HOW CREDIT MARKET CONDITIONS IMPACT THE EFFECT OF VOLUNTARY DISCLOSURE ON FIRMS' COST OF DEBT CAPITAL

A Dissertation

by

BRET WESTMAN SCOTT

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2012

Major Subject: Accounting

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Approved by:

Chair of Committee,	Thomas C. Omer
Committee Members,	Christopher J. Wolfe
	Anwer S. Ahmed
	D. Scott Lee
Head of Department,	James J. Benjamin

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ABSTRACT

How Credit Market Conditions
Impact the Effect of Voluntary Disclosure
on Firms' Cost of Debt Capital. (August 2012)
Bret Westman Scott, B.A., Western Washington University,
Chair of Advisory Committee: Dr. Thomas C. Omer

Prior literature finds that firms incur a lower cost of debt capital when they voluntarily disclose information. However, the economic literature demonstrates that creditors' lending standards become more stringent (lax) when credit is rationed (abundant) suggesting that they value voluntary disclosure from borrowers differentially across credit market regimes. I draw upon the economic and finance literature on credit rationing to test whether the effects of voluntary disclosure on firms' cost of debt capital is greater during periods of credit rationing. I provide some evidence that confirms this prediction. Moreover, I provide some evidence that this relation is stronger for *smaller* firms than larger firms during periods of credit rationing suggesting that creditors value voluntary disclosure more from firms that have fewer resources to cover the increased agency cost of lending during periods of credit rationing.

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1. INTRODUCTION

This study investigates how the observed relationship between firms' cost of debt capital and voluntary disclosure is influenced by credit market conditions. Specifically, I test whether creditors' sensitivity to conference call and earnings guidance frequency depends on the degree of rationing in the credit markets. Creditors' uncertainty about debt repayments vary with economic outlook (Rajan 1994; Ruckes 2004). For example, when creditors are pessimistic, credit is rationed and creditors' screening and monitoring efforts increase. While creditors have access to private information to satisfy information needs during periods of economic uncertainty (Rajan 1994; Jorion et al. 2005; Dell'Ariccia and Marquez 2006; Frost 2007), information acquisition and processing is costly (Ruckes 2004; Bonner 2008). Borrowers can partially subsidize the cost of monitoring by voluntarily disclosing financial information (e.g. Lang and Lundholm 1993) suggesting that voluntary disclosure becomes more important to creditors when credit is rationed. Thus, while prior literature finds that greater voluntary disclosure reduces firms' cost of debt capital (Sengupta 1998); I expect voluntary disclosure will have a greater effect on firms' cost of debt capital during periods of credit rationing.

Understanding the influence of creditor uncertainty and their use of voluntary disclosure to discriminate among potential borrowers is important for regulators and legislators who have, in the past decade, called for greater financial disclosure by way of

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This dissertation follows the style of *The Accounting Review*.

the Sarbanes-Oxley Act of 2002 (SOX) and the Dodd-Frank Act of 2010 to increase investor protection. If the importance of disclosure in debt contracts varies with creditors' economic outlook, as prior research suggests (e.g. Rajan 1994; Weinberg 1995), then regulatory reform mandating greater financial disclosure may not effectively increase investor protection as intended. Also, understanding the variability in the influence of voluntary disclosures is important to firms who use voluntary disclosures strategically to influence capital market responses to heightened uncertainty (e.g. Skinner 1994; Kasznik and Lev 1995; Soffer et al. 2000; Brown et al. 2005). Firms may be able to influence their access to debt capital during periods of credit rationing by subsidizing creditors' monitoring costs with additional financial disclosure (Holmstrom and Tirole 1997). Also, prior literature finds that firms are more (less) forthcoming with financial information during periods of positive (negative) expected earnings (Miller 2002). Understanding how creditors respond differentially to voluntary disclosure across credit market conditions would be of value to firms who contemplate adjusting their voluntary disclosure policy, especially during periods of credit rationing.

To test whether creditor uncertainty affects the extent to which creditors' use voluntary disclosure to discriminate among potential borrowers, I examine the association of conference call and earnings guidance disclosure frequency with firms' credit rating scores and interest rates across credit market conditions. Firms that voluntarily disclose financial information through conference calls and / or earnings guidance convey confidence and certainty in their financial reports while reducing the information asymmetry component of firms' cost of capital (Trueman 1986; Diamond

and Verrecchia 1991; Kasznik and Lev 1995; Brown et al. 2004). If the association between conference call and earnings guidance disclosure frequency and firms' credit rating scores and interest rates varies across credit market conditions, it implies that creditors are more (less) sensitive to voluntary disclosure during periods when credit is constrained (abundant) and thus simply mandating greater financial reporting may not effectively increase investor protection as intended. Alternatively, if the cost of greater financial disclosure is recognized by creditors as a long-term investment by borrowers that decreases the likelihood of financial insolvency, or if creditors work directly to obtain nonpublic (i.e. private) disclosure to satisfy increased information demands, I would expect no difference in association between voluntary disclosure and firms' cost of debt capital across periods of credit rationing / abundance.

I find some evidence that greater conference call disclosure frequency improves firms' credit ratings and reduces firms' interest rates more during periods of credit rationing. I also find some evidence that greater earnings guidance disclosure frequency improves firms' credit rating scores and reduces firms' interest rates during periods of credit rationing. These results suggest that the influence of voluntary disclosure on firms' cost of debt capital is greater when credit is constrained, and that creditors value public disclosure more during periods of uncertainty as means of subsidizing increased monitoring costs.

I also examine whether the effect of voluntary disclosure on firms' cost of debt capital during periods of credit rationing is conditional on firm size. Holmstrom and Tirole (1997) suggest that smaller firms are more likely to be denied credit when credit

is rationed because smaller firms have fewer resources available to cover increased agency costs of lending during periods of credit rationing. Additionally, prior studies find that smaller firms have more opaque information environments relative to larger firms (e.g. Lang and Lundholm 1993) suggesting that voluntary disclosure plays a larger role in debt contracting for smaller firms. My findings indicate that both conference call disclosure frequency and earnings guidance disclosure frequency improve firms' credit ratings and reduce firms' interest rates more for smaller firms than larger firms during periods of credit rationing suggesting that voluntary disclosure is more important to creditors of smaller firms than larger firms when credit becomes constrained.

My study contributes to extant literature by examining how credit market conditions affect the relation between voluntary disclosure and the cost of debt capital documented in prior literature. Anecdotal evidence of lax lending standards during the "easy credit" period of 2004-2006 (Acharya et al. 2009b) suggests that the importance of financial disclosure attenuates during periods of credit abundance. Prior economic

literature also finds that screening and monitoring efforts of creditors become more strict (lax) during periods of credit rationing (abundance) (e.g. Rajan 1994; Ruckes 2004). My study adds to extant literature by demonstrating that creditors' use of voluntary disclosure varies in degree of influence and direction of association depending on whether credit is rationed or abundant, and that this result occurs despite increased financial disclosure since the passage of SOX (Jain et al. 2008).

Also, prior literature finds the issuance of earnings guidance is on the decline which is likely in response to criticism surrounding such disclosure (Houston et al. 2010). This paper contributes to this stream of literature by suggesting that earnings guidance may be more valuable to both issuers and users of earnings guidance, especially in times of economic and financial uncertainty.

The remainder of this paper proceeds as follows. The background and hypotheses development for this paper are presented in section 2, while the data and methodology discussion are presented in section 3. Section 4 presents univariate statistics, and Section 5 presents results from testing. Section 6 documents the conclusions.

2. BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1 The Agency Problem

Jensen and Meckling (1976) posit that agency problems arise out of the separation of ownership and control. When an owner (i.e. principal) delegates managerial responsibilities to the firm manager (i.e. agent), the agent typically has access to information that the principal does not. This information may be useful to the principal in making investment and contracting decisions. Without full access to such information, an adverse selection dilemma is created which can result in an increased cost of capital.

2.2 Financial Disclosure and the Cost of Debt Capital

Prior theoretical literature suggests that, because investors are rational, firms will provide full disclosure to attract outside investment (Grossman 1981; Milgrom 1981). Yet, given that full disclosure is costly, firms are more likely to use discretion when determining the optimum threshold level of disclosure (Verrecchia 1983). Thus, while managers may not voluntarily provide full disclosure, the optimum threshold level of disclosure they do provide mitigates the information asymmetry and accompanying adverse selection problem faced by investors, which in turn reduces the risk premium charged by investors (Glosten and Milgrom 1985; Diamond and Verrecchia 1991). Thus, firms must weigh the cost of increased disclosure against the benefit of reduced cost of capital.

Several studies examine the capital market consequences of firms' voluntary financial disclosure policies by employing various proxies for voluntary disclosure. Welker (1995) finds that firms with higher financial disclosure ratings, such as those published by the Association for Investment Management and Research (AIMR), have lower bid-ask spreads. Similarly, other studies find that firms with higher AIMR scores attract greater investor interest, have greater stock liquidity, and have a lower cost of equity capital (Botosan 1997; Healy et al. 1999). Sengupta (1998) examines the effect of voluntary disclosure on firms' cost of debt capital and finds that greater AIMR scores are associated with higher credit ratings and, thus, a lower cost of debt capital. Prior studies also use earnings guidance as a proxy for voluntary disclosure and find that earnings guidance reduces the information asymmetry component of firms' cost of capital as evidenced by lower bid-ask spreads and higher equity price offerings (Coller and Yohn 1997; Lang and Lundholm 2000). Additionally, Frankel et al. (1995) find that firms issue earnings guidance more frequently when they regularly access financing from the capital markets. Conference calls, another proxy for voluntary disclosure, have been shown to be negatively associated with information asymmetry, and this effect is stronger for firms that regularly hold conference calls (Brown et al. 2004). Furthermore, firms that voluntarily disclose through conference calls have greater stock liquidity (Frankel et al. 1999). Taken together, these studies are consistent with the theoretical literature that finds greater voluntary disclosure reduces agency problems arising from information asymmetry between managers and investors, which reduces perceived investment risk and results in a lower cost of capital.

A key feature in the underlying disclosure-cost of capital literature above is the mediating role of risk. Diamond (1984) and Diamond and Verrecchia (1991) discuss how risk is the mediating factor that links the effect of financial disclosure to firms' cost of capital. The role of risk as a mediating factor relies on the assumption that financial disclosure will influence investors' perceived risk of investment. However, this assumption depends on investors' risk tolerance. In debt contracting, if creditors are risk-averse (i.e. have a low risk-tolerance), they will likely value voluntary disclosure because it provides greater assurance that debt obligations will be repaid. Yet, if creditors are risk-neutral or risk-seeking (i.e. have a high risk-tolerance), it is unclear whether voluntary disclosure will influence debt contracting decisions. If creditors' risk tolerance ultimately impacts the effect of voluntary disclosure on firms' cost of debt capital then it is important to understand what factors influence creditors' risk tolerance and whether creditors' risk tolerance is static or variable.

2.3 Variation in Creditors' Risk Tolerance

Prior literature finds that, on average, creditors' risk tolerance varies with their forecasts of future economic conditions (Schreft and Owens 1991; Rajan 1994), and that their risk tolerance cycles between periods of credit rationing and credit abundance (Wojnilower 1980; Bernanke et al. 1991; Schreft and Owens 1991 and 1995; Asea and Blomberg 1998; Lown and Morgan 2006). When creditors' economic outlook is pessimistic, their forecasted probability of borrower default increases and their overall risk tolerance decreases (Asea and Blomberg 1998; Ruckes 2004). As a result, screening and monitoring efforts increase, the price of loans increases, credit standards become strict, and fewer loans are extended to borrowers (Ruckes 2004). Periods in which this occurs are referred to as credit rationing periods; periods when creditors' risk tolerance and overall credit availability is low resulting in excess demand for loanable funds (Jaffee and Russell 1976; Stiglitz and Weiss 1981; Williamson 1986; Jaffee and Stiglitz 1990).

In contrast, when creditors' economic outlook is optimistic, their forecasted probability of borrower default decreases and their overall risk tolerance increases (Asea and Blomberg 1998). As a result, screening and monitoring efforts decline, the price of loans (e.g. interest rate) declines, credit standards become lax, and loans are extended to lower quality borrowers (Ruckes 2004). Periods in which this occurs are referred to as credit abundance periods; periods when creditors' risk tolerance and overall credit availability is high. Under such conditions, even poorly qualified borrowers obtain

credit when they otherwise would not (e.g. Rajan 1994; Black and de Meza 1994; Weinberg 1995).

Much of the activity both preceding and during the Financial Crisis of 2007-2009 corroborates the evidence cited above regarding the effect of varying investor risk tolerance. Richardson (2009) finds that much of the cause for the Financial Crisis can be attributed to the excessive risk-taking activities of financial institutions. One such activity was the exploitation of originate-to-distribute model of securitization (Richardson 2009), a process by which loans are packaged into securities and sold to investors. Cooley and Philippon (2009) discuss that there was a decline in the quality of loans[1] issued in the pre-crisis period, a consequence of the low interest rate / high liquidity environment of the time. Many non-prime loan assets were securitized into asset-backed securities (ABS) and then repackaged into collateralized debt obligations (CDOs). As much as 50% of these asset-backed securities remained in the banking system, effectively undermining the credit risk transfer process and leaving banks exposed to the inevitable default from non-prime borrowers (Jaffee, et al., 2009).

Another excessive risk-taking activity was the regulatory arbitrage undertaken by financial institutions in the form of off-balance sheet financing. The Bank Holding Company Act, as regulated by the Federal Deposit Insurance Corporation, requires that U.S. banks maintain a capital adequacy requirement of at least 4% Tier 1 equity capital

[1] Sub-prime mortgage loans received much of the media scrutiny surrounding the causes of the Financial Crisis. "Covenant-lite" loans were the commercial equivalent to sub-prime mortgages and showed marked increase during the pre-Crisis period (Richardson, 2009).

to risk-weighted assets[2]. This requirement effectively limits banks' credit risk exposure by reducing the amount of loans they can hold on their balance sheets. However, in the pre-crisis period banks arbitraged around this requirement by establishing asset-backed commercial paper (ABCP) conduits and special investment vehicles (SIVs) that enabled them to transfer loans off their balance sheets into shell companies in exchange for capital that they could further lend out to customers (see Acharya and Schnabl 2009). This increased bank leverage substantially while still meeting capital adequacy from a technical regulatory perspective. However, these off-balance sheet vehicles contained recourse requirements that forced financial institutions to take back the loans in the event of excessive loan write-offs. Since most of the loans transferred off-balance sheet were of poor quality, write-offs of these loans were inevitable and thus were transferred back to the financial institutions. With these loans now on-balance sheet, financial institutions were in breach (risk of breach) of the minimum Tier 1 capital regulatory requirement which resulted in disastrous consequences.

As outlined in Acharya et al. (2009b), the effects of poor lending standards and excessive leverage began to negatively impact the financial sector during the Financial Crisis of 2007-2009. Ownit Mortgage Solutions and New Century Financial, two major lenders in non-prime loans, filed for bankruptcy in December 2006 and April 2007, respectively. In June and July of 2007, Moody's and S&P downgraded several billion dollars of securities backed by subprime loans and put several CDO tranches on review

[2] Total qualifying capital must be 8% of risk-weighted assets. For details of the capital asset requirements see: http://www.fdic.gov/regulations/laws/rules/6000-2360.html#fdic6000appendixgtopart225sec3.

for a downgrade in credit rating. In August 2007, American Home Mortgage Lending Corp. files for bankruptcy and BNP Paribas suspended redemption of commercial paper from three of its SIVs which caused money markets to freeze. By mid-August of 2007, the volatility index which measures the degree of uncertainty in the capital markets grew to 3 times in February of the same year. TED spreads, an indicator of banks' willingness to lend, grew 4 times in first two weeks of August. Another indicator of banks' willingness to lend, the LIBOR-OIS spreads, grew 10 times wider over the summer of 2007. The remainder of 2007 was marked with announcements of large asset write-downs by major financial institutions such as Bear Stearns, Freddie Mac, Citibank, Merrill Lynch and UBS to name a few.

As a result of the above events, credit rationing ensued among financial institutions which was in sharp contrast to the credit abundance period just 3 years prior. Credit rationing within the financial sector was so rampant that, in the midst of large investment bank failures, the U.S. Federal Government passed the Troubled Asset Relief Program (TARP) on October 3rd, 2008 to stimulate credit markets and prevent financial collapse. Additionally, the Federal Reserve reduced the federal funds rate (FFR) to a target range between 0% and 0.25% as a means to reduce credit rationing. While the events both preceding and during the Financial Crisis were extreme examples of how creditors' risk tolerances vary over time, they do suggest that the role of disclosure in debt contracting can take on varying degrees of importance.

Given that creditors have greater uncertainty over debt repayment during periods of credit rationing, they are likely to seek assurances through greater disclosure

frequency. If creditors work directly with firms to obtain nonpublic information (e.g. through more frequent reporting of private financial information) then firms' decisions to voluntarily disclose more information publicly during periods of credit rationing may not have any marginal effect on their cost of debt capital. If, however, firms' voluntary disclosures partially subsidize creditors' cost of obtaining additional information (Lang and Lundholm 1993), then voluntary disclosures will likely matter more during periods of credit rationing. I argue that firms' voluntary disclosures are valued by creditors more when credit is rationed. Or, stated formally:

> **H1:** The effect of voluntary disclosure on firms' cost of debt capital is greater during periods of credit rationing.

2.4 The Influence of Firm Size During periods of Credit Rationing

Firm size can influence whether firms are able to obtain financing during tighter credit market conditions. Greenspan (2008) recalls that, during the credit rationing period of 1990-1991, "… small and midsize manufacturers and merchants all over America were finding it hard to get even routine business loans approved." (p. 117).

Prior theoretical literature documents this phenomenon by demonstrating that smaller firms are denied credit during periods of credit rationing because they lack sufficient collateral to provide creditors with assurance of debt repayment (Holmstrom and Tirole 1997; Tirole 2006)[3]. However, these studies also demonstrate that smaller firms are more likely to obtain debt financing if they can improve monitoring between themselves and the lender. If greater voluntary disclosure improves creditors' ability to monitor borrowers, then voluntary disclosure will matter more to creditors of smaller firms when credit is rationed. This conjecture is supported by the evidence found in prior literature that relatively large firms have more robust information environments than smaller firms (Collins et al. 1987; Lev and Penman 1990; Lang and Lundholm 1993; Frankel and Li 2004) and thus are not as likely to benefit from voluntary disclosure as smaller firms during periods of credit rationing.

To determine whether creditors react more to voluntary disclosure of smaller borrowers than larger borrowers during periods of credit rationing, I test the following hypothesis:

> **H2:** The effect of voluntary disclosure on firms' cost of debt capital is greater for smaller firms than larger firms during periods of credit rationing.

[3] See Appendix A for a derivation of the Holmstrom and Tirole (1997) model.

3. DATA AND METHODOLOGY

3.1 General Models

To test whether credit market conditions alter the effect of voluntary disclosure on firms' cost of debt capital, I use the following levels-model:

$$\text{Cost of debt capital} = f(\text{voluntary disclosure}, \Delta\text{credit market conditions}, \text{firm controls}) \quad (1)$$

While prior studies rely on levels-model tests, changes-models are stronger tests in that they are less subject to omitted variables bias (Woolridge 2000, p. 422). Thus, I also use the following model in this study:

$$\Delta\text{Cost of debt capital} = f(\Delta\text{voluntary disclosure}, \Delta\text{credit market conditions}, \Delta\text{firm controls}) \quad (2)$$

3.2 Cost of Debt Capital

To estimate Equations (1) and (2), I use credit ratings as one of my measures of firms' cost of debt capital. Prior research finds that credit ratings are associated with credit risk (e.g. Kaplan and Urwitz 1979; Ziebart and Reiter 1992) and encompass both pricing (e.g. interest charges) and non-pricing (e.g. debt covenant restrictiveness) attributes of firms' cost of debt capital (e.g. Holthausen and Leftwich 1986; Altman 1992). Data on firms' S&P domestic long-term issuer credit rating is obtained from Compustat (variable "splticrm" in the ADSPRATE dataset). Credit ratings are

converted into numeric scores where higher scores (i.e. high credit ratings) represent lower cost of debt capital (see Table 1). Scoring for *RATINGS1* follows the methodology used by Ahmed et al. (2002) where individual ratings are assigned a separate score. Scoring for *RATINGS2* and Ashbaugh-Skaife et al. (2006), where major categories (e.g. AAA, AA, A, etc.) are assigned a single score. Credit ratings are also delineated between investment- and speculative-grade where credit ratings of BBB- and higher are deemed investment grade and those lower than BBB- are deemed speculative grade (see Ashbaugh-Skaife et al. 2006; Frost 2007). Variable *RATINGS3* equals 1 for firms win an investment-grade credit rating, and zero otherwise. I include this measure because prior literature suggests that creditors are more sensitive to disclosure policies of firms that are rated just above or below the investment-/speculative-grade threshold (e.g. Ayers et al. 2010). This suggests that the effect of changes in voluntary disclosure may be stronger for firms that move into / out of investment-grade ratings.

TABLE 1

Credit Rating Scores

Credit Rating	*RATINGS1*	*RATINGS2*	*RATINGS3*
AAA	21	7	1
AA+	20	6	1
AA	19	6	1
AA-	18	6	1
A+	17	5	1
A	16	5	1
A-	15	5	1
BBB+	14	4	1
BBB	13	4	1
BBB-	12	4	1
BB+	11	3	0
BB	10	3	0
BB-	9	3	0
B+	8	2	0
B	7	2	0
B-	6	2	0
CCC+	5	1	0
CCC	4	1	0
CCC-	3	1	0
CC	2	1	0
C	1	1	0

Numeric scoring for *RATINGS1* follows Ahmed et a. (2002), and numeric scoring for *RATINGS2* and *RATINGS3* follows Ashbaugh-Skaife et al. (2006). Lower scores represent lower credit ratings and higher credit risk.

For my changes-model, Δ*RATINGS1*, Δ*RATINGS2*, and Δ*RATINGS3* represent the change in credit score from period *t* to period *t*+1 where positive (negative) changes represent a credit rating upgrade (downgrade), and going from negative changes in credit rating score to positive changes in credit rating score represents a general improvement in firms' credit ratings and a likely decrease their cost of debt capital.

My second measure of firms' cost of debt capital is firms' interest rate *INTRATE* is calculated as interest and related expense (variable "xint" in the Compustat FUNDA dataset) in period *t*+1divided by average total debt from the end of period *t* to the end of period *t*+1 (variables "dlc" plus "dltt" in the Compustat FUNDA dataset) multiplied by 100. My measure follows that of Francis et al. (2005) and Pittman and Fortin (2004). Pittman and Fortin (2004) suggest trimming this variable to eliminate outliers. As such, I restrict my levels-model measure of *INTRATE* to between zero and 30%, and my changes-model measure of Δ*INTRATE* to between -30% and 30%. These cut-off levels were chosen to be consistent with Pittman and Fortin (2004) and Francis et al. (2005).

The discrete categories of credit ratings are intended to measure credit risk which is a latent, continuous variable. The ranked levels of credit ratings differentiate between levels of credit risk, but I cannot assume uniform differences in credit risk between the levels of credit ratings or the scoring assigned to *RATINGS1*, *RATINGS2*, and *RATINGS3* (see Ahmed et al. 2002; Ashbaugh-Skaife et al. 2006; Ayers et al. 2010). Likewise, for my changes-models, Δ*RATINGS1*, Δ*RATINGS2*, and Δ*RATINGS3* identify changes in credit risk which is also a latent, continuous variable and thus represents increased / decreased credit risk. I cannot assume uniform differences between changes

in these credit rating scores. Thus, I estimate Equations (1) and (2) using ordinal logistic regression which treats levels and changes in credit rating scores as discrete. For Equations (1) and (2) which use *INTRATE* and Δ*INTRATE* as the dependent variable, respectively, I use ordinary least squares regression.

3.3 Voluntary Disclosure

My first measure of voluntary disclosure is earnings conference call disclosure frequency (*CC#*), which is calculated as the number of earnings conference call disclosures held during period *t*. Conference call data was obtained from BestCalls.com, which has since been acquired by NASDAQ. Changes in conference call disclosure frequency (Δ*CC#*) are calculated as the difference between the number of earnings conference calls in period *t* less the number of earnings conference calls in period *t*-1. Conference calls provide incremental information to required disclosures (Lang 1998), and prior literature demonstrates that more frequent conference calls reduce the information asymmetry component of firms' cost of capital (Tasker 1998; Frankel et al. 1999; Bushee et al. 2003; Brown et al. 2004). If creditors find greater conference call disclosure frequency useful in debt contracting, then I expect greater frequency in conference call disclosure frequency to result in a subsequent higher credit rating and a lower interest rate. Likewise, I expect positive changes in conference call disclosure frequency to result in a subsequent improvement in credit rating and reduction in interest rate. Furthermore, I expect these effects will be greater when credit is rationed suggesting that conference call disclosure is more important during periods of constrained credit. Additionally, I expect these effects will be greater for smaller firms

than larger firms during periods of credit rationing suggesting that smaller firms benefit more from greater conference call disclosure when credit is constrained.

My second measure of voluntary disclosure is earnings guidance disclosure frequency (*CIG#*), which is measured as the number of earnings guidance forecasts issued during period *t*. Earnings guidance data was obtained from First Call, which was decommissioned by Wharton Research Data Services in February of 2012. Changes in earnings guidance disclosure frequency (Δ*CIG#*) are calculated as the difference between the number of earnings guidance forecasts issued in period *t* less the number of earnings guidance forecasts issued in period *t*-1. Prior literature finds that managers who release earnings guidance reduce the information asymmetry component of firms' cost of capital (Coller and Yohn 1997; Lang and Lundholm 2000). Additionally, earnings guidance has been shown to mitigate litigation, reputational, and capital costs associated with future bad news (Skinner 1994; Kasznik and Lev 1995; Soffer et al. 2000). If creditors find greater earnings guidance disclosure frequency useful in debt contracting, then then I expect greater frequency in earnings guidance disclosure frequency to result in a subsequent higher credit rating and a lower interest rate. Likewise, I expect positive changes in earnings guidance disclosure frequency to result in a subsequent improvement in credit rating and reduction in interest rate. Furthermore, I expect these effects will be greater when credit is rationed suggesting that earnings guidance disclosure is more important during periods of constrained credit. Additionally, I expect these effects will be greater for smaller firms than larger firms during periods of credit

rationing suggesting that smaller firms benefit more from greater earnings guidance disclosure when credit is constrained.

3.4 Credit Market Conditions

I employ two measures of credit market conditions in my analyses. The first measure draws from the results of the Federal Reserve's Senior Loan Officer Opinion Survey. Schreft and Owens (1991), Berger and Udell (2004), and Lown and Morgan (2002 and 2006) find the results of the Senior Loan Officer Survey reflect credit market sentiment (e.g. optimism and pessimism) and follow a pattern of credit standard tightening before economic recessions and credit standard loosening before economic expansion. The survey is conducted approximately 4 times per year and consists of over 100 questions on creditor sentiment and lending policy changes. My first credit market condition variable, *SLOOS*, measures the net percentage of banks tightening commercial and industrial (C&I) lending standards. The figure reported by the Federal Reserve is calculated as the number of banks tightening their C&I lending standards less the number of banks easing their C&I lending standards, divided by the number of banks responding. I calculate the average of this reported figure over the 4 quarterly surveys to derive an annual net percentage of C&I credit standard tightening. The time-series trend in this figure is shown in Table 2.

TABLE 2

Time-series Measures of Credit Market Conditions

Year	*SLOOS*	Δ*SLOOS*	*KCFSI*	Δ*KCFSI*
1994	(12.4)		(0.888)	
1995	(5.6)	6.8	(0.799)	0.089
1996	(1.4)	4.3	(0.857)	(0.058)
1997	(6.3)	(5.0)	(0.608)	0.248
1998	7.8	14.1	0.093	0.701
1999	8.0	0.2	0.377	0.284
2000	28.3	20.3	0.666	0.289
2001	50.5	22.2	0.535	(0.131)
2002	28.0	(22.5)	0.424	(0.111)
2003	8.6	(19.4)	(0.178)	(0.602)
2004	(20.6)	(29.2)	(0.618)	(0.440)
2005	(18.3)	2.3	(0.649)	(0.032)
2006	(8.0)	10.3	(0.685)	(0.036)
2007	5.8	13.7	(0.133)	0.552
2008	57.2	51.5	2.325	2.458
2009	37.3	(19.9)	1.933	(0.393)
2010	(8.0)	(45.3)	0.025	(1.908)

Yearly measures of *SLOOS* and *KCFSI*. Changes in credit market conditions (Δ*SLOOS* and Δ*KCFSI*) are calculated as the value in the current period less the value in the prior period, where positive (negative) changes represent increases (decreases) over the prior year's value. Variables are defined in Appendix B.

While it is reasonable to view positive levels of net standard tightening as representing a periods of credit rationing, a declining but positive level of net standard tightening could reasonably be interpreted as a period of credit abundance of credit standard loosening. As such, the direction of change in *SLOOS* is deemed to identify credit market sentiment in this study where positive (negative) changes in *SLOOS* represent periods of credit rationing (abundance) and Δ*SLOOS* is used in both my levels- and changes-models.

My second measure of credit market conditions is an index derived from several individual credit rationing indicators. Sabry and Okongwu (2009) examine interest rate spreads both before and during the Credit Crisis of 2007-2009 and find sharp increases in the 2-Year Swap spread and TED spread in the month of August 2007, the beginning of the financial crisis (Acharya et al. 2009b; Brunnermeier 2009), followed by a period of high variation in the spreads and even further increases in September 2008. The Federal Reserve Bank of Kansas City compiles data on these and other credit market condition factors to create a composite index of credit market stress called the financial stress index. I use the Kansas City Financial Stress Index (*KCFSI*) as a measure of credit market conditions, where positive (negative) changes in the index (Δ*KCFSI*) indicate periods of credit rationing (abundance). Trends in the *KCFSI* are also shown in Table 2.

3.5 Control Variables

From Compustat I include numerous firm characteristics as control variables from prior literature that are associated with firms' cost of debt capital. Firm leverage (*DTA*) is the ratio of total debt to total assets at the end of period *t*. Firms with greater leverage are at greater risk of default and incur higher costs of debt capital (Kaplan and Urwitz 1979; Ziebart and Reiter 1992; Ogden 1987; Ashbaugh-Skaife et al. 2006). Firm size (*LNSIZE*) is measured by taking the natural log of 1 plus total assets at the end of period *t*. Large firms have greater resources available to service their debt and thus incur lower debt capital charges (Kaplan and Urwitz 1979; Ziebart and Reiter 1992; Ogden 1987; Ashbaugh-Skaife et al. 2006). Firm profitability (*ROA*) is the ratio of income before extraordinary items during period *t* to average total assets over the period *t*-1 to *t*. More profitable firms are better able to service their debt obligations and, as such, incur lower cost of debt capital (Kaplan and Urwitz 1979; Ziebart and Reiter 1992; Ogden 1987; Ashbaugh-Skaife et al. 2006). Interest coverage (*COV*) is the ratio of operating income before depreciation to interest costs for period *t*. Firms that are better able to meet debt service charges are at less risk of default and are charged a smaller risk premium (Kaplan and Urwitz 1979; Ziebart and Reiter 1992; Ashbaugh-Skaife et al. 2006). Capital intensity (*CAP*) is the ratio of gross property plant and equipment for period *t* divided by average total assets from period *t*-1 to period *t*. While prior literature finds that higher levels of *CAP* result in lower levels in firms' cost of debt capital (Ashbaugh-Skaife et al. 2006), it is unclear whether higher levels or an increase in *CAP* will results in a decrease in firms' cost of debt capital since less cash will be available to

service debt (see Ayers et al. 2010). As such I make no prediction of the direction of influence for *CAP*. Firms that experience a loss likely charged a higher cost of debt due to the greater risk of default (Ashbaugh-Skaife et al. 2006; Ayers et al. 2010). I create an indicator variable for loss firms (*LOSS*) equals 1 if income before extraordinary items is less than or equal to zero for period *t*. Firms with subordinated debt are considered to more risky due to the differential claims to assets by debt providers (Kaplan and Urwitz 1979; Ziebart and Reiter 1992; Ashbaugh-Skaife et al. 2006). I include an indicator variable (*SUB*) equal to 1 if a firm has subordinated debt at the end of period *t*. Changes in all control variables (Δ*CONTROLS*) are calculated as the difference between their measures in period *t* less their measures in period *t*-1. All variables are defined in Appendix B.

I also control for industry fixed effects using Fama and French's (1997) 17 industry classifications as firm membership in a particular industry will likely influence debt capital structure. I remove firms belonging to regulated utility and financial industries as these firms are highly leveraged and factors influencing their cost of debt capital are not likely to be consistent with firms in unregulated industries (Sengupta 1998; Pittman and Fortin 2004; Francis et al. 2005). I also control for time-series effects by including an indicator variable for the year of observation *t*.

4. SAMPLE SELECTION AND UNIVARIATE STATISTICS

4.1 Sample Selection

This section discusses the derivation of the samples used in my analyses. Because the years of coverage for my voluntary disclosure variables do not coincide, estimating a model that includes both conference call and earnings guidance disclosure data could potentially unnecessarily eliminate sample observations. Similarly, because I have more data on interest rates than data on credit ratings, requiring panel data to have both credit ratings and interest rates for each observation would potentially unnecessarily eliminate sample data. Thus, rather than construct a single sample that has both of my voluntary disclosure variables and both of my dependent variables I construct separate samples.

Data on credit ratings from Compustat consisted of 43,469 firm-year observations. After eliminating observations in regulated industries and observations

with missing data on control variables and disclosure variables, my sample sizes consisted of 7,564 (6,866) firm-year observations for my levels-model testing of the effects of conference call (earnings guidance) on credit ratings (see Panels A and B in Table 3). Using the same elimination procedure, my sample sizes consisted of 6,647 (6,079) firm-year observations for my changes-model testing of the effects of changes in conference call (earnings guidance) on changes in credit ratings (see Panels C and D in Table 3).

Data on interest rates from Compustat consisted of 141,359 firm-year observations. After eliminating observations in regulated industries and observations with missing data on control variables and disclosure variables, my sample sizes consisted of 18,665 (14,618) firm-year observations for my levels-model testing of the effects of conference call (earnings guidance) on interest rates (see Panels E and F in Table 3). Using the same elimination procedure, my sample sizes consisted of 15,042 (11,486) firm-year observations for my changes-model testing of the effects of changes in conference call (earnings guidance) on changes in credit ratings (see Panels C and D in Table 3).

TABLE 3

Sample Details

Panel A: Sample Selection for Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings

	Number of Observations
Total firm-year credit ratings for period	43,469
Less: unavailable data for control variables	(17,272)
Less: observations of firms in regulated industries	(2,561)
Less: unavailable conference call data	(15,982)
Total conference call observations for credit ratings levels-model testing	7,654

Panel B: Sample Selection for Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings

	Number of Observations
Total firm-year credit ratings for period	43,469
Less: unavailable data for control variables	(17,272)
Less: observations of firms in regulated industries	(2,561)
Less: unavailable earnings guidance data	(16,770)
Total earnings guidance observations for credit ratings levels-model testing	6,866

Panel C :Sample Selection for Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings

	Number of Observations
Total firm-year credit ratings for period	43,469
Less: unavailable data for year-over-year control variables	(18,009)
Less: observations of firms in regulated industries	(2,450)
Less: unavailable year-over-year conference call data	(16,363)
Total conference call observations for credit ratings changes-model testing	6,647

Panel D: Sample Selection for Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings

	Number of Observations
Total firm-year credit ratings for period	43,469
Less: unavailable data for year-over-year control variables	(18,009)
Less: observations of firms in regulated industries	(2,450)
Less: unavailable year-over-year earnings guidance data	(16,931)
Total earnings guidance observations for credit ratings changes-model testing	6,079

TABLE 3 (continued)

Panel E: Sample Selection for Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates

	Number of Observations
Total firm-year interest rates for period	141,359
Less: unavailable data for control variables	(48,565)
Less: observations of firms in regulated industries	(7,782)
Less: unavailable conference call data	(66,347)
Total conference call observations for interest rates levels-model testing	18,665

Panel F: Sample Selection for Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates

	Number of Observations
Total firm-year interest rates	141,359
Less: unavailable data for control variables	(48,565)
Less: observations of firms in regulated industries	(7,782)
Less: unavailable earnings guidance data	(70,394)
Total earnings guidance observations for interest rates levels-model testing	14,618

Panel G: Sample Selection for Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates

	Number of Observations
Total firm-year credit ratings	141,359
Less: unavailable data for year-over-year control variables	(57,868)
Less: observations of firms in regulated industries	(6,915)
Less: unavailable conference call data	(61,534)
Total conference call observations for interest rates changes-model testing	15,042

Panel H: Sample Selection for Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates

	Number of Observations
Total firm-year credit ratings	141,359
Less: unavailable data for year-over-year control variables	(57,868)
Less: observations of firms in regulated industries	(6,915)
Less: unavailable earnings guidance data	(65,090)
Total earnings guidance observations for interest rates changes-model testing	11,486

Panels A and B (C and D) detail the selection process for the levels- (changes-)model samples used in testing the effects of conference call and earnings guidance disclosure frequency on firms' credit ratings. Panels E and F (G and H) detail the selection process for levels- (changes-)model samples used in testing the effects of conference call and earnings guidance disclosure frequency on firms' interest rates.

4.2 Descriptive Statistics

Descriptive statistics for my separate levels- and changes-model samples are provided in Table 4. Individual Panels present correlation statistics for separate samples used in the study (see Table 3 for a description of how the separate samples are determined).Values of both levels and changes in my control variables and my voluntary disclosure variables are winzorized at the 1st and 99th percentiles to account for outliers.

The mean (median) level of *RATINGS1* for my levels-model testing of conference call disclosure frequency in Table 4, Panel A is 11.21 (11.00) which corresponds to a BB+ credit rating per my scoring methodology in Table 1. The mean (median) level of *RATINGS1* for my levels-model testing of earnings guidance disclosure frequency in Table 4, Panel B is 11.99 (12.00) which corresponds to a BBB- credit rating per my scoring methodology in Table 1. Panels C and D show mean and median values of approximately zero for Δ*RATINGS1* in both my conference call and earnings guidance samples which indicates that, on average, credit ratings change very little year-over-year.

The mean and median values for *INTRATE* are 7.55% and 6.87% for the conference call sample (Panel E) and 7.41% and 6.92% for the earnings guidance sample (Panel F). Mean and median values for Δ*INTRATE* in Panels G and H are approximately zero for the conference call and earnings guidance samples indicating that, on average, interest rates change very little year-over-year.

TABLE 4

Descriptive Statistics

Panel A: Univariate Statistics for Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
RATINGS1	7,654	11.21	3.45	9.00	11.00	14.00
RATINGS2	7,654	3.43	1.17	3.00	3.00	4.00
RATINGS3	7,654	0.46	0.50	0.00	0.00	1.00
Disclosure Variables						
CC#	7,654	3.33	1.11	3.00	4.00	4.00
CC# (smaller firm sample)	3,826	3.34	1.08	3.00	4.00	4.00
CC# (larger firm sample)	3,828	3.33	1.13	3.00	4.00	4.00
Credit Market Condition Variables						
Δ*SLOOS*	10	4.94	24.36	-19.35	6.29	20.33
Δ*KCFSI*	10	0.22	0.86	-0.13	-0.03	0.29
Control Variables						
DTA	7,654	0.34	0.20	0.20	0.31	0.44
LNSIZE	7,654	8.10	1.40	7.08	7.93	9.02
ROA	7,654	0.03	0.09	0.01	0.04	0.08
COV	7,654	12.13	22.36	3.12	6.23	12.16
CAP	7,654	0.60	0.39	0.28	0.53	0.87
LOSS	7,654	0.21	0.41	0.00	0.00	0.00
SUB	7,654	0.22	0.41	0.00	0.00	0.00

Panel B: Univariate Statistics for Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
RATINGS1	6,866	11.99	3.31	9.00	12.00	14.00
RATINGS2	6,866	3.68	1.13	3.00	4.00	4.00
RATINGS3	6,866	0.55	0.50	0.00	1.00	1.00
Disclosure Variables						
CIG#	6,866	5.27	4.07	2.00	4.00	8.00
CIG# (smaller firm sample)	3,429	4.72	3.87	2.00	4.00	7.00
CIG# (larger firm sample)	3,437	5.81	4.20	2.00	5.00	8.00
Credit Market Condition Variables						
Δ*SLOOS*	18	-0.57	22.33	-19.35	1.23	13.73
Δ*KCFSI*	18	0.02	0.82	-0.27	-0.05	0.28
Control Variables						
DTA	6,866	0.31	0.17	0.20	0.29	0.41
LNSIZE	6,866	8.08	1.32	7.13	7.98	8.96
ROA	6,866	0.04	0.08	0.02	0.05	0.08
COV	6,866	13.23	24.28	3.88	7.13	13.01
CAP	6,866	0.53	0.34	0.26	0.45	0.74
LOSS	6,866	0.16	0.37	0.00	0.00	0.00
SUB	6,866	0.19	0.39	0.00	0.00	0.00

TABLE 4 (continued)

Panel C : Univariate Statistics for Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
Δ*RATINGS1*	6,647	-0.14	0.82	0.00	0.00	0.00
Δ*RATINGS2*	6,647	-0.04	0.36	0.00	0.00	0.00
Δ*RATINGS3*	6,647	-0.01	0.18	0.00	0.00	0.00
Disclosure Variables						
Δ*CC#*	6,647	0.01	1.20	0.00	0.00	0.00
Δ*CC# (smaller firm sample)*	3,322	0.02	1.22	0.00	0.00	0.00
Δ*CC# (larger firm sample)*	3,325	0.00	1.18	0.00	0.00	0.00
Credit Market Condition Variables						
Δ*SLOOS*	9	5.47	25.77	-19.35	10.33	20.33
Δ*KCFSI*	9	0.22	0.91	-0.13	-0.04	0.29
Control Variables						
Δ*DTA*	6,647	0.00	0.09	-0.04	-0.01	0.03
Δ*LNSIZE*	6,647	0.08	0.23	-0.02	0.05	0.14
Δ*ROA*	6,647	-0.01	0.08	-0.02	0.00	0.02
Δ*COV*	6,647	-0.65	17.95	-1.11	0.27	1.78
Δ*CAP*	6,647	0.00	0.09	-0.02	0.01	0.04
Δ*LOSS*	6,647	0.01	0.41	0.00	0.00	0.00
Δ*SUB*	6,647	-0.01	0.22	0.00	0.00	0.00

Panel D: Univariate Statistics for Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
Δ*RATINGS1*	6,079	-0.13	0.79	0.00	0.00	0.00
Δ*RATINGS2*	6,079	-0.05	0.35	0.00	0.00	0.00
Δ*RATINGS3*	6,079	-0.01	0.19	0.00	0.00	0.00
Disclosure Variables						
Δ*CIG#*	6,079	0.33	3.29	-1.00	0.00	2.00
Δ*CIG# (smaller firm sample)*	3,035	0.28	3.17	-1.00	0.00	2.00
Δ*CIG# (larger firm sample)*	3,044	0.38	3.40	-1.00	0.00	2.00
Credit Market Condition Variables						
Δ*SLOOS*	16	0.28	23.55	-19.61	3.25	13.90
Δ*KCFSI*	16	0.06	0.87	-0.26	-0.03	0.29
Control Variables						
Δ*DTA*	6,079	0.00	0.08	-0.04	-0.01	0.03
Δ*LNSIZE*	6,079	0.08	0.21	-0.02	0.05	0.14
Δ*ROA*	6,079	-0.01	0.07	-0.02	0.00	0.02
Δ*COV*	6,079	-0.96	19.04	-1.46	0.15	1.69
Δ*CAP*	6,079	0.00	0.07	-0.02	0.01	0.03
Δ*LOSS*	6,079	0.02	0.40	0.00	0.00	0.00
Δ*SUB*	6,079	0.00	0.20	0.00	0.00	0.00

TABLE 4 (continued)

Panel E: Univariate Statistics for Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
INTRATE	18,665	7.55	4.28	5.12	6.87	8.95
Disclosure Variables						
CC#	18,665	3.19	1.21	2.00	4.00	4.00
CC# (smaller firm sample)	9,330	3.08	1.26	2.00	4.00	4.00
CC# (larger firm sample)	9,335	3.29	1.15	2.00	4.00	4.00
Credit Market Condition Variables						
Δ*SLOOS*	10	4.94	24.36	-19.35	6.29	20.33
Δ*KCFSI*	10	0.22	0.86	-0.13	-0.03	0.29
Control Variables						
DTA	18,665	0.26	0.22	0.10	0.23	0.37
LNSIZE	18,665	6.50	1.94	5.11	6.48	7.79
ROA	18,665	-0.02	0.21	-0.03	0.04	0.08
COV	18,665	20.59	172.61	2.13	6.40	16.39
CAP	18,665	0.52	0.38	0.21	0.42	0.75
LOSS	18,665	0.32	0.47	0.00	0.00	1.00
SUB	18,665	0.12	0.32	0.00	0.00	0.00

Panel F: Univariate Statistics for Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
INTRATE	14,618	7.41	3.87	5.22	6.92	8.73
Disclosure Variables						
CIG#	14,618	4.34	3.68	1.00	3.00	6.00
CIG# (smaller firm sample)	7,306	3.64	3.15	1.00	3.00	5.00
CIG# (larger firm sample)	7,312	5.04	4.02	2.00	4.00	7.00
Credit Market Condition Variables						
Δ*SLOOS*	19	-1.38	21.99	-19.35	0.20	13.73
Δ*KCFSI*	19	0.00	0.81	-0.39	-0.06	0.28
Control Variables						
DTA	14,618	0.25	0.18	0.11	0.23	0.35
LNSIZE	14,618	6.66	1.79	5.42	6.61	7.86
ROA	14,618	0.03	0.13	0.01	0.05	0.09
COV	14,618	34.80	143.55	3.84	8.35	19.84
CAP	14,618	0.48	0.33	0.22	0.40	0.68
LOSS	14,618	0.22	0.41	0.00	0.00	0.00
SUB	14,618	0.11	0.32	0.00	0.00	0.00

TABLE 4 (continued)

Panel G: Univariate Statistics for Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
Δ*INTRATE*	15,042	-0.17	4.47	-1.28	-0.12	0.89
Disclosure Variables						
Δ*CC#*	15,042	0.05	1.27	0.00	0.00	0.00
Δ*CC# (smaller firm sample)*	7,519	0.07	1.30	0.00	0.00	0.00
Δ*CC# (larger firm sample)*	7,523	0.02	1.23	0.00	0.00	0.00
Credit Market Condition Variables						
Δ*SLOOS*	9	5.47	25.77	-19.35	10.33	20.33
Δ*KCFSI*	9	0.22	0.91	-0.13	-0.04	0.29
Control Variables						
Δ*DTA*	15,042	0.01	0.11	-0.04	0.00	0.04
Δ*LNSIZE*	15,042	0.08	0.28	-0.04	0.06	0.17
Δ*ROA*	15,042	0.00	0.14	-0.03	0.00	0.03
Δ*COV*	15,042	-1.35	134.83	-2.49	0.36	3.75
Δ*CAP*	15,042	0.01	0.10	-0.02	0.01	0.04
Δ*LOSS*	15,042	0.01	0.42	0.00	0.00	0.00
Δ*SUB*	15,042	-0.01	0.18	0.00	0.00	0.00

Panel H: Univariate Statistics for Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates

Variable	N	Mean	Std Dev	Q1	Med	Q2
Dependent Variables						
Δ*INTRATE*	11,486	-0.07	3.86	-1.07	-0.07	0.86
Disclosure Variables						
Δ*CIG#*	11,486	0.35	3.06	-1.00	0.00	2.00
Δ*CIG# (smaller firm sample)*	5,739	0.31	2.83	-1.00	0.00	2.00
Δ*CIG# (larger firm sample)*	5,747	0.39	3.27	-1.00	0.00	2.00
Credit Market Condition Variables						
Δ*SLOOS*	17	0.16	22.80	-19.35	2.25	13.73
Δ*KCFSI*	17	0.04	0.85	-0.27	-0.04	0.28
Control Variables						
Δ*DTA*	11,486	0.00	0.09	-0.04	-0.01	0.03
Δ*LNSIZE*	11,486	0.09	0.24	-0.02	0.06	0.16
Δ*ROA*	11,486	-0.01	0.10	-0.03	0.00	0.02
Δ*COV*	11,486	-0.76	113.82	-2.75	0.17	2.97
Δ*CAP*	11,486	0.00	0.08	-0.02	0.01	0.04
Δ*LOSS*	11,486	0.03	0.41	0.00	0.00	0.00
Δ*SUB*	11,486	0.00	0.18	0.00	0.00	0.00

Variables are described in Appendix B. Changes in control variables and voluntary disclosure variables have been winzorized at the 1st and 99th percentile.

4.3 Correlation Statistics

Table 5 presents correlation statistics for all variables used in my levels- and changes-models. Individual Panels present correlation statistics for separate samples used in the study (see Table 3 for a description of how the separate samples are determined).

In Panels A through D, both levels and changes in conference call and earnings guidance disclosure frequency are positively and significantly correlated ($p \leq 0.10$) with *RATINGS1* suggesting that higher levels and positive changes in both conference call and earnings guidance disclosure frequency results in higher and improved credit ratings and likely a lower cost of debt capital. In Panels E through H, both levels and changes in conference call and earnings guidance disclosure frequency are negatively and significantly correlated ($p \leq 0.10$) with *INTRATE* suggesting that higher levels and positive changes in both conference call and earnings guidance disclosure frequency results in lower and reduced interest rate and likely a lower cost of debt capital.

TABLE 5

Correlations

Panel A: Correlation Statistics for Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	*RATINGS1*		**0.97**	**0.84**	0.01	**-0.03**	**-0.04**	**-0.50**	**0.63**	**0.49**	**0.34**	-0.01	**-0.45**	**-0.28**
(2)	*RATINGS2*	**0.97**		**0.84**	0.01	**-0.03**	**-0.04**	**-0.49**	**0.62**	**0.47**	**0.33**	-0.02	**-0.43**	**-0.27**
(3)	*RATINGS3*	**0.87**	**0.89**		0.00	-0.01	**-0.02**	**-0.43**	**0.54**	**0.35**	**0.26**	0.02	**-0.34**	**-0.33**
(4)	*CC#*	**0.03**	**0.03**	0.01		**-0.45**	**-0.50**	**-0.07**	**-0.03**	**0.07**	0.02	**-0.02**	**-0.06**	0.01
(5)	Δ*SLOOS*	**-0.03**	**-0.03**	-0.01	**-0.41**		**0.83**	**0.03**	**0.07**	**-0.04**	0.01	0.00	**0.04**	**-0.03**
(6)	Δ*KCFSI*	**-0.02**	**-0.02**	-0.02	**-0.41**	**0.67**		**0.03**	**0.09**	**-0.04**	**0.02**	0.01	**0.04**	**-0.05**
(7)	*DTA*	**-0.50**	**-0.49**	**-0.44**	**-0.09**	**0.05**	0.01		**-0.29**	**-0.36**	**-0.41**	**0.14**	**0.32**	**0.33**
(8)	*LNSIZE*	**0.62**	**0.60**	**0.55**	-0.01	**0.05**	**0.09**	**-0.29**		**0.19**	**0.17**	**0.02**	**-0.17**	**-0.19**
(9)	*ROA*	**0.53**	**0.51**	**0.41**	**0.07**	-0.01	**0.07**	**-0.40**	**0.18**		**0.34**	**-0.02**	**-0.70**	**-0.10**
(10)	*COV*	**0.67**	**0.65**	**0.55**	**0.07**	**-0.02**	**0.05**	**-0.70**	**0.31**	**0.74**		**-0.06**	**-0.21**	**-0.17**
(11)	*CAP*	**0.02**	0.02	**0.04**	-0.02	-0.01	-0.01	**0.13**	**0.04**	**-0.02**	-0.02		**0.05**	**-0.04**
(12)	*LOSS*	**-0.46**	**-0.44**	**-0.34**	**-0.07**	**0.06**	**-0.02**	**0.28**	**-0.16**	**-0.71**	**-0.52**	**0.04**		**0.08**
(13)	*SUB*	**-0.29**	**-0.29**	**-0.33**	0.01	**-0.02**	**-0.05**	**0.34**	**-0.20**	**-0.17**	**-0.32**	**-0.06**	**0.08**	

Panel B: Correlation Statistics for Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	*RATINGS1*		**0.97**	**0.82**	**0.16**	-0.01	-0.01	**-0.42**	**0.62**	**0.44**	**0.28**	**0.08**	**-0.36**	**-0.30**
(2)	*RATINGS2*	**0.97**		**0.83**	**0.15**	-0.01	0.00	**-0.42**	**0.60**	**0.43**	**0.27**	**0.06**	**-0.35**	**-0.29**
(3)	*RATINGS3*	**0.86**	**0.89**		**0.13**	0.00	0.00	**-0.39**	**0.52**	**0.32**	**0.21**	**0.10**	**-0.28**	**-0.35**
(4)	*CIG#*	**0.16**	**0.16**	**0.13**		**-0.10**	**-0.07**	**-0.14**	**0.20**	**0.15**	**0.12**	**-0.08**	**-0.15**	**-0.09**
(5)	Δ*SLOOS*	-0.01	-0.01	0.00	**-0.11**		**0.85**	**0.07**	-0.02	**-0.03**	**-0.04**	0.01	**0.04**	0.01
(6)	Δ*KCFSI*	**0.02**	**0.02**	0.02	**-0.17**	**0.71**		**0.06**	-0.01	**-0.04**	**-0.04**	0.01	**0.04**	0.01
(7)	*DTA*	**-0.41**	**-0.40**	**-0.37**	**-0.14**	**0.08**	**0.06**		**-0.25**	**-0.29**	**-0.42**	**0.09**	**0.22**	**0.33**
(8)	*LNSIZE*	**0.61**	**0.59**	**0.54**	**0.23**	**-0.02**	**-0.02**	**-0.23**		**0.15**	**0.12**	0.02	**-0.14**	**-0.16**
(9)	*ROA*	**0.48**	**0.46**	**0.37**	**0.20**	-0.02	**0.03**	**-0.35**	**0.14**		**0.31**	**-0.02**	**-0.67**	**-0.12**
(10)	*COV*	**0.61**	**0.58**	**0.51**	**0.24**	**-0.06**	**-0.02**	**-0.69**	**0.26**	**0.71**		**-0.05**	**-0.17**	**-0.16**
(11)	*CAP*	**0.12**	**0.11**	**0.13**	**-0.10**	0.02	0.01	**0.07**	**0.04**	-0.01	**0.02**		**0.04**	**-0.07**
(12)	*LOSS*	**-0.36**	**-0.35**	**-0.28**	**-0.16**	**0.04**	0.00	**0.19**	**-0.13**	**-0.63**	**-0.44**	**0.03**		**0.07**
(13)	*SUB*	**-0.32**	**-0.32**	**-0.35**	**-0.10**	0.02	0.00	**0.33**	**-0.18**	**-0.20**	**-0.35**	**-0.09**	**0.07**	

TABLE 5 (continued)

Panel C : Correlation Statistics for Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	Δ*RATINGS1*		**0.73**	**0.41**	**0.04**	**-0.10**	**-0.10**	**-0.23**	**0.15**	**0.25**	**0.06**	**-0.11**	**-0.19**	0.00
(2)	Δ*RATINGS2*	**0.66**		**0.53**	**0.05**	**-0.08**	**-0.08**	**-0.18**	**0.13**	**0.19**	**0.05**	**-0.10**	**-0.14**	0.01
(3)	Δ*RATINGS3*	**0.35**	**0.52**		0.01	-0.01	-0.02	**-0.06**	**0.07**	**0.07**	**0.05**	**-0.04**	**-0.07**	0.00
(4)	Δ*CC#*	**0.04**	**0.05**	0.02		**-0.33**	**-0.57**	**-0.08**	**0.09**	**0.06**	-0.01	**-0.05**	**-0.05**	0.01
(5)	Δ*SLOOS*	**-0.08**	**-0.07**	-0.01	**-0.21**		**0.85**	**0.16**	**-0.04**	**-0.18**	**-0.07**	**0.09**	**0.14**	0.00
(6)	Δ*KCFSI*	**-0.05**	**-0.04**	-0.01	**-0.39**	**0.71**		**0.16**	**-0.09**	**-0.16**	**-0.04**	**0.12**	**0.12**	0.00
(7)	Δ*DTA*	**-0.25**	**-0.18**	**-0.08**	**-0.09**	**0.19**	**0.17**		**0.09**	**-0.33**	**-0.24**	**0.07**	**0.17**	**0.05**
(8)	Δ*LNSIZE*	**0.18**	**0.15**	**0.08**	**0.08**	**-0.05**	**-0.04**	0.00		**0.13**	**-0.10**	**-0.53**	**-0.07**	**0.08**
(9)	Δ*ROA*	**0.25**	**0.19**	**0.09**	**0.05**	**-0.20**	**-0.11**	**-0.35**	**0.09**		**0.17**	**-0.22**	**-0.52**	-0.01
(10)	Δ*COV*	**0.24**	**0.18**	**0.11**	0.00	**-0.17**	**-0.12**	**-0.36**	**0.07**	**0.49**		0.01	**-0.09**	**-0.02**
(11)	Δ*CAP*	**-0.10**	**-0.09**	**-0.04**	**-0.02**	**0.09**	**0.05**	**0.05**	**-0.57**	**-0.13**	**-0.05**		**0.12**	**-0.03**
(12)	Δ*LOSS*	**-0.19**	**-0.14**	**-0.07**	**-0.06**	**0.14**	**0.09**	**0.20**	**-0.10**	**-0.55**	**-0.25**	**0.11**		0.00
(13)	Δ*SUB*	0.00	0.01	0.00	0.00	0.01	0.00	**0.05**	**0.05**	**-0.02**	**-0.05**	-0.02	0.00	

Panel D: Correlation Statistics for Changes-model Testing of the Effects of Conference Earnings Guidance Frequency on Credit Ratings

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	Δ*RATINGS1*		**0.74**	**0.47**	**0.03**	**-0.13**	**-0.11**	**-0.21**	**0.13**	**0.24**	**0.05**	**-0.08**	**-0.20**	**-0.04**
(2)	Δ*RATINGS2*	**0.65**		**0.60**	0.02	**-0.08**	**-0.06**	**-0.16**	**0.11**	**0.17**	**0.04**	**-0.06**	**-0.14**	-0.02
(3)	Δ*RATINGS3*	**0.39**	**0.59**		**0.02**	**-0.05**	**-0.04**	**-0.08**	**0.05**	**0.07**	**0.03**	-0.02	**-0.06**	**-0.02**
(4)	Δ*CIG#*	**0.02**	0.02	0.02		**0.03**	-0.01	-0.02	**0.07**	**0.05**	0.01	**-0.04**	**-0.06**	**-0.03**
(5)	Δ*SLOOS*	**-0.13**	**-0.09**	**-0.05**	**0.05**		**0.86**	**0.15**	0.00	**-0.16**	**-0.07**	**0.06**	**0.12**	**0.05**
(6)	Δ*KCFSI*	**-0.10**	**-0.06**	**-0.04**	-0.01	**0.72**		**0.14**	**-0.02**	**-0.14**	**-0.05**	**0.08**	**0.10**	**0.04**
(7)	Δ*DTA*	**-0.23**	**-0.16**	**-0.09**	-0.02	**0.18**	**0.19**		**0.20**	**-0.30**	**-0.22**	**-0.03**	**0.17**	**0.08**
(8)	Δ*LNSIZE*	**0.15**	**0.12**	**0.07**	**0.08**	**-0.02**	**0.02**	**0.13**		**0.12**	**-0.06**	**-0.54**	**-0.08**	**0.06**
(9)	Δ*ROA*	**0.26**	**0.18**	**0.10**	**0.05**	**-0.18**	**-0.09**	**-0.32**	**0.06**		**0.18**	**-0.20**	**-0.58**	**-0.02**
(10)	Δ*COV*	**0.25**	**0.18**	**0.12**	**0.04**	**-0.17**	**-0.14**	**-0.36**	**0.04**	**0.49**		-0.02	**-0.10**	**-0.02**
(11)	Δ*CAP*	**-0.08**	**-0.06**	**-0.02**	**-0.03**	**0.08**	**0.04**	**-0.06**	**-0.57**	**-0.10**	**-0.05**		**0.12**	**-0.02**
(12)	Δ*LOSS*	**-0.20**	**-0.14**	**-0.06**	**-0.05**	**0.12**	**0.07**	**0.20**	**-0.12**	**-0.56**	**-0.26**	**0.12**		**0.03**
(13)	Δ*SUB*	**-0.05**	-0.02	**-0.02**	**-0.03**	**0.05**	**0.05**	**0.07**	**0.03**	**-0.04**	**-0.07**	-0.01	**0.03**	

TABLE 5 (continued)

Panel E: Correlation Statistics for Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	*INTRATE*		**-0.08**	**0.02**	-0.01	-0.01	**-0.20**	**-0.19**	**-0.06**	0.00	**0.18**	**0.07**
(2)	*CC#*	**-0.08**		**-0.38**	**-0.43**	**-0.04**	**0.11**	**0.12**	**0.05**	**0.02**	**-0.10**	**0.02**
(3)	Δ*SLOOS*	**0.02**	**-0.35**		**0.82**	**0.04**	**0.05**	**-0.03**	0.00	**-0.02**	**0.03**	**-0.03**
(4)	Δ*KCFSI*	**0.04**	**-0.38**	**0.65**		**0.04**	**0.07**	-0.01	**0.02**	0.00	**0.02**	**-0.03**
(5)	*DTA*	**0.04**	**-0.04**	**0.04**	**0.03**		**0.17**	**-0.09**	**-0.11**	**0.20**	**0.09**	**0.31**
(6)	*LNSIZE*	**-0.17**	**0.11**	**0.04**	**0.07**	**0.28**		**0.38**	**0.07**	**0.16**	**-0.33**	**0.11**
(7)	*ROA*	**-0.19**	**0.08**	**-0.02**	**0.04**	**-0.13**	**0.30**		**0.33**	**0.09**	**-0.66**	**0.04**
(8)	*COV*	**-0.27**	**0.11**	**-0.04**	**0.01**	**-0.37**	**0.24**	**0.77**		0.01	**-0.25**	**-0.03**
(9)	*CAP*	**0.04**	**0.03**	**-0.02**	**-0.04**	**0.23**	**0.19**	**0.09**	**0.08**		**-0.07**	**0.02**
(10)	*LOSS*	**0.17**	**-0.10**	**0.04**	**-0.01**	**0.02**	**-0.34**	**-0.81**	**-0.66**	**-0.10**		0.00
(11)	*SUB*	**0.15**	**0.02**	**-0.02**	**-0.04**	**0.31**	**0.12**	**-0.06**	**-0.16**	0.01	0.00	

Panel F: Correlation Statistics for Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	*INTRATE*		**-0.16**	**0.04**	0.00	**-0.05**	**-0.21**	**-0.14**	**-0.07**	0.00	**0.14**	**0.09**
(2)	*CIG#*	**-0.21**		**-0.06**	**-0.01**	**-0.03**	**0.32**	**0.15**	**0.04**	**-0.03**	**-0.17**	**-0.03**
(3)	Δ*SLOOS*	**0.05**	**-0.06**		**0.80**	**0.06**	**0.02**	**-0.03**	**-0.03**	-0.01	**0.03**	-0.01
(4)	Δ*KCFSI*	**0.11**	**-0.13**	**0.64**		**0.05**	**0.04**	0.00	-0.01	**-0.02**	**0.02**	**-0.01**
(5)	*DTA*	**0.03**	-0.01	**0.06**	**0.06**		**0.19**	**-0.10**	**-0.25**	**0.15**	**0.06**	**0.33**
(6)	*LNSIZE*	**-0.19**	**0.34**	0.01	**-0.01**	**0.25**		**0.23**	**-0.05**	**0.10**	**-0.23**	**0.08**
(7)	*ROA*	**-0.17**	**0.17**	**-0.02**	**0.03**	**-0.20**	**0.14**		**0.25**	**0.04**	**-0.69**	**-0.03**
(8)	*COV*	**-0.27**	**0.19**	**-0.06**	**-0.02**	**-0.55**	**0.06**	**0.70**		**-0.06**	**-0.16**	**-0.07**
(9)	*CAP*	**0.05**	**-0.05**	0.00	-0.01	**0.16**	**0.11**	**0.03**	0.01		**-0.03**	**-0.03**
(10)	*LOSS*	**0.14**	**-0.17**	**0.04**	0.00	**0.03**	**-0.23**	**-0.72**	**-0.52**	**-0.05**		**0.03**
(11)	*SUB*	**0.16**	**-0.03**	0.00	-0.01	**0.31**	**0.09**	**-0.12**	**-0.26**	**-0.04**	**0.03**	

TABLE 5 (continued)

Panel G: Correlation Statistics for Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	Δ*INTRATE*		**-0.03**	**-0.04**	**-0.03**	-0.01	**-0.05**	**-0.02**	0.00	0.01	**0.02**	0.00
(2)	Δ*CC#*	**-0.02**		**-0.30**	**-0.54**	**-0.06**	**0.08**	**0.04**	0.00	**-0.03**	**-0.05**	0.01
(3)	Δ*SLOOS*	**-0.12**	**-0.19**		**0.85**	**0.11**	**-0.03**	**-0.14**	**-0.04**	**0.09**	**0.11**	-0.01
(4)	Δ*KCFSI*	**-0.04**	**-0.37**	**0.71**		**0.11**	**-0.06**	**-0.11**	**-0.02**	**0.10**	**0.10**	-0.01
(5)	Δ*DTA*	**-0.02**	**-0.08**	**0.14**	**0.12**		0.01	**-0.24**	**-0.05**	**0.10**	**0.13**	**0.06**
(6)	Δ*LNSIZE*	**-0.03**	**0.07**	**-0.04**	**-0.01**	0.00		**0.22**	**0.05**	**-0.54**	**-0.08**	**0.05**
(7)	Δ*ROA*	**-0.02**	**0.05**	**-0.17**	**-0.11**	**-0.28**	**0.15**		**0.13**	**-0.24**	**-0.43**	0.00
(8)	Δ*COV*	**0.02**	**0.02**	**-0.13**	**-0.11**	**-0.24**	**0.07**	**0.45**		**-0.04**	**-0.09**	-0.01
(9)	Δ*CAP*	0.00	**-0.02**	**0.09**	**0.04**	**0.07**	**-0.58**	**-0.19**	**-0.09**		**0.12**	**-0.02**
(10)	Δ*LOSS*	**0.03**	**-0.05**	**0.11**	**0.08**	**0.17**	**-0.11**	**-0.54**	**-0.28**	**0.13**		0.01
(11)	Δ*SUB*	**0.01**	0.01	-0.01	-0.01	**0.05**	**0.03**	**-0.01**	**-0.03**	**-0.01**	0.01	

Panel H: Correlation Statistics for Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	Δ*INTRATE*		**-0.03**	**-0.06**	**-0.03**	**-0.03**	**-0.04**	**-0.03**	**0.02**	0.01	**0.02**	0.01
(2)	Δ*CIG#*	**-0.04**		**0.04**	-0.01	**-0.03**	**0.08**	**0.03**	0.01	**-0.05**	**-0.05**	**-0.02**
(3)	Δ*SLOOS*	**-0.12**	**0.06**		**0.82**	**0.13**	-0.01	**-0.14**	**-0.05**	**0.06**	**0.11**	0.01
(4)	Δ*KCFSI*	**-0.03**	-0.01	**0.66**		**0.13**	**-0.03**	**-0.11**	**-0.04**	**0.06**	**0.09**	0.00
(5)	Δ*DTA*	**-0.03**	**-0.02**	**0.15**	**0.17**		**0.17**	**-0.25**	**-0.13**	**-0.03**	**0.16**	**0.08**
(6)	Δ*LNSIZE*	**-0.04**	**0.10**	**-0.02**	**0.03**	**0.13**		**0.16**	0.01	**-0.57**	**-0.09**	**0.04**
(7)	Δ*ROA*	**-0.03**	**0.04**	**-0.15**	**-0.08**	**-0.30**	**0.11**		**0.15**	**-0.23**	**-0.53**	**-0.02**
(8)	Δ*COV*	**0.04**	**0.04**	**-0.14**	**-0.13**	**-0.33**	**0.06**	**0.48**		**-0.04**	**-0.09**	0.00
(9)	Δ*CAP*	**0.02**	**-0.04**	**0.06**	**0.03**	**-0.04**	**-0.58**	**-0.16**	**-0.08**		**0.14**	-0.01
(10)	Δ*LOSS*	**0.03**	**-0.05**	**0.11**	**0.08**	**0.19**	**-0.13**	**-0.57**	**-0.29**	**0.14**		**0.03**
(11)	Δ*SUB*	**0.02**	**-0.02**	0.01	**0.02**	**0.07**	**0.03**	**-0.04**	**-0.05**	-0.01	**0.03**	

Pearson (Spearman) correlations are above (below) the diagonal. Bolded coefficients are significant at $p < 0.10$. Variables are defined in Appendix B.

5. RESULTS

5.1 Analysis of the Effects of Voluntary Disclosure on Credit Ratings Across Credit Market Conditions

Where levels and changes in *RATINGS1*, *RATINGS2*, and *RATINGS3* are used as the dependent variable, Equations (1) and (2) are estimated using ordinal logistic regression. For my levels-model, positive (negative) coefficients are interpreted as an increase (decrease) in the odds of a higher credit rating. For my changes-model, positive (negative) coefficients are interpreted as an increase (decrease) in the odds of a credit rating improvement. All models include year and industry fixed effects, and estimates are based on Roger's (1993) corrected standard errors clustered by firm. Coefficients are reported in log-odds format, and the percent change in the odds ratio is also reported for the coefficients of the main and interaction effects of my voluntary disclosure variables. Results from levels-model testing of the effects of voluntary disclosure on credit ratings across credit market conditions are shown in Sections 5.1.1 and 5.1.2. Results from changes-model testing of the effects of voluntary disclosure on credit ratings across credit market conditions are shown in Sections 5.1.3 and 5.1.4.

5.1.1 Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Table 6, Panel A examines the effect of conference call disclosure frequency (*CC#*) on firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that greater conference call disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater during periods of credit rationing. The coefficients for the main effect *CC#* are positive but insignificant across all models. The coefficients for the interaction term *CC#*×Δ*SLOOS* indicate whether the effect of conference call disclosure frequency on firms' credit rating scores varies with changes in the senior loan officer survey. However, the coefficients for all interaction terms are insignificant across all models and provide no support for H1.

Table 6, Panel B examines the effect of conference call disclosure frequency (*CC#*) on firms' credit rating scores across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*). I expect that greater conference call disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater during periods of credit rationing. The coefficients for the main effect *CC#* are positive but insignificant across all models. The coefficients for the interaction term *CC#*×Δ*KCFSI* indicate whether the effect of conference call disclosure frequency on firms' credit rating scores varies with changes in the financial stress index. However, the coefficients for all interaction terms are insignificant across all models and provide no support for H1.

TABLE 6

Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *RATINGS1*		(2) *RATINGS2*		(3) *RATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CC#	+	0.028	3.1%	0.038	4.3%	0.042	4.8%
		(0.79)		(1.00)		(0.71)	
CC# × ΔSLOOS	+	-0.000	-0.0%	-0.001	-0.1%	-0.001	-0.1%
		(-0.11)		(-0.44)		(-0.25)	
DTA	−	-3.190***		-3.617***		-5.363***	
		(-11.19)		(-11.70)		(-9.83)	
LNSIZE	+	1.055***		1.079***		1.266***	
		(23.42)		(22.88)		(18.66)	
ROA	+	7.973***		8.679***		9.409***	
		(13.18)		(11.85)		(6.82)	
COV	+	0.009***		0.007***		-0.001	
		(2.92)		(2.41)		(-0.32)	
CAP	?	0.539***		0.516***		0.841***	
		(4.16)		(3.77)		(3.75)	
LOSS	−	-1.199***		-1.166***		-1.251***	
		(-11.39)		(-10.04)		(-6.79)	
SUB	−	-0.567***		-0.605***		-1.592***	
		(-6.21)		(-6.03)		(-9.38)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		7,654		7,654		7,654	
(Pseudo) R^2		0.21		0.32		0.49	

TABLE 6 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *RATINGS1*		(2) *RATINGS2*		(3) *RATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CC#	+	0.024	2.7%	0.034	3.8%	0.040	4.5%
		(0.71)		(0.91)		(0.70)	
CC# × ΔKCFSI	+	0.045	5.1%	0.024	2.7%	-0.014	-1.5%
		(0.97)		(0.46)		(-0.16)	
DTA	–	-3.192***		-3.618***		-5.363***	
		(-11.20)		(-11.70)		(-9.83)	
LNSIZE	+	1.055		1.079***		1.266***	
		(23.41)		(22.87)		(18.65)	
ROA	+	7.973***		8.678***		9.406***	
		(13.17)		(11.84)		(6.81)	
COV	+	0.009***		0.007***		-0.001	
		(2.91)		(2.41)		(-0.32)	
CAP	?	0.540***		0.517***		0.841***	
		(4.17)		(3.78)		(3.75)	
LOSS	–	-1.200***		-1.166***		-1.252***	
		(-11.39)		(-10.04)		(-6.79)	
SUB	–	-0.567***		-0.605***		-1.592***	
		(-6.21)		(-6.03)		(-9.38)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		7,654		7,654		7,654	
(Pseudo) R^2		0.21		0.32		0.49	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in conference call disclosure frequency.

5.1.2 Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Table 7, Panel A examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that greater earnings guidance disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater during periods of credit rationing. The coefficients for the main effect *CIG#* are positive and significant ($p \leq 0.01$) across all models which suggests that, in terms of the percent change in the odds ratio, a one standard deviation increase in earnings guidance disclosure frequency increases the odds of a higher credit rating score between 17.7% and 22.6%. The coefficients for the interaction term *CIG#*×Δ*SLOOS* indicate whether the effect of earnings guidance disclosure frequency on firms' credit rating scores varies with changes in the senior loan officer survey. In Model 3, the coefficient for the interaction term is significant ($p \leq 0.10$) suggesting that a one standard deviation increase in earnings guidance disclosure frequency increases the odds of going from a speculative-grade credit rating to an investment-grade credit rating by an additional 0.4% when credit is rationed which provides some support for H1.

TABLE 7

Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *RATINGS1*		(2) *RATINGS2*		(3) *RATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CIG#	+	0.050***	22.6%	0.050***	22.6%	0.040***	17.7%
		(4.42)		(4.22)		(2.49)	
CIG# × ΔSLOOS	+	-0.000	0.0%	0.000	0.0%	0.001*	0.4%
		(-0.00)		(0.85)		(1.61)	
DTA	−	-3.599***		-3.825***		-5.068***	
		(-9.82)		(-9.84)		(-8.87)	
LNSIZE	+	1.161***		1.174***		1.387***	
		(21.16)		(20.40)		(16.05)	
ROA	+	9.722***		10.111***		11.093***	
		(11.89)		(10.84)		(7.33)	
COV	+	0.005**		0.005*		-0.000	
		(1.69)		(1.64)		(-0.04)	
CAP	?	0.987***		0.974***		1.392***	
		(5.94)		(5.47)		(5.16)	
LOSS	−	-0.712***		-0.680***		-0.648***	
		(-6.16)		(-5.27)		(-3.26)	
SUB	−	-0.777***		-0.827***		-1.732***	
		(-7.39)		(-6.95)		(-9.52)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		6,866		6,866		6,866	
(Pseudo) R^2		0.21		0.32		0.48	

TABLE 7 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *RATINGS1*		(2) *RATINGS2*		(3) *RATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CIG#	+	0.050***	22.6%	0.049***	22.1%	0.039***	17.2%
		(4.44)		(4.20)		(2.41)	
CIG# × ΔKCFSI	+	-0.000	0.0%	0.004	1.6%	0.015*	6.3%
		(-0.01)		(0.75)		(1.60)	
DTA	–	-3.599***		-3.824***		-5.066***	
		(-9.82)		(-9.84)		(-8.86)	
LNSIZE	+	1.161***		1.174***		1.387***	
		(21.16)		(20.41)		(16.05)	
ROA	+	9.722***		10.108***		11.082***	
		(11.89)		(10.84)		(7.32)	
COV	+	0.005**		0.005*		-0.000	
		(1.69)		(1.64)		(-0.04)	
CAP	?	0.987***		0.974***		1.390***	
		(5.94)		(5.47)		(5.16)	
LOSS	–	-0.712***		-0.680***		-0.648***	
		(-6.16)		(-5.27)		(-3.26)	
SUB	–	-0.777***		-0.827***		-1.733***	
		(-7.39)		(-6.96)		(-9.52)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		6,866		6,866		6,866	
(Pseudo) R^2		0.21		0.316		0.478	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in earnings guidance disclosure frequency.

Table 7, Panel B examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' credit rating scores across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*). I expect that greater earnings guidance disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater during periods of credit rationing. The coefficients for the main effect *CIG#* are positive and significant ($p \leq 0.01$) across all models which suggests that, in terms of the percent change in the odds ratio, a one standard deviation increase in earnings guidance disclosure frequency increases the odds of a higher credit rating score between 17.2% and 22.6%. The coefficients for the interaction term *CIG#*×Δ*KCFSI* indicate whether the effect of earnings guidance disclosure frequency on firms' credit rating scores varies with changes in the financial stress index. In Model 3, the coefficient for the interaction term is significant ($p \leq 0.10$) suggesting that a one standard deviation increase in earnings guidance disclosure frequency increases the odds of going from a speculative-grade credit rating to an investment-grade credit rating by an additional 6.3% when credit is rationed which provides some support for H1.

5.1.3 Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Table 8, Panel A examines the effect of changes in conference call disclosure frequency (Δ*CC#*) on subsequent changes in firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that an increase in conference call disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater during periods of credit rationing. In Model 2, the coefficient for the main effect Δ*CC#* is positive and significant ($p \leq 0.10$) which suggests that, in terms of the percent change in the odds ratio, a one standard deviation increase in the change in conference call disclosure frequency increases the odds of an improved credit rating score by 11%. The coefficients for the interaction term Δ*CC#*×Δ*SLOOS* indicate whether the effect of changes in conference call disclosure frequency on subsequent changes in firms' credit rating scores varies with changes in the senior loan officer survey. However, the coefficients for all interaction terms are insignificant across all models and provide no support for H1.

TABLE 8

Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *ΔRATINGS1*		(2) *ΔRATINGS2*		(3) *ΔRATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CC#*	+	0.028	3.4%	0.087*	11.0%	0.031	3.8%
		(0.74)		(1.58)		(0.30)	
Δ*CC#* × Δ*SLOOS*	+	-0.001	-0.1%	-0.003	-0.4%	0.004	0.5%
		(-0.58)		(-1.31)		(1.22)	
Δ*DTA*	–	-4.798***		-4.436***		-2.381***	
		(-13.08)		(-9.34)		(-3.92)	
Δ*LNSIZE*	+	1.412***		1.223***		1.365***	
		(8.18)		(6.05)		(5.00)	
Δ*ROA*	+	2.814***		2.380***		1.074*	
		(5.34)		(3.98)		(1.30)	
Δ*COV*	+	0.000		0.002		0.008***	
		(0.29)		(1.15)		(3.12)	
Δ*CAP*	?	0.862**		-0.109		0.483	
		(2.10)		(-0.21)		(0.62)	
Δ*LOSS*	–	-0.537***		-0.455***		-0.541***	
		(-6.55)		(-3.99)		(-2.88)	
Δ*SUB*	–	0.039		0.130		-0.086	
		(0.34)		(0.79)		(-0.30)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		6,647		6,647		6,647	
(Pseudo) R^2		0.06		0.08		0.04	

TABLE 8 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *ΔRATINGS1*		(2) *ΔRATINGS2*		(3) *ΔRATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CC#*	+	0.021	2.6%	0.070*	8.8%	0.039	4.8%
		(0.59)		(1.30)		(0.37)	
Δ*CC#* × Δ*KCFSI*	+	0.004	0.5%	-0.023	-2.7%	0.133**	17.4%
		(0.09)		(-0.37)		(1.94)	
Δ*DTA*	–	-4.800***		-4.441***		-2.374***	
		(-13.08)		(-9.34)		(-3.91)	
Δ*LNSIZE*	+	1.413***		1.222***		1.370***	
		(8.18)		(6.04)		(5.00)	
Δ*ROA*	+	2.813***		2.365***		1.109*	
		(5.34)		(3.95)		(1.34)	
Δ*COV*	+	0.000		0.002		0.008***	
		(0.29)		(1.13)		(3.18)	
Δ*CAP*	?	0.866**		-0.107		0.486	
		(2.11)		(-0.20)		(0.62)	
Δ*LOSS*	–	-0.537***		-0.457***		-0.536***	
		(-6.56)		(-4.01)		(-2.85)	
Δ*SUB*	–	0.039		0.128		-0.085	
		(0.34)		(0.78)		(-0.30)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		6,647		6,647		6,647	
(Pseudo) R^2		0.06		0.08		0.04	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in the change in conference call disclosure frequency.

Table 8, Panel B examines the effect of changes in conference call disclosure frequency (Δ*CC#*) on subsequent changes in firms' credit rating scores across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*). I expect that an increase in conference call disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater during periods of credit rationing. In Model 2, the coefficient for the main effect Δ*CC#* is positive and significant ($p \leq 0.10$) which suggests that, in terms of the percent change in the odds ratio, a one standard deviation increase in the change in conference call disclosure frequency increases the odds of an improved credit rating score by 8.8%. The coefficients for the interaction term Δ*CC#*×Δ*KCFSI* indicate whether the effect of changes in conference call disclosure frequency on firms' credit rating scores varies with changes in the financial stress index. In Model 3, the coefficient for the interaction term is significant ($p \leq 0.05$) suggesting that a one standard deviation increase in the change in conference call disclosure frequency increases the odds of a credit rating improvement from speculative-grade to investment-grade by an additional 17.4% when credit is rationed which provides some support for H1.

5.1.4 Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Table 9, Panel A examines the effect of changes in earnings guidance disclosure frequency (Δ*CIG#*) on subsequent changes in firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that an increase in earnings guidance disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater during periods of credit rationing. In Models 1 and 3, the coefficient for the main effect Δ*CIG#* is positive and significant which suggests that, in terms of the percent change in the odds ratio, a one standard deviation increase in the change in earnings guidance disclosure frequency increases the odds of an improved credit rating score between 7.8% and 14%. The coefficients for the interaction term Δ*CIG#*×Δ*SLOOS* indicate whether the effect of changes in earnings guidance disclosure frequency on subsequent changes in firms' credit rating scores varies with changes in the senior loan officer survey. In Model 2, the coefficient for the interaction term is significant ($p \leq 0.10$) suggesting that a one standard deviation increase in the change in earnings guidance disclosure frequency increases the odds of a credit rating improvement by an additional 0.3% when credit is rationed. In Model 3, the coefficient for the interaction term is significant ($p \leq 0.05$) suggesting that a one standard deviation increase in the change in earnings guidance disclosure frequency increases the odds of a credit rating improvement from speculative-grade to investment-grade by an additional 0.3% when credit is rationed. These findings provide support for H1.

TABLE 9

Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *ΔRATINGS1*		(2) *ΔRATINGS2*		(3) *ΔRATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CIG#*	+	0.023***	7.8%	0.017	5.7%	0.040**	14.0%
		(2.49)		(1.27)		(1.89)	
Δ*CIG#* × Δ*SLOOS*	+	0.000	0.0%	0.001*	0.3%	0.001**	0.3%
		(1.04)		(1.47)		(2.19)	
Δ*DTA*	−	-5.427***		-5.466***		-4.125***	
		(-12.78)		(-9.72)		(-5.52)	
Δ*LNSIZE*	+	1.741***		1.971***		1.586***	
		(8.76)		(8.03)		(4.54)	
Δ*ROA*	+	2.472***		1.733***		0.796	
		(4.27)		(2.48)		(0.81)	
Δ*COV*	+	-0.001		0.001		0.004**	
		(-0.71)		(-0.35)		(1.74)	
Δ*CAP*	?	1.413**		1.755***		1.849	
		(2.52)		(2.58)		(1.64)	
Δ*LOSS*	−	-0.635***		-0.558***		-0.391**	
		(-6.67)		(-4.16)		(-1.76)	
Δ*SUB*	−	-0.396***		-0.182		-0.433*	
		(-2.94)		(-0.86)		(-1.45)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		6,079		6,079		6,079	
(Pseudo) R^2		0.07		0.08		0.06	

TABLE 9 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *ΔRATINGS1*		(2) *ΔRATINGS2*		(3) *ΔRATINGS3*	
Variable	**Sign**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CIG#*	+	0.022***	7.5%	0.016	5.4%	0.039**	13.7%
		(2.46)		(1.24)		(1.85)	
Δ*CIG#* × Δ*KCFSI*	+	0.009	3.0%	0.022**	7.5%	0.040***	14.0%
		(0.95)		(1.72)		(2.77)	
Δ*DTA*	–	-5.423***		-5.460***		-4.111***	
		(-12.76)		(-9.71)		(-5.49)	
Δ*LNSIZE*	+	1.741***		1.972***		1.592***	
		(8.76)		(8.05)		(4.58)	
Δ*ROA*	+	2.474***		1.736***		0.815	
		(4.28)		(2.48)		(0.83)	
Δ*COV*	+	-0.001		-0.001		0.004**	
		(-0.72)		(-0.35)		(1.73)	
Δ*CAP*	?	1.415**		1.761***		1.862*	
		(2.52)		(2.59)		(1.66)	
Δ*LOSS*	–	-0.635***		-0.559***		-0.390**	
		(-6.67)		(-4.16)		(-1.76)	
Δ*SUB*	–	-0.396***		0.182		-0.434*	
		(-2.94)		(-0.86)		(-1.45)	
Industry Fixed Effects		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes	
Observations		6,079		6,079		6,079	
(Pseudo) R^2		0.07		0.08		0.06	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in the change in earnings guidance disclosure frequency.

Table 9, Panel B examines the effect of changes in earnings guidance disclosure frequency (Δ*CIG#*) on subsequent changes in firms' credit rating scores across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*). I expect that an increase in earnings guidance disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater during periods of credit rationing. In Models 1 and 3, the coefficients for the main effect Δ*CIG#* are positive and significant which suggests that, in terms of the percent change in the odds ratio, a one standard deviation increase in the change in earnings guidance disclosure frequency increases the odds of an improved credit rating score between 7.5% and 13.7%. The coefficients for the interaction term Δ*CIG#*×Δ*KCFSI* indicate whether the effect of changes in earnings guidance disclosure frequency on firms' credit rating scores varies with changes in the financial stress index. In Model 2, the coefficient for the interaction term is significant ($p \leq 0.05$) suggesting that a one standard deviation increase in the change in earnings guidance disclosure frequency increases the odds of a credit rating improvement by an additional 7.5% when credit is rationed. In Model 3, the coefficient for the interaction term is significant ($p \leq 0.01$) suggesting that a one standard deviation increase in the change in earnings guidance disclosure frequency increases the odds of a credit rating improvement from speculative-grade to investment-grade by an additional 14% when credit is rationed. These findings provide support for H1.

5.2 Analysis of the Effects of Voluntary Disclosure on Interest Rates Across Credit Market Conditions

Where levels and changes in *INTRATE* are used as the dependent variable, Equations (1) and (2) are estimated using ordinary least squares regression. All models include year and industry fixed effects, and estimates are based on Roger's (1993) corrected standard errors clustered by firm. Results from levels-model testing of the effects of voluntary disclosure on interest rates across credit market conditions are shown in Sections 5.2.1 and 5.2.2. Results from changes-model testing of the effects of voluntary disclosure on interest rates across credit market conditions are shown in Sections 5.2.3 and 5.2.4.

Given the way the variable is derived, higher levels of *INTRATE* and positive changes in Δ*INTRATE* imply a higher cost of debt capital. The expected direction of influence of the voluntary disclosure variables, credit market condition variables, and their interactions are reversed relative to the expected signs in shown in previous Tables. As a result, I expect that greater conference call and earnings guidance disclosure frequency will be *negatively* associated with firms' interest rate and that this negative association will become greater during periods of credit rationing. The predicted direction of influence for the control variables are also reversed with the exception of capital intensity (*CAP* and Δ*CAP*), which has no predicted direction of influence, and leverage (*DTA* and Δ*DTA*), which has been shown in prior literature to be negatively related to firms' interest rates (Pittman and Fortin 2004; Francis et al. 2005).

5.2.1 Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions

Table 10, Panel A examines the effect of conference call disclosure frequency (*CC#*) on firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that greater conference call disclosure frequency will be associated with lower interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect *CC#* is negative and significant ($p \leq 0.01$) suggesting that greater conference call disclosure frequency is associated with lower interest rates. The coefficient for the interaction term *CC#*×Δ*SLOOS* indicates whether the effect of conference call disclosure frequency on firms' interest rates varies with changes in the senior loan officer survey. However, the coefficient is insignificant and provides no support for H1.

Table 10, Panel B examines the effect of conference call disclosure frequency (*CC#*) on firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*). I expect that greater conference call disclosure frequency will be associated with lower interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect *CC#* is negative and significant ($p \leq 0.01$) suggesting that greater conference call disclosure frequency is associated with lower interest rates. The coefficient for the interaction term *CC#*×Δ*KCFSI* indicates whether the effect of conference call disclosure frequency on firms' interest rates varies with changes in the financial stress index. However, the coefficient is insignificant and provides no support for H1.

TABLE 10

Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

Variable	**Sign**	***INTRATE***
Constant		9.693***
		(21.42)
CC#	−	-0.145***
		(-3.56)
CC# × Δ*SLOOS*	−	0.002
		(1.07)
DTA	−	-0.710***
		(-3.04)
LNSIZE	−	-0.332***
		(-12.43)
ROA	−	-1.780***
		(-5.22)
COV	−	-0.000
		(-0.18)
CAP	?	0.372***
		(2.78)
LOSS	+	0.843***
		(7.61)
SUB	+	1.325***
		(12.26)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		18,665
Adj. R^2		0.09

TABLE 10 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

Variable	Sign	*INTRATE*
Constant		9.305***
		(17.48)
CC#	−	-0.138***
		(-3.29)
CC# × Δ*KCFSI*	−	-0.033
		(-0.44)
DTA	−	-0.709***
		(-3.03)
LNSIZE	−	-0.332***
		(-12.47)
ROA	−	-1.781***
		(-5.23)
COV	−	-0.000
		(-0.19)
CAP	?	0.373***
		(2.79)
LOSS	+	0.844***
		(7.62)
SUB	+	1.326***
		(12.26)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		18,665
Adj. R^2		0.09

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

5.2.2 Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions

Table 11, Panel A examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that greater earnings guidance disclosure frequency will be associated with lower interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect *CIG#* is negative and significant ($p \leq 0.01$) suggesting that greater earnings guidance disclosure frequency is associated with lower interest rates. The coefficient for the interaction term *CIG#*×Δ*SLOOS* indicates whether the effect of earnings guidance disclosure frequency on firms' interest rates varies with changes in the senior loan officer survey. However, the coefficient is insignificant and provides no support for H1.

Table 11, Panel B examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*). I expect that greater earnings guidance disclosure frequency will be associated with lower interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect *CIG#* is negative and significant ($p \leq 0.01$) suggesting that greater earnings guidance disclosure frequency is associated with lower interest rates. The coefficient for the interaction term *CIG#*×Δ*KCFSI* indicates whether the effect of earnings guidance disclosure frequency on firms' interest rates varies with changes in the financial stress index. However, the coefficient is insignificant and provides no support for H1.

TABLE 11

Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

Variable	**Sign**	***INTRATE***
Constant		10.251***
		(23.17)
CIG#	−	-0.045***
		(-3.92)
CIG# × Δ*SLOOS*	−	-0.000
		(-0.93)
DTA	−	-2.208***
		(-7.67)
LNSIZE	−	-0.283***
		(-10.21)
ROA	−	-1.564***
		(-3.25)
COV	−	-0.001***
		(-3.90)
CAP	?	0.016
		(0.11)
LOSS	+	0.706***
		(5.98)
SUB	+	1.508***
		(13.90)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		14,618
Adj. R^2		0.12

TABLE 11 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

Variable	**Sign**	***INTRATE***
Constant		10.253***
		(23.17)
CIG#	−	-0.044***
		(-3.83)
CIG# × ΔKCFSI	−	-0.006
		(-0.70)
DTA	−	-2.209***
		(-7.67)
LNSIZE	−	-0.283***
		(-10.21)
ROA	−	-1.566***
		(-3.25)
COV	−	-0.001***
		(-3.89)
CAP	?	0.016
		(0.11)
LOSS	+	0.706***
		(5.98)
SUB	+	1.508***
		(13.90)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		14,618
Adj. R^2		0.12

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

5.2.3 Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions

Table 12, Panel A examines the effect of changes in conference call disclosure frequency (Δ*CC#*) on subsequent changes in firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that an increase in conference call disclosure frequency will result in a reduction in interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect Δ*CC#* is negative and significant ($p \leq 0.05$) suggesting that positive changes in conference call disclosure frequency reduce firms' interest rates. The coefficient for the interaction term Δ*CC#*×Δ*SLOOS* indicates whether the effect of changes in conference call disclosure frequency on changes in firms' interest rates varies with changes in the senior loan officer survey. Contrary to H1, the coefficient for the interaction is positive and significant ($p \leq 0.10$) suggesting that the negative association between changes in

TABLE 12

Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

Variable	**Sign**	***ΔINTRATE***
Constant		0.142
		(0.42)
Δ*CC#*	−	-0.100**
		(-2.04)
Δ*CC#* × Δ*SLOOS*	−	0.004*
		(1.87)
Δ*DTA*	−	-0.470
		(-0.96)
Δ*LNSIZE*	−	-0.898***
		(-4.11)
Δ*ROA*	−	-0.489
		(-0.96)
Δ*COV*	−	0.000
		(0.31)
Δ*CAP*	?	-0.490
		(-0.85)
Δ*LOSS*	+	0.263***
		(2.42)
Δ*SUB*	+	0.198
		(0.89)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		15,042
Adj. R^2		0.01

TABLE 12 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

Variable	**Sign**	**Δ*INTRATE***
Constant		0.025
		(0.07)
Δ*CC#*	−	-0.088**
		(-1.77)
Δ*CC#* × Δ*KCFSI*	−	0.059
		(1.05)
Δ*DTA*	−	-0.464
		(-0.95)
Δ*LNSIZE*	−	-0.900***
		(-4.12)
Δ*ROA*	−	-0.470
		(-0.92)
Δ*COV*	−	0.000
		(0.31)
Δ*CAP*	?	0.493
		(-0.86)
Δ*LOSS*	+	0.263***
		(2.42)
Δ*SUB*	+	0.198
		(0.89)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		15,042
Adj. R^2		0.01

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

conference call disclosure frequency and subsequent changes in firms' interest rates attenuates during periods of credit rationing. This finding provides no support for H1.

Table 12, Panel B examines the effect of changes in conference call disclosure frequency ($\Delta CC\#$) on subsequent changes in firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index ($\Delta KCFSI$). I expect that an increase in conference call disclosure frequency will result in a reduction in interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect $\Delta CC\#$ is negative and significant ($p \leq 0.05$) suggesting that positive changes in conference call disclosure frequency reduce firms' interest rates. The coefficient for the interaction term $\Delta CC\# \times \Delta KCFSI$ indicates whether the effect of changes in conference call disclosure frequency on changes in firms' interest rates varies with changes in the financial stress index. However, the coefficient for the interaction term is insignificant provides no support for H1.

5.2.4 Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions

Table 13, Panel A examines the effect of changes in earnings guidance disclosure frequency (Δ*CIG#*) on subsequent changes in firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*). I expect that an increase in earnings guidance disclosure frequency will result in a reduction in interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect Δ*CIG#* is negative but insignificant suggesting that positive changes in earnings guidance disclosure frequency has no effect on subsequent changes in firms' interest rates. The coefficient for the interaction term Δ*CIG#*×Δ*SLOOS* indicates whether the effect of changes in earnings guidance disclosure frequency on changes in firms' interest rates varies with changes in the senior loan officer survey. However, the coefficient for the interaction term is insignificant provides no support for H1.

TABLE 13

Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

Variable	**Sign**	***ΔINTRATE***
Constant		-0.772
		(-1.39)
Δ*CIG#*	−	-0.013
		(-1.03)
Δ*CIG#* × Δ*SLOOS*	−	-0.000
		(-0.46)
Δ*DTA*	−	-1.236**
		(-2.30)
Δ*LNSIZE*	−	-0.720***
		(-2.89)
Δ*ROA*	−	-1.548***
		(-2.36)
Δ*COV*	−	0.001
		(0.89)
Δ*CAP*	?	-0.755
		(-1.09)
Δ*LOSS*	+	0.094
		(0.77)
Δ*SUB*	+	0.309
		(1.28)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		11,486
Adj. R^2		0.02

TABLE 13 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

Variable	**Sign**	***ΔINTRATE***
Constant		-0.775
		(-1.40)
Δ*CIG#*	−	-0.011
		(-0.92)
Δ*CIG#* × Δ*KCFSI*	−	-0.017*
		(-1.29)
Δ*DTA*	−	-1.235**
		(-2.30)
Δ*LNSIZE*	−	-0.721***
		(-2.89)
Δ*ROA*	−	-1.547***
		(-2.36)
Δ*COV*	−	0.001
		(0.88)
Δ*CAP*	?	-0.760
		(-1.09)
Δ*LOSS*	+	0.094
		(0.78)
Δ*SUB*	+	0.309
		(1.28)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		11,486
Adj. R^2		0.02

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

Table 13, Panel B examines the effect of changes in earnings guidance disclosure frequency (Δ*CIG#*) on subsequent changes in firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*). I expect that an increase in earnings guidance disclosure frequency will result in a reduction in interest rates, and that this effect will be greater during periods of credit rationing. The coefficient for the main effect Δ*CIG#* is negative but insignificant suggesting that positive changes in earnings guidance disclosure frequency has no effect on subsequent changes in firms' interest rates. The coefficient for the interaction term Δ*CIG#*×Δ*KCFSI* indicates whether the effect of changes in earnings guidance disclosure frequency on firms' interest rates varies with changes in the financial stress index. The coefficient for the interaction term is negative and significant ($p \leq 0.10$) suggesting that an increase in earnings guidance reduces firms' interest rates more during periods of credit rationing. This result supports H1.

5.3 Analysis of the Effects of Voluntary Disclosure on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Prior literature posits that smaller firms are denied credit first when credit becomes scarce, and that monitoring can be a partial substitute for collateral (Holmstrom and Tirole 1997). Additionally, smaller firms have weaker information environments than larger firms and can likely benefit more from increased voluntary disclosure (Lang and Lundholm 1993). If greater voluntary disclosure facilitates monitoring of borrowers, then, as H2 suggests, the effect of voluntary disclosure on firms' cost of debt capital will be greater for smaller firms than larger firms during periods of credit rationing.

To test this association, firms are ranked as small (large) if total assets for a given fiscal year are below (above) the median level of total assets for all firms in the same fiscal year. Equations (1) and (2) are then estimated for the smallest and largest firms separately. All models include year and industry fixed effects, and estimates are based on Roger's (1993) corrected standard errors clustered by firm. Coefficients are reported in log-odds format, and the percent change in the odds ratio is also reported for the coefficients of the main and interaction effects of my voluntary disclosure variables. Results from levels-model testing of the effects of conference call and earnings guidance disclosure frequency on firms' credit rating scores for small and large firms are examined in Sections 5.3.1 and 5.3.2. Results from changes-model testing are examined in Sections 5.3.3 and 5.3.4.

5.3.1 Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Table 14, Panel A examines the effect of conference call disclosure frequency (*CC#*) on firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that greater conference call disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In Model 1, the coefficient for the main effect *CC#* is positive and significant for the smaller-firm subsample and negative and significant for the larger-firm subsample. Also, the coefficients for the interaction term *CC#*×Δ*SLOOS* are insignificant for both the smaller-firm and the larger firm subsamples in Model 1. In Models 2 and 3, the coefficients for the main effect *CC#* are positive and significant for the smaller-firm subsamples but not the larger-firm subsamples, and the coefficients for the interaction term *CC#*×Δ*SLOOS* is insignificant for both the smaller-firm and the larger firm subsamples in both Models. For all Models, the combined effect from the main effect (*CC#*) and the interaction (*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing. That is, the summed percent change in the odds ratio for the main effects and interaction effects is greater for the smaller-firm subsamples than the larger-firm subsamples across all models, which supports H2.

TABLE 14

Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *RATINGS1*				(2) *RATINGS2*				(3) *RATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CC#	+	0.165***	19.5%	-0.109**	-11.6%	0.171***	20.3%	-0.075	-8.1%	0.166**	19.6%	0.106	-11.3%
		(3.37)		(-2.25)		(3.03)		(-1.47)		(1.70)		(-1.34)	
CC# × ΔSLOOS	+	-0.002	-0.2%	0.002	0.2%	-0.001	-0.1%	0.001	0.1%	0.002	0.2%	-0.001	-0.1%
		(-0.88)		(1.24)		(-0.50)		(0.34)		(0.42)		(-0.20)	
DTA	–	-2.779***		-4.239***		-3.215***		-4.304***		-5.408***		-4.903***	
		(-8.93)		(-7.46)		(-9.72)		(-7.07)		(-6.46)		(-6.71)	
LNSIZE	+	1.455***		0.937***		1.524***		0.949***		2.447***		0.950***	
		(15.39)		(12.34)		(13.78)		(11.67)		(10.53)		(9.07)	
ROA	+	6.556***		10.674***		7.373***		10.614***		9.931***		10.493***	
		(9.81)		(9.70)		(8.71)		(8.93)		(4.38)		(4.81)	
COV	+	0.006		0.008**		0.003		0.007**		-0.001		0.005	
		(1.24)		(2.06)		(0.87)		(1.96)		(-0.37)		(0.59)	
CAP	?	0.744***		0.388**		0.728***		0.330		1.618***		0.331	
		(4.40)		(2.06)		(4.02)		(1.63)		(4.87)		(1.13)	
LOSS	–	-1.342***		-1.040***		-1.198***		-1.105***		-0.949***		-1.078***	
		(-10.75)		(-6.30)		(-8.40)		(-6.56)		(-3.13)		(-4.83)	
SUB	–	-0.473***		-0.742***		-0.556***		-0.700***		-2.118***		-1.365***	
		(-4.39)		(-4.63)		(-4.71)		(-3.95)		(-7.57)		(-5.93)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,826		3,828		3,826		3,828		3,826		3,828	
(Pseudo) R^2		0.18		0.17		0.28		0.26		0.47		0.38	
Sum of the %[a]			19.5%		-11.6%		20.3%		0.0%		19.6%		0.0%
Supports H2				Yes				Yes				Yes	

TABLE 14 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *RATINGS1*				(2) *RATINGS2*				(3) *RATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CC#	+	0.160***	18.8%	-0.112**	-11.9%	0.168***	19.9%	-0.082*	-8.9%	0.172**	20.4%	-0.108	-11.5%
		(3.30)		(-2.38)		(3.06)		(-1.65)		(1.84)		(-1.40)	
CC# × ΔKCFSI	+	-0.041	-4.3%	0.136***	16.6%	-0.075	-7.8%	0.109**	13.1%	0.079	8.9%	0.017	-1.9%
		(-0.46)		(2.56)		(-0.72)		(1.89)		(0.39)		(-0.16)	
DTA	–	-2.779***		-4.232***		-3.213***		-4.300***		-5.410***		-4.904***	
		(-8.94)		(-7.45)		(-9.71)		(-7.07)		(-6.46)		(-6.72)	
LNSIZE	+	1.455***		0.939***		1.525***		0.950***		2.447***		0.950***	
		(15.40)		(12.36)		(13.78)		(11.69)		(10.52)		(9.06)	
ROA	+	6.561***		10.696***		7.375***		10.630***		9.941***		10.491***	
		(9.81)		(9.70)		(8.71)		(8.93)		(4.38)		(4.81)	
COV	+	0.006		0.008**		0.003		0.007**		-0.001		0.005	
		(1.24)		(2.06)		(0.88)		(1.98)		(-0.38)		(0.59)	
CAP	?	0.745***		0.390**		0.728***		0.333		1.618***		0.331	
		(4.40)		(2.08)		(4.01)		(1.64)		(4.88)		(1.13)	
LOSS	–	-1.341***		-1.043***		-1.198***		-1.109***		-0.950***		-1.079***	
		(-10.74)		(-6.33)		(-8.40)		(-6.59)		(-3.13)		(-4.83)	
SUB	–	-0.474***		-0.743***		-0.557***		-0.699***		-2.118***		-1.365***	
		(-4.40)		(-4.64)		(-4.71)		(-3.94)		(-7.56)		(-5.93)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,826		3,828		3,826		3,828		3,826		3,828	
(Pseudo) R^2		0.18		0.17		0.28		0.26		0.47		0.38	
Sum of the %[a]			18.8%		4.7%		19.9%		4.3%		20.4%		0.0%
Supports H2			Yes				Yes				Yes		

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in conference call disclosure frequency.

[a] Odds for insignificant coefficients are deemed zero when summing the odds.

Table 14, Panel B examines the effect of conference call disclosure frequency (*CC#*) on firms' credit rating scores across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that greater conference call disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In Models 1 and 2, the coefficients for the main effect *CC#* are positive and significant for the smaller-firm subsamples and negative and significant for the larger-firm subsamples. Also, the coefficients for the interaction term *CC#*×Δ*SLOOS* is insignificant for the smaller-firm subsamples but positive and significant for the larger firm subsamples. In Model 3, the coefficient for the main effect *CC#* is positive and significant for the smaller-firm subsample but not the larger-firm subsample, and the coefficients for the interaction term *CC#*×Δ*SLOOS* is insignificant for both the smaller-firm and the larger firm subsamples. For all Models, the combined effect from the main effect (*CC#*) and the interaction (*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing. That is, the summed percent change in the odds ratio for the main effects and interaction effects is greater for the smaller-firm subsample than the larger-firm subsample, which supports H2.

5.3.2 Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Table 15, Panel A examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that greater earnings guidance disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In all Models, the coefficient for the main effect *CIG#* is positive and significant for both the smaller-firm and the larger-firm subsamples. In Model 3, the coefficient for the interaction term *CIG#*×Δ*SLOOS* is positive and significant for the smaller-firm subsample only. In Models 1 and 2, the combined effect from the main effect (*CIG#*) and the interaction (*CIG#*×Δ*SLOOS*) suggests that earnings guidance disclosure frequency matters more to creditors of larger firms than smaller firms even during periods of credit rationing, which does not support H2. In Model 3, the combined effect from the main effect (*CIG#*) and the interaction (*CIG#*×Δ*SLOOS*) suggests that earnings guidance disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which does support H2. Overall, the results in Panel A are mixed.

Table 15, Panel B examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' credit rating scores across changes in the Kansas City Federal Reserve

TABLE 15

Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *RATINGS1*				(2) *RATINGS2*				(3) *RATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CIG#	+	0.045***	19.0%	0.055***	26.0%	0.048***	20.4%	0.054***	25.4%	0.044**	18.6%	0.036**	16.3%
		(3.44)		(3.28)		(3.41)		(3.10)		(2.05)		(1.58)	
CIG# × ΔSLOOS	+	0.000	0.0%	-0.000	0.0%	0.000	0.0%	0.000	0.0%	0.001*	0.4%	0.000	0.0%
		(0.17)		(-0.50)		(1.06)		(0.01)		(1.64)		(0.58)	
DTA	–	-3.180***		-3.905***		-3.403***		-4.011***		-5.177***		-4.174***	
		(-7.93)		(-5.16)		(-8.22)		(-5.12)		(-7.03)		(-4.46)	
LNSIZE	+	1.672***		0.923***		1.769***		0.935***		2.499***		0.924***	
		(16.46)		(9.27)		(14.75)		(8.89)		(11.56)		(7.21)	
ROA	+	7.887***		13.024***		8.552***		12.188***		11.434***		11.851***	
		(9.06)		(8.10)		(7.73)		(7.54)		(5.15)		(4.62)	
COV	+	0.004		0.004		0.004		0.005		-0.000		0.012	
		(1.20)		(1.06)		(1.09)		(1.20)		(-0.11)		(0.60)	
CAP	?	1.249***		0.668**		1.362***		0.529*		2.137***		0.620	
		(6.48)		(2.40)		(6.44)		(1.80)		(6.76)		(1.42)	
LOSS	–	-0.990***		-0.376**		-0.886***		-0.485***		-0.559**		-0.553**	
		(-6.85)		(-1.95)		(-5.21)		(-2.43)		(-1.86)		(-2.10)	
SUB	–	-0.664***		-1.083***		-0.807***		-0.994***		-2.071***		-1.569***	
		(-5.56)		(-5.06)		(-6.11)		(-4.15)		(-8.23)		(-5.92)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,429		3,437		3,429		3,437		3,429		3,437	
(Pseudo) R^2		0.19		0.16		0.29		0.24		0.47		0.35	
Sum of the %[a]			19.0%		26.0%		20.4%		25.4%		18.9%		16.3%
Supports H2			No				No				Yes		

TABLE 15 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *RATINGS1*				(2) *RATINGS2*				(3) *RATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
CIG#	+	0.045***	19.0%	0.055***	26.0%	0.047***	19.9%	0.054***	25.4%	0.043**	18.1%	0.035**	15.8%
		(3.46)		(3.31)		(3.37)		(3.11)		(2.01)		(1.52)	
CIG# × ΔKCFSI	+	0.003	1.2%	0.004	-1.7%	0.012	4.8%	-0.002	-0.8%	0.028**	11.4%	0.003	1.3%
		(0.39)		(-0.67)		(1.27)		(-0.31)		(2.05)		(0.20)	
DTA	–	-3.180***		-3.906***		-3.403***		-4.011***		-5.181***		-4.169***	
		(-7.93)		(-5.17)		(-8.22)		(-5.12)		(-7.01)		(-4.45)	
LNSIZE	+	1.671***		0.923***		1.769***		0.935***		2.499***		0.924***	
		(16.47)		(9.26)		(14.75)		(8.89)		(11.55)		(7.21)	
ROA	+	7.885***		13.024***		8.545***		12.187***		11.410***		11.852***	
		(9.06)		(8.10)		(7.73)		(7.54)		(5.14)		(4.62)	
COV	+	0.004		0.004		0.003		0.005		-0.000		0.012	
		(1.20)		(1.06)		(1.09)		(1.20)		(-0.11)		(0.60)	
CAP	?	1.250***		0.668**		1.362***		0.529*		2.138***		0.619	
		(6.49)		(2.40)		(6.44)		(1.80)		(6.77)		(1.42)	
LOSS	–	-0.991***		0.376**		-0.886***		-0.486***		-0.565**		-0.553**	
		(-6.85)		(-1.95)		(-5.21)		(-2.44)		(-1.88)		(-2.11)	
SUB	–	-0.665***		-1.083***		-0.809***		-0.995***		-2.080***		-1.568***	
		(-5.56)		(-5.06)		(-6.12)		(-4.15)		(-8.27)		(-5.92)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,429		3,437		3,429		3,437		3,429		3,437	
(Pseudo) R^2		0.19		0.16		0.29		0.24		0.47		0.35	
Sum of the %[a]			19.0%		26.0%		19.9%		25.4%		29.5%		15.8%
Supports H2			No				No				Yes		

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in earnings guidance disclosure frequency.

[a] Odds for insignificant coefficients are deemed zero when summing the odds.

Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that greater earnings guidance disclosure frequency will be associated with higher credit rating scores, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In all Models, the coefficient for the main effect *CIG#* is positive and significant for both the smaller-firm and the larger-firm subsamples. In Model 3, the coefficient for the interaction term *CIG#*×Δ*SLOOS* is positive and significant for the smaller-firm subsample only. In Models 1 and 2, the combined effect from the main effect (*CIG#*) and the interaction (*CIG#*×Δ*SLOOS*) suggests that earnings guidance disclosure frequency matters more to creditors of larger firms than smaller firms even during periods of credit rationing, which does not support H2. In Model 3, the combined effect from the main effect (*CIG#*) and the interaction (*CIG#*×Δ*SLOOS*) suggests that earnings guidance disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which does support H2. Overall, the results in Panel B are mixed.

5.3.3 Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Table 16, Panel A examines the effect of changes in conference call disclosure frequency (Δ*CC#*) on subsequent changes in firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that an increase in conference call disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In Models 1 and 2, the coefficient for the main effect Δ*CC#* is positive and significant for the smaller-firm subsample only. In Model 3, the coefficient for the interaction term Δ*CC#*×Δ*SLOOS* is positive and significant for the smaller-firm subsample only. In all Models, the combined effect from the main effect (Δ*CC#*) and the interaction (Δ*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which supports H2.

TABLE 16

Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *ΔRATINGS1*				(2) *ΔRATINGS2*				(3) *ΔRATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CC#*	+	0.125***	16.5%	-0.084	-9.5%	0.167***	22.7%	-0.002	-0.2%	-0.044	-5.2%	0.130	16.6%
		(2.46)		(-1.60)		(2.33)		(-0.02)		(-0.33)		(0.84)	
Δ*CC#* ×Δ*SLOOS*	+	-0.001	-0.1%	0.000	0.0%	-0.003	-0.4%	0.001	-0.1%	0.011**	1.4%	-0.001	-0.1%
		(-0.52)		(0.01)		(-1.10)		(-0.41)		(1.99)		(-0.18)	
Δ*DTA*	–	-4.042***		-6.639***		-3.430***		-7.085***		-2.057***		-3.677***	
		(-9.70)		(-8.69)		(-6.36)		(-7.44)		(-2.73)		(-3.05)	
Δ*LNSIZE*	+	(-9.70)***		1.728***		0.946***		1.828***		0.881***		2.009***	
		(5.46)		(6.69)		(3.47)		(6.34)		(2.51)		(4.90)	
Δ*ROA*	+	2.569***		3.182***		2.044***		3.117***		0.710		2.225*	
		(4.03)		(3.13)		(2.71)		(2.84)		(0.84)		(1.36)	
Δ*COV*	+	-0.000		0.002		0.001		0.003		0.011***		0.004	
		(-0.23)		(0.86)		(0.58)		(0.78)		(3.38)		(0.82)	
Δ*CAP*	?	-0.008		2.047***		-1.223*		1.525*		-0.579		1.632	
		(-0.02)		(3.11)		(-1.95)		(1.88)		(-0.54)		(1.51)	
Δ*LOSS*	–	-0.546***		-0.519***		-0.355**		-0.526***		-0.175		-0.738***	
		(-5.09)		(-4.03)		(-2.32)		(-3.08)		(-0.79)		(-2.57)	
Δ*SUB*	–	-0.022		0.074		0.092		0.064		-0.215		-0.068	
		(-0.17)		(0.37)		(0.49)		(0.19)		(-0.95)		(-0.11)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,322		3,325		3,322		3,325		3,322		3,325	
(Pseudo) R^2		0.07		0.06		0.08		0.10		0.05		0.07	
Sum of the %[a]			16.5%		0.0%		22.7%		0.0%		1.4%		0.0%
Supports H2				Yes				Yes				Yes	

TABLE 16 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *ΔRATINGS1*				(2) *ΔRATINGS2*				(3) *ΔRATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CC#*	+	0.117***	15.4%	-0.084*	-9.5%	0.150**	20.2%	-0.010	-1.2%	-0.026	-3.1%	0.108	13.6%
		(2.37)		(-1.65)		(2.13)		(-0.13)		(-0.19)		(0.72)	
Δ*CC#* × Δ*KCFSI*	+	0.025	3.1%	0.002	0.2%	0.014	1.7%	-0.017	-2.0%	0.248**	35.5%	0.096*	12.0%
		(0.35)		(0.03)		(0.15)		(-0.23)		(1.72)		(1.53)	
Δ*DTA*	–	-4.041***		-6.639***		-3.426***		-7.089***		-2.052***		-3.696***	
		(-9.69)		(-8.68)		(-6.35)		(-7.43)		(-2.73)		(-3.06)	
Δ*LNSIZE*	+	1.247***		1.728***		0.946***		1.825***		0.894***		2.005***	
		(5.47)		(6.69)		(3.47)		(6.33)		(2.52)		(4.88)	
Δ*ROA*	+	2.574***		3.183***		2.044***		3.099***		0.736		2.243*	
		(4.03)		(3.13)		(2.70)		(2.82)		(0.88)		(1.37)	
Δ*COV*	+	-0.000		0.002		0.001		0.003		0.011***		0.004	
		(-0.21)		(0.85)		(0.59)		(0.77)		(3.46)		(0.81)	
Δ*CAP*	?	0.004		2.047***		-1.220**		1.523*		-0.587		1.629	
		(0.01)		(3.11)		(-1.96)		(1.87)		(-0.54)		(1.51)	
Δ*LOSS*	–	-0.544***		-0.519***		-0.356**		-0.527***		-0.168		-0.741**	
		(-5.08)		(-4.03)		(-2.32)		(-3.09)		(-0.76)		(-2.56)	
Δ*SUB*	–	-0.022		0.074		0.091		0.065		-0.197		-0.071	
		(-0.17)		(0.37)		(0.49)		(0.20)		(-0.88)		(-0.12)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,322		3,325		3,322		3,325		3,322		3,325	
(Pseudo) R^2		0.07		0.06		0.08		0.10		0.05		0.07	
Sum of the %[a]			15.4%		-9.5%		20.2%		0.0%		35.5%		12.0%
Supports H2				Yes				Yes				Yes	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in the change in conference call disclosure frequency.

[a] Odds for insignificant coefficients are deemed zero when summing the odds.

Table 16, Panel B examines the effect of changes in conference call disclosure frequency (Δ*CC#*) on subsequent changes in firms' credit rating scores across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that an increase conference call disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In Model 1, the coefficient for the main effect Δ*CC#* is positive and significant for the smaller-firm subsample but negative and significant for the larger-firm subsample. In Model 2, the coefficient for the main effect Δ*CC#* is positive and significant for the smaller-firm subsample only. In Model 3, the coefficient for the interaction term Δ*CC#*×Δ*SLOOS* is positive and significant for the smaller-firm and larger-firm subsamples. In all Models, the combined effect from the main effect (Δ*CC#*) and the interaction (Δ*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which supports H2.

5.3.4 Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Table 17, Panel A examines the effect of changes in earnings guidance disclosure frequency (Δ*CIG#*) on subsequent changes in firms' credit rating scores across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that an increase in earnings guidance disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In Models 1 and 3, the coefficient for the main effect Δ*CIG#* is positive and significant for the smaller-firm subsamples only. In Model 1, the coefficient for the interaction term Δ*CIG#*×Δ*SLOOS* is positive and significant for the smaller-firm subsample only, and in Model 3, the coefficient for the interaction term Δ*CIG#*×Δ*SLOOS* is positive and significant for the larger-firm subsample only. While the results in Model 2 are inconclusive, the combined effect from the main effect (Δ*CIG#*) and the interaction (Δ*CIG#*×Δ*SLOOS*) in Models 1 and 3, suggests that earnings guidance disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which supports H2.

TABLE 17

Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Credit Ratings Across Credit Market Conditions Conditional on Firm Size

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		(1) *ΔRATINGS1*				(2) *ΔRATINGS2*				(3) *ΔRATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CIG#*	+	0.039***	13.2%	0.012	4.2%	0.020	6.5%	0.014	4.9%	0.067**	23.7%	0.022	7.8%
		(3.07)		(0.90)		(1.00)		(0.85)		(1.95)		(0.82)	
Δ*CIG#* × Δ*SLOOS*	+	0.001**	0.3%	-0.000	0.0%	0.001	0.3%	0.001	0.3%	0.001	0.3%	0.002**	0.7%
		(1.93)		(-0.09)		(1.13)		(1.13)		(0.80)		(2.24)	
Δ*DTA*	–	-4.845***		-6.832***		-4.501***		-7.536***		-3.078***		-5.786***	
		(-9.36)		(-8.75)		(-6.52)		(-7.40)		(-3.40)		(-4.40)	
Δ*LNSIZE*	+	2.164***		1.303***		2.166***		1.811***		1.269***		1.879***	
		(8.48)		(4.56)		(6.71)		(4.83)		(2.91)		(3.21)	
Δ*ROA*	+	1.708***		3.778***		1.089		3.183***		0.284		2.581*	
		(2.37)		(3.45)		(1.22)		(2.91)		(0.28)		(1.45)	
Δ*COV*	+	0.001		-0.000		-0.002		-0.001		0.007***		-0.003	
		(-0.94)		(-0.10)		(-0.50)		(-0.24)		(2.42)		(-1.05)	
Δ*CAP*	?	1.371*		1.220		1.450*		1.859*		1.722		1.838	
		(1.72)		(1.54)		(1.65)		(1.75)		(1.08)		(1.01)	
Δ*LOSS*	–	-0.738***		-0.507***		-0.588***		-0.399**		-0.086		-0.509*	
		(-5.85)		(-3.37)		(-3.50)		(-1.85)		(-0.31)		(-1.52)	
Δ*SUB*	–	-0.351**		-0.569***		-0.299		-0.090		0.510*		-0.500	
		(-2.23)		(-2.57)		(-1.19)		(-0.26)		(-1.59)		(-0.90)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,035		3,044		3,035		3,044		3,035		3,044	
(Pseudo) R^2		0.09		0.07		0.09		0.09		0.07		0.09	
Sum of the %[a]			13.5%		0.0%		0.0%		0.0%		23.7%		0.7%
Supports H2				Yes				No				Yes	

TABLE 17 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		(1) *ΔRATINGS1*				(2) *ΔRATINGS2*				(3) *ΔRATINGS3*			
		Smaller Firms		**Larger Firms**		**Smaller Firms**		**Larger Firms**		**Smaller Firms**		**Larger Firms**	
Variable		**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**	**Log-odds**	**%**
Δ*CIG#*	+	0.038***	12.8%	0.012	4.2%	0.018	5.9%	0.015	5.2%	0.065**	22.9%	0.024	8.5%
		(2.97)		(0.90)		(0.91)		(0.89)		(1.88)		(0.91)	
Δ*CIG#* × Δ*KCFSI*	+	0.021*	6.9%	-0.000	0.0%	0.030**	10.0%	0.019	6.7%	0.034*	11.4%	0.051***	18.9%
		(1.63)		(-0.02)		(1.67)		(0.94)		(1.44)		(2.68)	
Δ*DTA*	–	-4.834***		-6.832***		-4.503***		-7.526***		-3.079***		-5.779***	
		(-9.36)		(-8.75)		(-6.54)		(-7.38)		(-3.40)		(-4.38)	
Δ*LNSIZE*	+	2.163***		1.302***		2.172***		1.815***		1.280***		1.896***	
		(8.48)		(4.56)		(6.73)		(4.84)		(2.95)		(3.26)	
Δ*ROA*	+	1.719***		3.778***		1.091		3.185***		0.290		2.593*	
		(2.39)		(3.45)		(1.22)		(2.91)		(0.28)		(1.47)	
Δ*COV*	+	-0.001		-0.000		-0.001		-0.001		0.008***		-0.003	
		(-0.96)		(-0.09)		(-0.49)		(-0.24)		(2.45)		(-1.03)	
Δ*CAP*	?	1.376*		1.219		1.461*		1.875*		1.732		1.878	
		(1.73)		(1.54)		(1.66)		(1.77)		(1.09)		(1.04)	
Δ*LOSS*	–	-0.738***		-0.507***		-0.589***		-0.401**		-0.087		-0.512*	
		(-5.84)		(-3.37)		(-3.51)		(-1.85)		(-0.32)		(-1.53)	
Δ*SUB*	–	-0.347**		-0.568***		-0.296		-0.099		-0.507*		-0.518	
		(-2.20)		(-2.57)		(-1.17)		(-0.29)		(-1.58)		(-0.92)	
Industry Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes		Yes	
Observations		3,035		3,044		3,035		3,044		3,035		3,044	
(Pseudo) R^2		0.09		0.07		0.09		0.09		0.07		0.09	
Sum of the %[a]			19.7%		0.0%		10.0%		0.0%		34.2%		18.9%
Supports H2				Yes				Yes				Yes	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinal logistic regression. z-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009). Columns labeled "%" present changes in the odds ratio from a 1 standard deviation increase in the change in earnings guidance disclosure frequency.

[a] Odds for insignificant coefficients are deemed zero when summing the odds.

Table 17, Panel B examines the effect of changes in earnings guidance disclosure frequency (Δ*CIG#*) on subsequent changes in firms' credit rating scores across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that an increase earnings guidance disclosure frequency will result in an increase in the odds of an improved credit rating score, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. In Models 1 and 3, the coefficient for the main effect Δ*CIG#* is positive and significant for the smaller-firm subsamples only. In Models 1 and 2, the coefficient for the interaction term Δ*CIG#*×Δ*SLOOS* is positive and significant for the smaller-firm subsample only. In Model 3, the coefficient for the interaction term Δ*CIG#*×Δ*SLOOS* is positive and significant for both the smaller-firm and larger-firm subsamples. In all Models, the combined effect from the main effect (Δ*CIG#*) and the interaction (Δ*CIG#*×Δ*SLOOS*) suggests that earnings guidance disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which supports H2.

5.4 Analysis of the Effects of Voluntary Disclosure on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Using the same methodology discussed in section 5.3 above, Equations (1) and (2) are estimated for the smallest and largest firms separately where levels and changes in *INTRATE* are used as the dependent variable. All models include year and industry fixed effects, and estimates are based on Roger's (1993) corrected standard errors clustered by firm. Results from levels-model testing of the effects of conference call and earnings guidance disclosure frequency on firms' interest rates for small and large firms are examined in Sections 5.4.1 and 5.4.2. Results from changes-model testing of the effects of changes in conference call and earnings guidance disclosure frequency on changes in firms' interest rates for small and large firms are examined in Sections 5.4.3 and 5.4.4 20 and 21.

5.4.1 Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Table 18, Panel A examines the effect of conference call disclosure frequency (*CC#*) on firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that greater conference call disclosure frequency will be associated with lower interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficient for the main effect *CC#* is negative and significant for the larger-firm subsample only, and the coefficients for the interaction term *CC#*×Δ*SLOOS* are

insignificant for both the smaller-firm and larger-firm subsamples. The combined effect from the main effect (*CC#*) and the interaction (*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of larger firms than smaller firms even during periods of credit rationing, which does not support H2.

Table 18, Panel B examines the effect of conference call disclosure frequency (*CC#*) on firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that greater conference call disclosure frequency will be associated with lower interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficient for the main effect *CC#* is negative and significant for the larger-firm subsample only, and the coefficients for the interaction term Δ*CC#*×Δ*SLOOS* are insignificant for both the smaller-firm and larger-firm subsamples. The combined effect from the main effect (Δ*CC#*) and the interaction (Δ*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of larger firms than smaller firms even during periods of credit rationing, which does not support H2.

TABLE 18

Results from Levels-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		INTRATE	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		9.492***	9.265***
		(12.94)	(15.01)
CC#	−	-0.054	-0.237***
		(-0.92)	(-4.38)
CC# × Δ*SLOOS*	−	0.003	0.002
		(1.15)	(0.78)
DTA	−	-0.412*	-1.089***
		(-1.29)	(-3.34)
LNSIZE	−	-0.440***	-0.219***
		(-5.83)	(-4.94)
ROA	−	-1.739***	-0.890*
		(-4.29)	(-1.47)
COV	−	0.000	-0.001*
		(0.49)	(-1.55)
CAP	?	0.243	0.471***
		(1.15)	(2.99)
LOSS	+	0.896***	0.864***
		(5.37)	(7.02)
SUB	+	1.939***	1.114***
		(8.52)	(10.34)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		9,330	9,335
Adj. R^2		0.06	0.10

TABLE 18 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		INTRATE	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		9.871***	8.316***
		(11.45)	(12.93)
CC#	–	-0.048	-0.231***
		(-0.82)	(-4.38)
CC# × ΔKCFSI	–	-0.023	0.011
		(-0.20)	(0.12)
DTA	–	-0.410*	-1.087***
		(-1.29)	(-3.34)
LNSIZE	–	-0.442***	-0.219***
		(-5.86)	(-4.93)
ROA	–	-1.741***	-0.888*
		(-4.30)	(-1.47)
COV	–	0.000	-0.001*
		(0.48)9	(-1.55)
CAP	?	0.242	0.472***
		(1.15)	(3.00)
LOSS	+	0.894***	0.865***
		(5.35)	(7.03)
SUB	+	1.940***	1.114***
		(8.53)	(10.34)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		9,330	9,335
Adj. R^2		0.06	0.10

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

5.4.2 Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Table 19, Panel A examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that greater earnings guidance disclosure frequency will be associated with lower interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficients for the main effect *CIG#* is negative and significant for both the smaller-firm and larger-firm subsamples, however the effect is greater for the smaller-firm subsample than the larger-firm subsample. The coefficients for the interaction term *CIG#*×Δ*SLOOS* are insignificant for both the smaller-firm and larger-firm subsamples. The combined effect from the main effect (*CIG#*) and the interaction (*CIG#*×Δ*SLOOS*) suggests that earnings guidance disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which supports H2.

TABLE 19

Results from Levels-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		INTRATE	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		10.121***	9.353***
		(10.19)	(15.86)
CIG#	−	-0.048**	-0.041***
		(-2.29)	(-3.19)
CIG# × Δ*SLOOS*	−	-0.001	0.000
		(-1.07)	(0.55)
DTA	−	-2.329***	-1.844***
		(-5.65)	(-4.81)
LNSIZE	−	-0.314***	-0.196***
		(-4.05)	(-3.89)
ROA	−	-1.544***	-0.952
		(-2.59)	(-1.28)
COV	−	-0.002***	-0.001
		(-3.79)	(-1.04)
CAP	?	0.089	0.149
		(-0.40)	(0.90)
LOSS	+	0.796***	0.574***
		(4.48)	(4.36)
SUB	+	1.888***	1.328***
		(8.92)	(11.72)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		7,306	7,312
Adj. R^2		0.09	0.15

TABLE 19 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		INTRATE	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		10.114***	9.352***
		(10.19)	(15.86)***
CIG#	–	-0.045**	-0.042***
		(-2.17)	(-3.19)
CIG# × ΔKCFSI	–	-0.017	0.005
		(-0.97)	(0.54)
DTA	–	-2.328***	-1.844***
		(-5.65)	(-4.81)
LNSIZE	–	-0.315***	-0.196***
		(-4.06)	(-3.88)
ROA	–	-1.547***	-0.952
		(-2.60)	(-1.28)
COV	–	-0.002***	-0.001
		(-3.79)	(-1.04)
CAP	?	-0.090	0.148
		(-0.40)	(0.90)
LOSS	+	0.795***	0.574***
		(4.48)	(4.36)
SUB	+	1.887***	1.328***
		(8.92)	(11.72)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		7,306	7,312
Adj. R^2		0.09	0.15

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

Table 19, Panel B examines the effect of earnings guidance disclosure frequency (*CIG#*) on firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that greater earnings guidance disclosure frequency will be associated with lower interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficients for the main effect *CIG#* is negative and significant for both the smaller-firm and larger-firm subsamples, however the effect is greater for the smaller-firm subsample than the larger-firm subsample. The coefficients for the interaction term *CIG#*×Δ*SLOOS* are insignificant for both the smaller-firm and larger-firm subsamples. The combined effect from the main effect (*CIG#*) and the interaction (*CIG#*×Δ*SLOOS*) suggests that earnings guidance disclosure frequency matters more to creditors of smaller firms than larger firms even during periods of credit rationing, which supports H2.

5.4.3 Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Table 20, Panel A examines the effect of changes in conference call disclosure frequency (*CC#*) on subsequent changes in firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that an increase in conference call disclosure frequency will result in a reduction in interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficients for the main effect *CC#* are negative and significant for both the smaller-firm and larger-firm subsamples, however the effect is greater for the smaller-firm subsample than the larger-firm subsample. The coefficient for the interaction term *CC#*×Δ*SLOOS* is positive and significant for the smaller-firm subsample but insignificant for larger-firm subsample. The combined effect from the main effect (*CC#*) and the interaction (*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of smaller firms than

TABLE 20

Results from Changes-model Testing of the Effects of Conference Call Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Panel A: Conference Call Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		Δ*INTRATE*	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		-0.511	-0.061
		(-0.73)	(-0.22)
Δ*CC#*	−	-0.128**	-0.066*
		(-1.65)	(-1.35)
Δ*CC#* × Δ*SLOOS*	−	0.007**	-0.000
		(2.23)	(-0.08)
Δ*DTA*	−	0.093	-1.590***
		(0.14)	(-2.64)
Δ*LNSIZE*	−	-1.068***	-0.634***
		(-3.37)	(-2.62)
Δ*ROA*	−	0.302	-0.917
		(-0.49)	(-1.25)
Δ*COV*	−	-0.000	0.003***
		(-0.47)	(2.90)
Δ*CAP*	?	-0.599	-0.236
		(-0.70)	(-0.40)
Δ*LOSS*	+	0.355**	0.125
		(2.09)	(1.23)
Δ*SUB*	+	0.192	0.173
		(0.46)	(1.01)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		7,519	7,523
Adj. R^2		0.01	0.03

TABLE 20 (continued)

Panel B: Conference Call Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		ΔINTRATE	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		-0.383	-0.049
		(-0.55)	(-0.18)
Δ*CC#*	–	-0.117*	-0.056
		(-1.49)	(-1.16)
Δ*CC#* × Δ*KCFSI*	–	0.164**	-0.080*
		(1.96)	(-1.49)
Δ*DTA*	–	0.103	-1.581***
		(0.15)	(-2.63)
Δ*LNSIZE*	–	-1.074***	-0.633***
		(-3.38)	(-2.61)
Δ*ROA*	–	-0.271	-0.925
		(-0.44)	(-1.26)
Δ*COV*	–	-0.000	0.003***
		(-0.47)	(2.90)
Δ*CAP*	?	-0.606	-0.231
		(-0.71)	(-0.40)
Δ*LOSS*	+	0.356**	0.124
		(2.09)	(1.22)
Δ*SUB*	+	0.197	0.172
		(0.47)	(1.00)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		7,519	7,523
Adj. R^2		0.01	0.03

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

larger firms even during periods of credit rationing, which supports H2.

Table 20, Panel B examines the effect of changes in conference call disclosure frequency (*CC#*) on subsequent changes in firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that an increase in conference call disclosure frequency will result in a reduction in interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficient for the main effect *CC#* is negative and significant for the smaller-firm subsample only, while the coefficient for the interaction term *CC#*×Δ*SLOOS* is positive and significant for the smaller-firm subsample and negative and significant for the larger-firm subsample. The combined effect from the main effect (*CC#*) and the interaction (*CC#*×Δ*SLOOS*) suggests that conference call disclosure frequency matters more to creditors of larger firms than smaller firms even during periods of credit rationing, which does not support H2.

5.4.4 Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Table 21, Panel A examines the effect of changes in earnings guidance disclosure frequency (*CIG#*) on subsequent changes in firms' interest rates across changes in the Federal Reserve Senior Loan Officer Survey (Δ*SLOOS*) for both smaller and larger firms. I expect that an increase in earnings guidance disclosure frequency will result in a reduction in interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficients for the main effect *CIG#* are insignificant for both the smaller-firm and larger-firm subsamples, as are the coefficients for the interaction term *CIG#*×Δ*SLOOS*, which provides no support for H2.

Table 21, Panel B examines the effect of changes in earnings guidance disclosure frequency (*CIG#*) on subsequent changes in firms' interest rates across changes in the Kansas City Federal Reserve Financial Stress Index (Δ*KCFSI*) for both smaller and larger firms. I expect that an increase in earnings guidance disclosure frequency will result in a reduction in interest rates, and that this effect will be greater for smaller firms than larger firms during periods of credit rationing. The coefficients for the main effect *CIG#* are insignificant for both the smaller-firm and larger-firm subsamples, as are the coefficients for the interaction term *CIG#*×Δ*SLOOS*, which provides no support for H2.

TABLE 21

Results from Changes-model Testing of the Effects of Earnings Guidance Disclosure Frequency on Interest Rates Across Credit Market Conditions Conditional on Firm Size

Panel A: Earnings Guidance Disclosure Frequency and the Federal Reserve Senior Loan Officer Opinion Survey

		Δ*INTRATE*	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		0.491	-0.726
		(0.39)	(-0.43)
Δ*CIG#*	−	-0.014	-0.012
		(-0.54)	(-1.17)
Δ*CIG#* × Δ*SLOOS*	−	-0.000	0.000
		(-0.19)	(-0.68)
Δ*DTA*	−	-1.000*	-1.576***
		(-1.30)	(-2.48)
Δ*LNSIZE*	−	-0.814**	-0.607**
		(-2.07)	(-2.14)
Δ*ROA*	−	-1.483**	-1.545**
		(-1.74)	(-1.94)
Δ*COV*	−	0.000	0.002
		(0.48)	(1.47)
Δ*CAP*	?	-0.586	-1.010
		(-0.52)	(-1.63)
Δ*LOSS*	+	0.137	0.035
		(0.73)	(0.29)
Δ*SUB*	+	0.446	0.165
		(1.02)	(0.75)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		5,739	5,747
Adj. R^2		0.02	0.03

TABLE 21 (continued)

Panel B: Earnings Guidance Disclosure Frequency and the Kansas City Federal Reserve Financial Stress Index

		ΔINTRATE	
VARIABLES	**Sign**	**Smaller Firms**	**Larger Firms**
Constant		0.489	-0.727
		(0.39)	(-0.43)
Δ*CIG#*	–	-0.012	-0.011
		(-0.46)	(-1.11)
Δ*CIG#* × Δ*KCFSI*	–	-0.025	-0.011
		(-0.90)	(-1.03)
Δ*DTA*	–	-0.996*	-1.577***
		(-1.30)	(-2.48)
Δ*LNSIZE*	–	-0.817**	-0.609**
		(-2.08)	(-2.15)
Δ*ROA*	–	-1.476**	-1.549**
		(-1.73)	(-1.95)
Δ*COV*	–	0.000	0.002
		(0.47)	(1.47)
Δ*CAP*	?	-0.596	-1.014
		(-0.52)	(-1.64)
Δ*LOSS*	+	0.139	0.035
		(0.74)	(0.28)
Δ*SUB*	+	0.446	0.166
		(1.02)	(0.75)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
Observations		5,739	5,747
Adj. R^2		0.02	0.03

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, in a one-tailed test if the results are consistent with the direction of prediction, and two-tailed otherwise. All models use ordinary least squares regression. t-statistics are reported in parentheses below coefficient estimates. See Appendix B for variable definitions. Standard errors are clustered by firm (Peterson 2009).

5.5 Summary of Results

Results from levels- and changes-model testing provide some evidence that the influence of voluntary disclosure on firms' cost of debt capital increases during periods of credit rationing. When firms' credit ratings are used as the dependent variable, there is little evidence that the influence of conference call disclosure frequency increases during periods of credit rationing. There is, however, stronger evidence that the effect of earnings guidance disclosure frequency is of greater influence when credit becomes constrained. When firms' interest rates are used as the dependent variable, there is no evidence of an increased effect of conference call disclosure frequency during periods of credit rationing and very little evidence of an increased effect of earnings guidance disclosure frequency when credit is constrained.

Results from levels- and changes-model testing on smaller-firm and larger-firm subsamples provide mixed evidence of whether voluntary disclosure has a greater impact on firms' cost of debt capital during periods of credit rationing. When firms' credit ratings are used as the dependent variable, there is strong evidence that conference call disclosure frequency matters more to creditors of smaller firms than larger firms when

credit is rationed. There is mixed evidence, however, that earnings guidance disclosure frequency matters more to creditors of smaller firms than larger firms when credit becomes constrained. When interest rates are used as the dependent variable, there is mixed evidence as to whether either measure of voluntary disclosure matters more to creditors of smaller firms than larger firms during periods of credit rationing.

Upon closer examination, it appears that many of the expected effects of voluntary disclosure on firms' cost of debt capital load insignificantly in models where firms' interest rates are used as the dependent variable. Pittman and Fortin (2004) note that the interest rate variable, as constructed both here and in their study, potentially contains noise which makes it difficult to for regression models to pick up effects from right-hand side variables. Future research could examine whether the model used in this study is more sensitive to variation in interest rates of different ranks such as 0% to 5%, 5% to 10%, etc.

6. CONCLUSIONS

This study investigates how the observed relationship between firms' cost of debt capital and voluntary disclosure is influenced by credit market conditions. Prior literature indicates that when creditors are pessimistic, credit becomes rationed and creditors' screening and monitoring efforts increase (Rajan 1994; Ruckes 2004). While lenders have access to private information to satisfy information needs during periods of forecasted uncertainty (Rajan 1994; Jorion et al. 2005), information acquisition and processing is costly (Ruckes 2004; Bonner 2008). However, borrowers can partially subsidize the cost of monitoring by voluntarily disclosing financial information (e.g. Lang and Lundholm 1993) suggesting that voluntary disclosure becomes more important to creditors when credit is rationed. Thus, while prior literature finds that greater voluntary disclosure reduces firms' cost of debt capital (Sengupta 1998); I suggest that voluntary disclosure will have a greater effect on firms' cost of debt capital during periods of credit rationing.

Using conference call and earnings guidance disclosure frequency as my proxy for voluntary disclosure, I find some evidence that greater conference call disclosure frequency improves firms' credit ratings and reduces firms' interest rates more during periods of credit rationing. I also find some evidence that greater earnings guidance disclosure frequency improves firm's credit ratings and reduces firms' interest rates more during periods of credit rationing. These results suggest that the influence of voluntary disclosure on firms' cost of debt capital is greater when credit is constrained.

I also examine whether the effect of voluntary disclosure on firms' cost of debt capital during periods of credit rationing is conditional on firm size. Smaller firms have more opaque information environments relative to larger firms (e.g. Lang and Lundholm 1993) and are more likely to benefit from voluntary disclosure in debt contracting when credit is rationed. I find some evidence that greater conference call and earnings guidance disclosure frequency improves firms' credit ratings and reduces firms' interest rates more for smaller firms than larger firms during periods of credit rationing, suggesting that voluntary disclosure is more important to creditors of smaller firms than larger firms when credit becomes constrained.

My study contributes to extant literature by examining how credit market conditions affect the relation between voluntary disclosure and the cost of debt capital documented in prior literature. Anecdotal evidence of lax lending standards during the "easy credit" period of 2004-2006 (Acharya et al. 2009b) suggests that the importance of financial disclosure attenuates during periods of credit abundance. Prior economic literature also finds that screening and monitoring efforts of creditors become more strict (lax) during periods of credit rationing (abundance) (e.g. Rajan 1994; Ruckes 2004). My study adds to extant literature by demonstrating that creditors' use of voluntary disclosure varies in degree of influence and direction of association depending on whether credit is rationed or abundant, and that this result occurs despite increased financial disclosure since the passage of SOX documented in prior literature (Jain et al. 2008).

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APPENDIX A

The Holmstrom and Tirole (1997) model of credit rationing is simplistic in nature. Its purpose here is to conceptually demonstrate some of the dynamics of credit rationing and is not meant to be a depiction of all factors influencing the credit markets at any single point in time.

Scenario: A firm wants to invest in a project but lacks sufficient assets (e.g. cash) to pay for the project (i.e. internal capital is insufficient). The firm chooses outside financing (i.e. debt financing) to invest in the project.

Players : Firm (and manager), uninformed investors.

A = firm assets (or capital). The existing, but insufficient amount of capital the firm is able to put up.

I = cost of investment or cost of the project.

$A < I$ = the firm does not have enough collateral to pay for the project.

$I - A$ = the amount the firm needs to borrow from the investors.

p_H = the probability of success when the manager of the firm works (i.e. exerts effort).

p_L = the probability of success when the manager of the firm shirks (i.e. takes private benefits). The taking of private benefits is analogous to the manager acting in a way that is not in the best interest of the investor. Aside from the probability of the project failing (i.e. $1 - p_H$), manager impropriety is the investor's next biggest concern.

$\Delta p = pH - pL > 0$ = represents the strength of the signal as to whether the manager has worked or shirked. It is assumed that this probability is known in advance by both the manager and investor.

- If Δp is high (i.e. high pH and low pL), and the project fails, it will signal to the investor that the manager has likely shirked (i.e. that the failures was not likely due to misfortune).
- If the Δp is low (i.e. $p_H \approx p_L$) and the project failed, it will not be clear whether the project failed due to misfortune given the manager worked (i.e. $1 - p_H$) or to manager misbehavior given the manager shirked (i.e. $1 - p_L$).

B = private benefits inured to the manager as a result of shirking (instead of working). This also represents the manager's opportunity cost of working.

γ = the rate of return on investor capital (i.e. the rate of return demanded by investors). Represents the opportunity cost (as a percentage) of investing in the firm.

$I\gamma$ = the investor's opportunity cost.

Project outcomes:
1. Zero = Failure (zero returns from the project)
2. R = Success (project has positive returns)

$R = R_f + R_u$ = total returns from the project are allocated to the firm (R_f) and the investor ($_{Ru}$).

Investment Payoffs (total)

Successful project returns:
$p_H R$ = total project returns from the manager working
$p_L R + B$ = total project returns from the manager shirking (where private benefits are inured to the manager only).

$p_H R - \gamma I > 0$… or…
$p_H R > \gamma I$ = the project's total return (based on the probability of success due to working) must be greater than the return from investing that same project capital in another investment (i.e. opportunity cost). This is the necessary condition that must exist if investor is to invest in the firm.

$p_L R + B < \gamma I$ = if the manager shirks, the project's return, including private benefits must be less than the returns from investing the same funds in an alternative project. This condition is necessary to force the investor to incentivize the firm / manager against shirking.

$p_H R > \gamma I > p_L R + B$… or…
$p_H R > p_L R + B$ = the summary of the total payoff structure (for both the manager and investor).

$p_H R_f > p_L R_f + B$ = the manager's payoff structure, or…
$p_H R_f - p_L R_f > B$… or…
$R_f (p_H - p_L) > B$… or…
$R_f (\Delta p) > B$… or…
$R_f > B / \Delta p$ = the minimum return (i.e. incentive) demanded by the manager to work. The manager's share of the project's return must be greater than the private benefit inured if the manager shirks

Incentive Compatibility Constraint

$R = (B / \Delta p) - R_u$ = total return substituting "$B / \Delta p$" for "R_f"…or…

$R_u = R - (B / \Delta p)$ = the investor's incentive compatibility constraint (ICC). The return to the investor will equal the project's total return less the incentive to make the manager work (and not shirk). Note, *ceteris paribus*:

- As the manager's private benefit "B" increases, the investor's proportion of the total return "R_u" decreases. That is, as the temptation to shirk "B" increases, the investor will have to give up more of his / her return "R_u" in order to incentivize the manager to work (and not shirk).
- As the signal of manager effort "Δp" decreases, the investor's proportion of the total return "R_u" decreases. That is, because it is easier for the manager to get away with shirking if the signal between working and shirking "Δp" is opaque the investor will have to give up more of his / her return "R_u" in order to incentivize the manager to work (and not shirk).
- As the total project return "R" decreases, the investor's proportion of the total return "R_u" decreases. That is, as the project's total return decreases the residual return to the investor "R_u" after incentivizing the manager to work "R_f" also shrinks.

Maximum Pledgeable Income

$R_u = R - (B / \Delta p)$ = represents investor's proportion of the project's total return… or…

$p_H R_u = p_H[R - (B / \Delta p)]$ = investor's return given the probability of success from the manager working (and not shirking). Note that "$p_H[R - (B / \Delta p)]$" represents the investor's maximum pledgeable income, or the maximum amount that can be pledged to the investor without jeopardizing the manager's incentive to work.

γ (I – A) = represents investor's demanded return given rate of return "γ" and investment "I – A". This is equal to the investor's return "$p_H R_u$", or maximum pledgeable income, and can be rewritten in the context of the investor's ICC as…

γ (I – A) = $p_H[R – (B / \Delta p)]$… or…

I – A = $\{p_H[R – (B / \Delta p)]\} / \gamma$… or…

– A = $\{p_H[R – (B / \Delta p)]\} / \gamma$ – I… or…

A = I – $\{p_H[R – (B / \Delta p)]\} / \gamma$… or…

$A \geq I – \{p_H[R – (B / \Delta p)]\} / \gamma$ = the minimum amount of assets (i.e. collateral) that the firm must have "A" in order for the investor to put up financing. to get direct financing from investors. Several things to note from this equation:

1. As the project's investment amount "I" increases, the minimum amount of collateral the firm must put up "A" increases.
2. As the probability of success from the manager working "p_H" decreases, the signal between working and shirking "Δp" decreases (or become more opaque), and the minimum amount of collateral the firm must put up "A" increases.
3. As the total project return "R" decreases, the minimum amount of collateral the firm must put up "A" increases.
4. As the private benefits available to the manager "B" increases, the minimum amount of collateral the firm must put up "A" increases.
5. As the required rate of return by the investor "γ" increases, the minimum amount of collateral the firm must put up "A" increases.

As Holmstrom and Tirole (1997) discuss, in a credit constrained environment, firms with insufficient collateral "A" are rationed from any available credit. Typically, smaller firms are rationed first as larger firms tend to have sufficient collateral "A".

APPENDIX B

Dependent Variables

RATINGS = the score assigned to each firm's Standard & Poor senior debt rating score at the end of period *t*+1. See Table 1 for scoring methodology. Credit ratings were obtained from Compustat (variable "splticrm" in the ADSPRATE dataset). Higher values of *RATINGS* represent higher credit scores and a lower cost of debt capital.

Δ*RATINGS* = the change in each firm's Standard & Poor senior debt rating score from period *t* to period *t*+1. See Table 1 for scoring methodology. Credit ratings were obtained from Compustat (variable "splticrm" in the ADSPRATE dataset). Positive values of Δ*RATINGS* represents an improvement in credit ratings, and, generally speaking, going from more negative changes to less negative changes, or going from less positive changes to more positive changes represents an improvement in credit rating and a lower cost of debt capital.

INTRATE = each firm's interest rate for period *t*+1 calculated as total interest and related expense for period *t*+1 (variable "xint" in the Compustat FUNDA dataset) divided by average total debt at the end of period *t* and period *t*+1 (variables "dlc" plus "dltt" in the Compustat FUNDA dataset) multiplied by 100. Methodology follows Francis, et al. (2005) and Pittman and Fortin (2004). Higher values of *INTRATE* represent a higher cost of debt capital.

Δ*INTRATE* = the change in each firm's interest rate from period *t* to period *t*+1, where *INTRATE* for period *t*+1 is described above, and *INTRATE* for period *t* is calculated as total interest and related expense for period *t* (variable "xint" in the Compustat FUNDA dataset) divided by average total debt at the end of period *t*−1 and period *t* (variables "dlc" plus "dltt" in the Compustat FUNDA dataset) multiplied by 100. Positive values of Δ*INTRATE* represent an increase in the cost of debt capital.

Voluntary Disclosure Variables

CC# = the frequency of earnings conference calls held by each firm during period *t*. Higher values represent greater voluntary disclosure.

Δ*CC#* = the change in the frequency of earnings conference calls held by each firm from period *t*−1 to period *t*. Positive values represent an increase in voluntary disclosure.

CIG# = the frequency of earnings guidance issued by each firm during period *t*. Higher values represent greater voluntary disclosure.

Δ*CIG#* = the change in the frequency of earnings guidance issued by each firm from period *t*−1 to period *t*. Positive values represent an increase in voluntary disclosure.

Credit Market Condition Variables

Δ*SLOOS* = the change the average net percentage of bank survey respondents reporting tighter credit standards for commercial and industrial loans from period *t*−1 to period *t*, Table 2 shows the time-series trend in Δ*SLOOS*. Positive changes represent periods of increased credit rationing.

ΔKCFSI = the change in the Kansas City Federal Reserve Financial Stress Index from period *t*−1 to period t. Table 2 shows the time-series trend in Δ*KCFSI*. Positive changes represent periods of increased credit rationing.

Control Variables

DTA = firm leverage for period *t* calculated as the ratio of total debt (variables "dlc" plus "dltt" in the Compustat FUNDA dataset) to total assets (variable "at" in the Compustat FUNDA dataset) at the end of period *t*. Higher values represent higher leverage.

Δ*DTA* = the change in firm leverage from period *t*−1 to period *t*, where *DTA* for period *t* is described above, and *DTA* for period *t*−1 is calculated as the ratio of total debt (variables "dlc" plus "dltt" in the Compustat FUNDA dataset) to total assets (variable "at" in the Compustat FUNDA dataset) at the end of period *t*−1. Positive changes represent an increase in firm leverage.

LNSIZE = firm size for period *t* calculated as the log of 1 plus total assets (variable "at" in the Compustat FUNDA dataset) at the end of period *t*. Higher values represent larger firms.

Δ*LNSIZE* = the change in firm size from period *t*−1 to period *t*, where *LNSIZE* for period *t* is described above, and *LNSIZE* for period *t*−1 is calculated as the log of 1 plus total assets (variable "at" in the Compustat FUNDA dataset) at the end of period *t*−1. Positive changes represent an increase in firm size.

ROA = firm profitability for period *t* calculated as the ratio of income before extraordinary items (variable "ib" in the Compustat FUNDA dataset) to total assets (variable "at" in the Compustat FUNDA dataset) from period *t*−1 to period *t*. Higher values represent greater firm profitability.

ΔROA = the change in firm profitability from period *t*−1 to period *t*, where *ROA* for period *t* is described above, and *ROA* for period *t*−1 is calculated as the ratio of income before extraordinary items (variable "ib" in the Compustat FUNDA dataset) to total assets (variable "at" in the Compustat FUNDA dataset) from period *t*−2 to period *t*−1. Positive changes represent an increase in firm profitability.

COV = firm debt interest coverage for period *t* calculated as the ratio of operating income before depreciation (variable "oibdp" in the Compustat FUNDA dataset) to total interest and related expense (variable "xint" in the Compustat FUNDA dataset) during period *t*. Higher values represent debt interest coverage.

ΔCOV = the change in firm debt interest coverage from period *t*−1 to period *t*, where *COV* for period *t* is described above, and *COV* for period *t*−1 is calculated as the ratio of operating income before depreciation (variable "oibdp" in the Compustat FUNDA dataset) to total interest and related expense (variable "xint" in the Compustat FUNDA dataset) during period *t*−1. Positive changes represent an increase in debt interest coverage.

CAP = firm capital intensity for period *t* calculated as the ratio of gross property plant and equipment (variable "ppegt" in the Compustat FUNDA dataset) at the end of period *t* divided by total assets (variable "at" in the Compustat FUNDA dataset) at the end of period *t*. Higher values represent greater firm capital intensity.

ΔCAP = the change in firm capital intensity from period *t*−1 to period *t*, where *CAP* for period *t* is described above, and *CAP* for period *t*−1 is calculated as the ratio of gross property plant and equipment (variable "ppegt" in the Compustat FUNDA dataset) at the end of period *t*−1 divided by total assets (variable "at" in the Compustat FUNDA dataset) at the end of period *t*−1. Positive changes represent an increase in firm capital intensity.

LOSS = firm net loss indicator for period *t* where *LOSS* equals 1 if income before extraordinary items (variable "ib" in the Compustat FUNDA dataset) is less than or equal to zero for period *t*, and zero otherwise.

ΔLOSS = the change in firm net loss indicator from period $t-1$ to period *t*, where *LOSS* for period *t* is described above, and *LOSS* for period $t-1$ equals 1 if income before extraordinary items (variable "ib" in the Compustat FUNDA dataset) is less than or equal to zero for period $t-1$, and zero otherwise. Positive changes represent a firm going from a net profit in the prior period to a net loss in the current period.

SUB = firm subordinated debt indicator for period *t* where *SUB* equals 1 if a firm has subordinated debt (variable "ds" in the Compustat FUNDA dataset) at the end of period *t*, and zero otherwise.

ΔSUB = the change in firm subordinated debt indicator from period $t-1$ to period *t*, where *SUB* for period *t* is described above, and *SUB* for period $t-1$ equals 1 if a firm has subordinated debt (variable "ds" in the Compustat FUNDA dataset) at the end of period $t-1$, and zero otherwise. Positive changes represent a firm going from having no subordinated debt in the prior period to having subordinated debt in the current period.

Industry Fixed Effects = firms are assigned 1 of 17 industry classification codes based their individual 4-digit SIC code and the Fama-French 17 industry classification schema.

Year Fixed Effects = where each year is assigned its own indicator variable equal to 1 if the firm's fiscal year equals the indicator variable year, and zero otherwise.

VITA

Name:	Bret Westman Scott
Address:	Department of Accounting Mays School of Business Texas A&M University 460 Wehner Building, 4353 TAMU College Station, TX 77843-4353
Email Address:	bscott@mays.tamu.edu
Education:	B.A., Accounting, Western Washington University, 2001