890)	(0.888)	(0.836)
$LoanMaturity_t$	0.002	0.002	0.002
	(1.528)	(1.523)	(1.414)
$\ln(FirmSize_{t-1})$	-0.130***	-0.130***	-0.132***
	(-5.690)	(-5.545)	(-5.621)
Age_{t-1}	-0.001**	-0.001**	-0.001**
	(-2.460)	(-2.455)	(-2.430)
$\ln(Leverage_{t-1})$	0.320***	0.320***	0.299***
	(4.334)	(4.329)	(4.012)
ROA_{t-1}	-0.940**	-0.939**	-0.939**
	(-2.502)	(-2.494)	(-2.501)
$\ln(PTB_{t-1})$	-0.208***	-0.208***	-0.208***
	(-6.031)	(-6.022)	(-6.031)
$\ln(Tangibility_{t-1})$	-0.010	-0.010	-0.010
	(-0.367)	(-0.367)	(-0.374)
Constant (β_0)	5.447***	5.445***	5.584***
	(10.851)	(10.667)	(10.885)
N	449	449	449
Adjusted R^2	0.158	0.156	0.161

The sample consists of 463 observations of the S&P 500 index for the period 2014-2017. The regression model is based on 449 observations, because some negative values of PTB were eliminated after the natural log transformation. Model (1) specifies the (base-line) the baseline effect of readability on borrowing costs. Model (2) adds the governance variable ($StrongGov$) to the regression model. Model (3) adds the interaction effect ($BogIndex \times StrongGov$) to the regression model. The t-statistics are reported in parentheses; *,** and *** indicate significance at the 10%,5% and 1% levels, respectively.

Table 4: Regression results of borrowing costs on financial disclosure readability with standardized regression coefficients

Variable	Model		
	(1)	(2)	(3)
$BogIndex_{t-1}$	0.108**	0.109**	0.092*
	(2.266)	(2.211)	(1.849)
$StrongGov_{t-1}$		-0.001	0.007
		(-0.025)	(0.150)
$BogIndex_{t-1} \times StrongGov_{t-1}$			-0.084*
			(-1.867)
$\ln(LoanSize_t)$	0.047	0.047	0.044
	(0.890)	(0.888)	(0.836)
$LoanMaturity_t$	0.069	0.069	0.064
	(1.528)	(1.523)	(1.414)
$\ln(FirmSize_{t-1})$	-0.355***	-0.335***	-0.339***
	(-5.690)	(-5.545)	(-5.621)
Age_{t-1}	-0.116**	-0.116**	-0.114**
	(-2.460)	(-2.455)	(-2.430)
$\ln(Leverage_{t-1})$	0.225***	0.225***	0.210***
	(4.334)	(4.329)	(4.012)
ROA_{t-1}	-0.123**	-0.123**	-0.123**
	(-2.502)	(-2.494)	(-2.501)
$\ln(PTB_{t-1})$	-0.307***	-0.307***	-0.307***
	(-6.031)	(-6.022)	(-6.031)
$\ln(Tangibility_{t-1})$	-0.017	-0.017	-0.017
	(-0.367)	(-0.367)	(-0.374)
Constant (β_0)	0.502***	0.510***	0.514***
	(10.851)	(10.667)	(10.885)
N	449	449	449
Adjusted R^2	0.158	0.156	0.161

The sample consists of 463 observations of the S&P 500 index for the period 2014-2017. The regression model is based on 449 observations, due to the fact that some negative values of PTB were eliminated after the natural log transformation. Coefficients are standardized (expect for the constant β_0). The standardized coefficient of 0.108 for the Bog Index indicates that when the standard deviation of $Bog\ Index$ increases with one, the expected increase in borrowing costs is 0.108 of its standard deviation (*SD* = 0.445). Model (1) specifies the (base-line) the baseline effect of readability on borrowing costs. Model (2) adds the governance variable ($StrongGov$) to the regression model. Model (3) adds the interaction effect ($BogIndex \times StrongGov$) to the regression model. The t-statistics are reported in parentheses; *,** and *** indicate significance at the 10%,5% and 1% levels, respectively.

Surprisingly, $LoanSize$ (t = 0.890, p = 0.374) and $LoanMaturity$ (t = 0.069, p > 0.127) do not have a significant effect on borrowing costs. On the other hand, a firm's borrowing cost increases significantly when firms are more leveraged (t = 4.334, p < 0.001), which is consistent with the notion that highly leveraged firms have a relatively high default risk (Ertugul et al., 2017). The following variables have a significant negative effect on borrowing costs: Age (t = -2.460, p = 0.014), ROA (t = -2.502, p = 0.013), $FirmSize$ (t = -5.690, p < 0.001) and PTB ratio (t = -6.031, p < 0.001). This is consistent with the predicted signs. In table 4, the Bog Index coefficient (0.108) is smaller (in absolute terms) than most other regression coefficients. The $Leverage$ coefficient is, in absolute terms, twice as large as the coefficient of $BogIndex$. This suggests that, although financial disclosure readability does have a significant effect on borrowing costs, lenders place more weight on firm characteristics. Based on this outcome, it is questionable whether firms want to spend time and money to increase the readability of their financial disclosure. Given the fact that lenders place more weight on firm characteristics, firms may prefer to make changes in their capital structure to improve their leverage ratio and refrain from making changes that improve readability. Therefore, the effect of financial disclosure readability is statistically significant, but not economically significant.

4.1. Hypothesis testing

4.1.1. Hypothesis 1

The first hypothesis states that firms with strong corporate governance face lower borrowing costs, compared to firms with weak corporate governance. Model (2) in table 3 shows a non-significant association between *StrongGov* and borrowing costs (t = -0.025, p = 0.980). Bhojray & Sengupta (2003) find that firms with strong governance have significantly better bond ratings than firms with weak governance. Results suggest that firms with strong governance do not face lower borrowing costs than firms with weak governance, which also implies that better bond ratings do not lower borrowing costs.

A reason for the effect of governance strength on borrowing costs being insignificant, is the lack of construct validity. Governance at the firm-level is an abstract concept for which it is hard to find a reasonable proxy (Black, de Carvalho, Khanna, Kim & Yurtoglu, 2017). The concern here is that the governance index (the proxy) does not relate well enough with the underlying concept (corporate governance at the firm-level). Following Khanchel (2007), I used 15 governance variables across three subindices, which suggest that a reasonable amount of corporate governance elements have been taken into account. Another issue is that the subindices are too similar, meaning that they capture aspects of governance that are very similar.

Table 5: Pearson correlation between the board of directors index, board committees index and the audit index.

Variable	Board of directors Index	Board committees index	Audit index
Board of directors index		0.240***	0.061
Board committees index	0.240***		0.282***
Audit index	0.061	0.282***	

This table shows the Pearson correlations between the three governance subindices: the board of directors index, board committees index and the audit index. *** Indicates that the correlation is significant at the 0.01 level (2-tailed).

Table 5 shows the Pearson correlations between the different subindices. The correlation between the board committees index and the board of directors index is significantly positive (r = 0.240, p < 0.001), as well as the correlation between the board committees index and the audit index (r = 0.282, p < 0.001). However, the correlations between all subindices are moderate. This means that all subindices do measure different aspects of corporate governance (Black et al, 2017). The consequence is that the use of a single subindex as total governance index would be problematic, as a single subindex would then likely to be subject to omitted variable bias.

What should be noted is that a lot of observations have the same outcomes for certain variables. Although there is intra-sample variation for board (committee) sizes and board (committee) meetings, almost every firm in the sample has a nominating and compensation committee (table 2). Furthermore, the CEO is never a member of these committees and the audit committee always has at least one financial expert. Lastly, the audit committee almost always chooses a Big 4 firm as independent auditor. The consequence is that it is harder to properly distinguish “strong” from “weak” governance firms, which can attribute to the non-significant finding.

4.1.2. Hypothesis 2

The second hypothesis states that the negative relationship between financial disclosure readability and borrowing costs is weaker (less negative) for firms with strong corporate governance, compared to firms with weak corporate governance. Table 3 shows a significant interaction effect between $BogIndex$ and $StrongGov$ (t = -1.867, p = 0.063). The coefficient of -0.012 suggest that, for the same readability score, strong corporate governance firms face, on average, 1,2% lower borrowing costs than weak corporate governance firms. However, it should be noted that the moderation effect of corporate governance on the relationship between financial disclosure readability and borrowing costs is only significant at the 10% level. This result shows that creditors take into account that weak corporate governance firms have additional information risk compared to strong corporate governance firms. For a given readability score, strong corporate governance firms face lower borrowing costs than weak corporate governance firms. This suggests

that characteristics of relatively weak governance firms, such as a low fraction of outside directors in the board and no separation between the CEO and chairman roles, are priced in through higher borrowing costs. This could also suggest that creditors do take into account additional information risk from weak corporate governance firms, where managers are more likely to obfuscate information, when reading an annual report.

5. Conclusion

5.1. Summary of the results

Before moving to the two hypotheses, I investigate whether better readable financial disclosures indeed lower borrowing costs. I find that financial disclosure readability has a negative and significant effect on borrowing costs, which is in line with previous research (Bonsall & Miller, 2016; Ertugul et al., 2017; Hoffmann & Kleimeier, 2019). Although readability has a significant effect on borrowing costs, lenders seem to base their loan terms on fundamental firm characteristics than annual report readability. A firm's capital structure is deemed more important in the determination of borrowing costs; highly leveraged firms face higher borrowing costs because of increased default risk.

The first hypothesis investigates whether firms with strong corporate governance face lower borrowing costs, compared to firms with weak corporate governance. I do not find that firms with strong corporate governance face significantly lower borrowing costs than firms with weak corporate governance. The results here are heavily influenced by the choice of governance variables and subindices which comprise the overall governance index. I do not find a significant effect with the choice of variables and subindices in this study. A different choice of variables, subindices and the way variables are grouped into subindices (see suggestions for further research) can potentially alter this result.

The second hypothesis investigates whether the (negative) association between financial disclosure readability and borrowing costs is more pronounced for firms weak corporate governance, compared to firms with strong corporate governance. I do find, at a low significance level, that corporate governance strength moderates the relationship between readability and borrowing costs. Lenders do price in additional information risk from weak governance firms when reading annual reports to determine borrowing costs.

5.2. Practical implications

If firms want cheaper external financing, then focusing on improving financial disclosure readability may be desirable. However, firm specific characteristics like capital structure is viewed as a more important determinant of borrowing costs. Firms should decrease their "deleverage" in order to decrease their perceived default risk and borrowing costs.

5.3. Research limitations

This research only focuses on S&P 500 Index companies, which lays the focus on the largest U.S. public firms. This reduces variability in governance strength between sample firms, because most large public firms are characterized by strong governance systems, as these firms need keep their reputation high. Another limitation is the missing data for the AISD variable, where the most recent year in which data is available is 2017. I also

did not include two control variables, because of the amount of missing data for these variables. The first variable is firm complexity, which can be proxied by the number of business segments. More complex firms need longer financial disclosures to report information, which could reduce readability (Loughran & McDonald, 2014). The second variable relates to whether a loan is secured or not. Berger & Udell (1990) find that secured loans are associated with higher credit spreads and, thus, higher borrowing costs. This is because collateral is often associated with risker borrowers.

5.4. Suggestions for further research

A possible explanation for the lack of a moderating effect of corporate governance strength on the relation between financial disclosure readability and the cost of borrowing is the lack of governance index variation among the sample firms. A larger sample that also includes firms from other stock indices, like the S&P MidCap 400, S&P SmallCap 600 or even the Wilshire 5000 index (the entire U.S. stock market), would allow for more variation in the governance index. This can lead to clearer distinction between relatively weak and strong governance systems, which can (1) lead to governance strength being a more prominent and more significant determinant of borrowing costs and (2) governance strength being a significant moderating variable in the relation between readability and borrowing costs. Another way to potentially increase the variation in the governance index is to compute the subindices in another way, such as with principal component analysis (PCA) (Black et al., 2017). PCA is aimed to find clusters that consist of related variables. The variables in the cluster correlate more with one another than with variables that do not belong to that cluster.

Furthermore, what should be noted is that I measured the readability of entire annual reports. Some sections of the report might not be relevant for readability measurement, as these are not subject to any discretion in how to present an explanation of its current financial situation and financial forecast. Lo et al. (2017) use the Management Discussion and Analysis (MD&A) of the report to measure readability. The MD&A presents management's perspective and opinion about the firm's operations, results, risks, opportunities and projections. This section is legally required to be included in a 10-K report and also has a fixed structure, which can incentivize managers to use discretion in the way an explanation is presented, especially when the firm's performance is below par. The MD&A section is therefore more likely to include weak modal or uncertain words, which can lead to lower readability and more stringent loan terms. Using the MD&A section instead of the annual report as measurement base can therefore strengthen the positive (baseline) relation between financial disclosure readability, measured with the Bog Index, and borrowing costs.

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Appendix

Table A1: Pearson correlation between $BogIndex$, $StrongGov$ and the interaction term before and after mean-centering.

Variable	BogIndex	StrongGov	Interaction	BogIndex_ Centered	StrongGov_ Centered	Interaction_ Centered
BogIndex	-	0.20***	0.26***	1.00***	0.20***	-0.15***
StrongGov	0.20***	-	1.00***	0.20***	1.00***	0.00
Interaction	0.26***	1.00***	-	0.26***	0.26***	0.06
BogIndex_ Centered	1.00***	0.20***	0.26***	-	0.20***	-0.15***
StrongGov _Centered	0.20***	1.00***	1.00***	0.20***	-	0.00
Interaction _Centered	-0.15***	0.00	0.06	-0.15***	0.00	-

This table shows the Pearson correlations between the Bog Index, Governance variable, the interaction effect and the mean-centered transformations of these variables. The Pearson correlations among these variables are checked to see whether mean-centering reduces multicollinearity issues (does mean-centering reduce the absolute value of the correlation between, on the one hand, the Bog Index variable and Governance variable and, on the other hand, the interaction variable?).*** Indicates that the correlation is significant at the 0.01 level (2-tailed).

Table A2: VIF Values of all variables for the three regression models

Variable	**Model**		
	(1)	**(2)**	**(3)**
$BogIndex_{t-1}$	1.22	1.28	1.33
$StrongGov_{t-1}$	-	1.14	1.14
$BogIndex_{t-1} \times StrongGov_{t-1}$	-	-	1.07
$\ln(LoanSize_t)$	1.50	1.50	1.50
$LoanMaturity_t$	1.08	1.09	1.10
$\ln(FirmSize_{t-1})$	1.85	1.94	1.94
Age_{t-1}	1.19	1.19	1.19
$\ln(Leverage_{t-1})$	1.44	1.44	1.47
ROA_{t-1}	1.29	1.29	1.29
$\ln(PTB_{t-1})$	1.38	1.38	1.38
$\ln(Tangibility_{t-1})$	1.14	1.14	1.14

This table shows Variance Inflation Factors (VIFs) of all variables across the three regression models. The VIF value measures the degree of multicollinearity among the independent variables. VIF values equal to 1 indicate no correlation, VIF values between 1 and 5 indicate moderate correlation and VIF values above 5 indicate high correlation among the independent variables (multicollinearity) (Daoud, 2017).