Active CDS Trading and Managers' Voluntary Disclosure

Jae B. Kim
School of Accountancy, Singapore Management University
70 Stamford Road, Singapore 178900
jbkim@smu.edu.sg

Pervin Shroff
Carlson School of Management, University of Minnesota
321 19th Ave S, Minneapolis, MN 55455
shrof003@umn.edu

Dushyantkumar Vyas
Department of Management – UTM & Rotman School of Management
University of Toronto
105 St. George Street, Toronto, M5S 3E6, Canada
dushyantkumar.vyas@rotman.utoronto.ca

Regina Wittenberg-Moerman
The University of Chicago Booth School of Business
5807 South Woodlawn Avenue, Chicago, IL, USA
regina.wittenberg-moerman@chicagobooth.edu

First draft: March, 2014
This draft: September, 2014

We appreciate the helpful comments of Phil Berger, Neil Bhattacharya, Jeffrey Callen, Maria Correia, Xia Chen, Gus De Franco, Emmanuel De George, Christian Leuz, Miguel Minutti-Meza, Jeffrey Ng, Doug Skinner, Irem Tuna, Yoonseok Zang and workshop participants at London Business School and Singapore Management University. We are very grateful to Vincent Pham for excellent research assistance. We thank the Thomson Reuters Loan Pricing Corporation for providing loan data and RavenPack for media data. We gratefully acknowledge the financial support of the School of Accountancy Research Center at Singapore Management University, the Carlson School of Management at the University of Minnesota, the Rotman School of Management at the University of Toronto and the University of Chicago Booth School of Business.

Active CDS Trading and Managers' Voluntary Disclosure

Abstract

We investigate how the development of the credit default swap (CDS) market affects firms' voluntary disclosure choices. The CDS market has been criticized for its vulnerability to insider trading by informed lenders who trade on borrowers' private information. We predict that the threat of private information revelation in the spreads of actively traded CDSs will pressure managers into enhancing their voluntary disclosures to mitigate the litigation and reputation risks associated with non-disclosure. Consistent with our prediction, we find that managers are more likely to issue earnings forecasts when their firms have actively traded CDSs. Our results also suggest that liquid CDSs discipline managers to disclose bad news earnings forecasts, despite their career- and wealth-related incentives to withhold adverse information. In addition to disclosures via management forecasts, we document that liquid CDSs also enhance disclosure via firm-initiated press releases. Our findings suggest that informed trading by lenders in the CDS market results in a positive externality for capital markets by eliciting enhanced voluntary disclosures, thus contributing to a richer information environment.

1. Introduction

This paper investigates the effect of a significant institutional environment change of the last two decades – the development of the credit default swap (CDS) market – on firms' voluntary disclosure choices.[1] The CDS market has enabled financial institutions to distribute credit risk to parties who are more willing and able to bear it, thereby enhancing liquidity and flexibility in the financial system (Greenspan, 2004). However, many have criticized CDSs for significantly exacerbating the recent financial crisis (e.g., Bank of England, 2008, and Stanton and Wallace, 2009) and decreasing the efficiency of lender monitoring (e.g., Ashcraft and Santos, 2009, and Gong et al., 2011). Another major criticism of the CDS market is that it is vulnerable to insider trading, as large financial institutions, the common counterparties in CDS contracts, often trade on inside information about CDS reference entities obtained in their capacity as private lenders (e.g., The Economist, 2003, The Financial Times, 2005, Acharya and Johnson, 2007, and Standard and Poor's, 2007). We propose that this allegedly negative attribute of the CDS market – informed trading by lenders – results in a positive externality for capital markets by eliciting enhanced voluntary disclosures from CDS reference entities.

Large financial institutions trade in the CDS market to satisfy their hedging and speculative needs. They also serve as dealers in this market, often supplying CDS spread quotes for firms to which they have loan exposure. Because these institutions typically do not have perfect Chinese walls between their lending and trading activities, material non-public information obtained through their lending activities is frequently traded on in the CDS market. Trading by informed lenders thus often results in the revelation of a substantial amount of private information through CDS pricing (Glantz, 2003, and Whitehead, 2012). We argue that the threat of lenders trading on

[1] A CDS protects the buyer of the contract against default risk in return for a periodic payment (CDS spread) over the term of the contract. The buyer is compensated if the reference entity and/or its credit instruments experience a "credit event" specified in the contract, such as default, restructuring, bankruptcy or a credit rating downgrade.

private information and the consequent revelation of such information in CDS spreads will increase managers' exposure to the litigation and reputation risks associated with non-disclosure. In response to this heightened risk exposure, we predict that managers will enhance their voluntary disclosures and level the playing field between informed and uninformed investors.[2]

While there is evidence that lenders trade on their borrowers' private information in other markets (e.g., Ivashina and Sun, 2011, and Massoud et al., 2011), we expect lenders' insider trading in the CDS market to have a more pronounced effect on a firm's voluntary disclosure.[3] First, the CDS market is considerably less regulated and is subject to less stringent SEC scrutiny relative to bond and stock markets (e.g., ISDA, 2003, Bloomberg, 2006, The Wall Street Journal, 2006 and 2007, and Yadav, 2013). In particular, over our sample period, CDSs were largely exempted from the restrictions of SEC's Rule 10b-5 because swaps are excluded from the definition of "securities" by the Commodity Futures Modernization Act of 2000.[4] Second, prior research shows that lenders' insider trading in the equity market is limited to non-bank institutional investors, such as mutual and hedge funds, with no evidence of banks engaging in such behavior (e.g., Bushman et al., 2010).[5] In contrast, a distinguishing characteristic of the CDS market is that banks with access to a firm's private information via lending relationships are the common counterparties and dealers in CDS contracts, which substantially increases the

[2] Consistent with CDS trading imposing pressure on companies to disclose, managers are frequently asked by market participants to comment on sizable changes in their firm's CDS spreads when they are unaccompanied by public information disclosure (Bloomberg, 2006, and The Wall Street Journal, 2006).

[3] Ivashina and Sun (2011) and Massoud et al. (2011) show that non-bank institutional lenders, such as hedge funds, trade in the equity market on the borrower's confidential information around information intensive events, such as loan originations and renegotiations.

[4] Subsequent to our sample period, the 2010 Dodd-Frank Act extends the reach of Rule 10b-5 to over-the-counter derivatives markets, including the CDS market. However, extending traditional insider trading laws to the CDS market poses serious challenges as the law must accommodate the distinctive features of trading in credit derivatives (e.g., Levene, 2012, and Yadav, 2013).

[5] Bushman et al. (2010) also show that insider trading by non-bank institutional investors is concentrated in the equities of opaque borrowers, such as firms with no management earnings forecasts and few firm-initiated press releases.

likelihood of private information revelation in CDS spreads. Third, due to informed lenders' trading, CDS spreads often reflect private information ahead of public disclosures and price discovery in other markets (e.g., Glantz, 2003, Standard and Poor's, 2007, and Whitehead, 2012). Acharya and Johnson (2007) and Qiu and Yu (2012) show that the CDS market leads the equity market in price discovery, particularly when a CDS reference entity has a high number of ongoing banking relationships, which is consistent with informed trading by lenders. The CDS market also leads the bond market in price discovery (Blanco et al., 2005) and, prior to adverse information events, the equity option market as well (Berndt and Ostrovnaya, 2007).[6] Blanco et al. (2005) emphasize that price discovery is faster in the CDS market because it is the most convenient venue for informed investors to trade credit risk. Substantial anecdotal evidence also suggests that CDS spreads reflect information ahead of price movements in other markets (e.g., The Wall Street Journal, 2006, 2007, Bloomberg, 2006, and The New York Times, 2007).

We expect the CDS market to have a pronounced effect on managers' voluntary disclosure choices mainly when CDS contracts are actively traded. Prior literature shows that liquidity enhances price discovery in the stock market (e.g., Subrahmanyam and Titman, 2001, Khanna and Sonti, 2004, and Chordia et al., 2006). Prices from liquid markets are more informative due to their timely incorporation of information, the increased incorporation of private information, and a quicker convergence to fundamentals (e.g., Chordia et al., 2006, Sadka and Scherbina, 2007, and Fang et al., 2009). Supporting the importance of liquidity in enhancing the information content of CDS spreads, Qiu and Yu (2012) find that the most liquid firms in the CDS market are associated with the highest level of informed trading. We follow Qiu and Yu (2012) and measure

[6] Even though private information is typically quickly revealed via option trading (e.g., Diamond and Verrecchia, 1987, Skinner, 1990, and Chakravarty et al., 2004), Berndt and Ostrovnaya (2007) find that the equity market does not respond to information revealed by option prices unless the information is also manifested in the CDS market. A potential explanation offered by the authors is that options are more likely to trade on unsubstantiated rumors.

CDS liquidity by the annual CDS market depth, proxied by the average number of distinct dealers providing a firm's daily CDS spread quotes over a given year.[7]

To test our predictions, we focus on the management decision to issue earnings forecasts, which represents one of the most important voluntary disclosure choices (Beyer et al., 2010). Due to the *threat* that lenders may engage in informed trading in the CDS market, managers may be compelled to inform investors at the same time that they convey information to lenders, thus providing public disclosures prior to or simultaneous with information revelation through CDS spreads. However, managers may also choose to respond to insider trading by lenders, thus providing public disclosures subsequent to informing lenders and the consequent private information revelation through CDS spreads. Because our main focus is to examine whether active CDS trading elicits enhanced voluntary disclosures and because the exact timing of information provision from managers to lenders is unobservable, our predictions relate to overall disclosure intensity, without differentiating between these two potential disclosure strategies.

We find that firms with actively traded CDS contracts are more likely to issue a management forecast relative to non-CDS firms or firms with less liquid CDS contacts. Economically, having liquid CDS contracts increases the likelihood of a management forecast by 14.0%. We reaffirm this finding and show that active CDS trading is strongly associated with the number of management forecasts issued; the management forecasts of firms with liquid CDSs are 1.49 times more frequent relative to those issued by other sample firms. While these findings are consistent with our predictions, it is possible that firms with liquid CDS contracts are different from other sample firms in ways that are systematically related to their voluntary disclosure choices. We conduct a series of tests to mitigate endogeneity concerns.

[7] Because CDSs trade over the counter, liquidity measures based on trading activity and bid-ask spreads are unavailable for a comprehensive sample of CDS contracts. We find robust results when we employ an alternative liquidity measure based on the number of distinct maturities of traded CDS contracts for a firm.

We begin by comparing the sample of liquid CDS firms with a matched-firm control sample constructed using the propensity score matching methodology (PSM) and continue to find a significant effect of liquid CDSs on management forecast disclosure. We also employ an instrumental variables (IV) approach. Our instruments capture bond investors' hedging and speculative demand in the CDS market and the extent of insider trading in this market, which we do not expect to be directly related to management's voluntary disclosure. Relying on the *negative* relation between the bond market's and the CDS market's liquidity (Oehmke and Zawadowski, 2013), we follow Boehmer et al. (2013) and use the level of bond trading volume of a firm's industry peers as a (*inverse*) measure of bond investors' CDS trading demand. Our alternative instrument that captures bond investors' trading demand in the CDS market reflects whether the reference entity's bond credit ratings are on the investment grade/speculative grade rating frontier (BBB+, BBB, or BBB- rating). This instrument follows Qiu and Yu (2012), who show an inverse U-shaped relation between CDS liquidity and credit ratings, in line with bond investors' hedging demand being strongest for bonds on the frontier. Building on a strong positive relation between CDS liquidity and the number of the firm's informed lenders (Qiu and Yu, 2012), our second instrument, which reflects the extent of insider trading in the CDS market, is based on the number of lenders involved in a firm's outstanding loans. The results of IV tests also suggest that firms with liquid CDSs are more likely to voluntarily disclose earnings news.

To further address endogeneity concerns in general and reverse causality in particular, we perform a number of tests that examine how an *increase* in CDS liquidity affects voluntary disclosure. Although liquidity in the CDS market is provided primarily by informed lenders with access to a firm's private information (Qiu and Yu, 2012) and is therefore unlikely to be affected by a firm's public disclosures, there may be a concern that managers' voluntary public disclosure

can affect CDS liquidity. To address this reverse causality concern, in the first set of liquidity change analyses, we identify the year in which a firm's CDS liquidity changes from low to high for the first time during the sample period and then compare the extent of forecast disclosure in the pre- and post-change periods. Consistent with expectation, we find that a firm's forecast likelihood and the number of forecasts issued are significantly higher following a switch from low to high CDS liquidity. Next, we examine the changes specification, where we relate *changes* in forecast activity to the change in CDS liquidity. We find that an increase in CDS liquidity from the low to high category significantly increases the number of earnings forecasts.

We also show that all our liquidity analyses are robust to the exclusion of firms that experience an increase in stock market liquidity in the same year as the increase in CDS liquidity. If, in line with reverse causality, an increase in forecast activity is the primary driver of an increase in CDS liquidity, this increased forecast disclosure should also increase the liquidity of a firm's equity (e.g., Diamond and Verrecchia, 1991, and Leuz and Verrecchia, 2000). Thus, by focusing on firms with an increase in CDS liquidity but no simultaneous increase in stock liquidity, it is more likely that our results capture the effect of an increase in CDS liquidity on forecast disclosure rather than the other way around.

Having addressed endogeneity concerns, we next examine the effect of liquid CDSs on the voluntary disclosure of bad news. Because the information revelation of bad news is especially timely in the CDS market (Acharya and Johnson, 2007, and Qiu and Yu, 2012), we expect liquid CDSs to pressure managers to disclose bad news in particular. We focus on the sample of forecasting firms (i.e., firm-year observations with at least one management forecast) and find that liquid CDSs are associated with a significantly higher frequency of bad news forecasts, both in absolute terms and relative to the total number of management forecasts in a given year. We

also find that the effect of liquid CDSs on forecasting strengthens with negative credit news, as measured by an increase in abnormal CDS spreads, further suggesting that unobservable firm characteristics correlated with CDS liquidity are unlikely to drive forecasting behavior.

Next, we validate that the enhanced bad news forecast disclosure is indeed driven by liquid CDSs and not by firm characteristics potentially associated with negative news. We repeat the analyses for the sample of liquid CDS firms with negative news in the forecast year and control firms without liquid CDSs matched on the magnitude of negative news, when negative news are measured by a negative earnings surprise or an increase in abnormal CDS spreads. We find that, conditional on negative news, firms with liquid CDSs have a significantly higher frequency of bad news earnings forecasts relative to their matched firms. Thus, liquid CDSs pressure managers to disclose bad news, despite their career- and wealth-related incentives for delaying the revelation of adverse information (Graham et al., 2005, and Kothari et al., 2009).

To provide further support for the disciplining effect of liquid CDSs on bad news forecast disclosure, we also examine how CDSs affect the frequency of unbundled bad news forecasts (forecasts that are not bundled with earnings announcements). While most earnings forecasts are issued in conjunction with earnings announcements in recent years (Anilowski et al., 2007, and Rogers and Van Buskirk, 2009), unbundled forecasts are more salient and provide more timely information to investors (e.g., Atiase et al., 2005, and Baginski et al., 2012). We find that liquid CDSs induce the timely updating of earnings expectations via unbundled bad news forecasts, consistent with liquid CDSs pressuring managers to promptly disclose adverse information.

In our final set of analyses, because managers can convey information to investors through multiple disclosure channels, we explore the association between liquid CDSs and voluntary disclosure via press releases. Because identifying voluntary disclosure through press releases and

quantifying the sign of press release news is challenging (see the discussion in Section 4.5), we view the press release tests as supplemental to our earnings forecast analyses. We find that firms with liquid CDSs issue a higher number of press releases and exhibit a higher frequency of negative press releases. Our findings suggest that, in response to actively traded CDSs, managers enhance disclosures not only through earnings forecasts but also via other channels.

Our study contributes to the literature along several dimensions. There is an intense debate about the economic effects of financial innovation in general and credit default derivatives in particular. While some studies highlight the role of the CDS market in enhancing the liquidity and flexibility of credit markets (e.g., Saretto and Tookes, 2013), others indicate substantial negative consequences of CDS trading, such as the exacerbated credit risk of reference entities (e.g., Subrahmanyam et al., 2012), informed lenders' insider trading (e.g., Acharya and Johnson, 2007), reduced lender monitoring and the empty creditor problem (Hu and Black, 2008, Bolton and Oehmke, 2011, and Gong et al., 2011). We extend this literature by highlighting a positive externality of CDS trading. Our results suggest that, by eliciting enhanced voluntary disclosures, active CDS trading contributes to a richer information environment in capital markets.

Second, we contribute to the extensive research on voluntary disclosure. Prior studies have identified securities litigation, information uncertainty, institutional ownership, proprietary costs, management composition and investor sentiment as important drivers of disclosure choices (e.g., Verrecchia, 1983, Bergman and Roychowdhury, 2008, Kwak et al., 2012, and Bozanic et al., 2013). However, with the exception of Lo (2014), who examines disclosure changes following the emerging-market financial crises of the late 1990s, little is known about how changes in the institutional environment affect managers' incentives to voluntarily disclose information (Beyer et al., 2010). Our paper fills this void by shedding light on how the development of the CDS

market and the threat of informed lenders' trading in this market induce managers to enhance their voluntary disclosure practices. In particular, our evidence suggests that active CDS trading plays a disciplining role by eliciting the voluntary disclosure of bad news.

Finally, we extend the growing research on the consequences of financial institutions' exploitation of their access to firms' private information through lending relationships (Ivashina and Sun, 2011, Massoud et al., 2011, and Kang and Mullineaux, 2011). Bushman et al. (2010) find that non-bank institutional lenders trade on private information in the secondary loan and equity markets, but that this informed trading enhances price discovery in both markets. Our contribution is to further highlight a potential positive externality of lenders' access to a borrower's private information. We suggest that the revelation of private information in CDS spreads, induced by informed lenders' trading, can lead to positive capital market effects by enhancing firms' voluntary disclosures.

The next section presents our hypotheses development. Section 3 describes the sample and data. Section 4 reports our main results and Section 5 concludes the paper.

2. Motivation, Related Literature and Hypotheses Development

2.1 Information flows in the CDS market

Our study integrates two different strands of the literature – the literature on voluntary disclosure and the literature on information flow in the CDS market. Voluntary disclosure plays a key role in shaping a firm's information environment. Previous studies demonstrate that managers' voluntary disclosure choices are determined to a large extent by investor demand for information in the presence of uncertainty (Ajinkya and Gift, 1984, Waymire, 1985, and Coller and Yohn, 1997) and the threat of securities litigation (e.g., Skinner, 1994, and Baginski et al., 2002). We expect the development of the CDS market, one of the more significant financial

innovations in recent times, to have a substantial influence on managers' voluntary disclosure practices. The CDS market has grown from an exotic niche market in the 1990s to the largest credit risk trading venue, with a total notional CDS amount outstanding of $27 trillion in June 2012, following a peak of $62.2 trillion outstanding in the second half of 2007, prior to the financial crisis.[8] We examine whether and how the frequent revelation of private information in the CDS market, which often leads public information disclosure and price discovery in other markets, affects managers' incentives to voluntarily disclose information to investors.

The dominant players in the CDS market are major banks and financial institutions with access to material non-public information about CDS reference entities through their lending activities. This confidential information usually includes timely financial disclosures, covenant compliance information, amendment and waiver requests, financial projections, and plans for acquisitions or dispositions and is typically provided to lenders well in advance of its public release (Standard and Poor's, 2007).[9] In addition to trading in the CDS market to satisfy their hedging and speculative needs, informed lenders often serve as dealers in this market. While guidance from the International Swaps and Derivatives Association suggests that "…banks must not use private knowledge about corporate clients to trade instruments such as credit default swaps," absent effective Chinese walls between loan officers and bank trading desks, material non-public information frequently gets traded on in the lightly regulated CDS market (e.g., The Economist, 2003, Financial Times, 2005, and Standard and Poor's, 2007).

In addition, hedge funds have lately intensified their CDS trading, further fuelling insider

[8] CDS contracts are mostly standardized according to the guidance of the International Swaps and Derivatives Association (ISDA). CDS contracts have a variety of standard terms, ranging from six months to thirty years, although CDS contracts with a five year maturity are the most actively traded.

[9] Reg FD exempts the private communication of information to lenders conditional on lenders adhering to confidentiality provisions in loan agreements (LSTA, 2007a and 2007b, and Li et al., 2013). According to the Loan Syndication and Trading Association (LSTA), if lenders breach these provisions, as in the case of trading on private information, the selective disclosure to lenders may no longer qualify as Reg FD compliant.

trading concerns. Hedge funds often gain access to private information through participation in syndicated loans' (e.g., Bushman et al., 2010, Ivashina and Sun, 2011, and Massoud et al., 2011) and tight connections with large financial institutions (e.g., The Wall Street Journal, 2006, The New York Times, 2007, and Financial Times, 2009). In its first CDS insider trading case, the SEC recently charged a hedge fund with insider trading in CDSs on the basis of private information learned from a major investment bank (Financial Times, 2009, and Yadav, 2013).[10]

Because CDS spreads often reflect a substantial amount of private information transmitted via informed investor trading, changes in CDS pricing typically provide more timely feedback on a firm's performance than the pricing of its public debt or equity securities (Glantz, 2003, and Whitehead, 2012). Significant movement in credit derivatives prices without any corresponding news usually serves as an indication to investors that private lenders have received information that is not yet public (Standard and Poor's, 2007). In a number of acquisition transactions (e.g., First Data, HCA Inc., Harrah's Entertainment Inc., Anadarko Petroleum Corp), CDS spreads reflected information about upcoming deals weeks ahead of the deals' public announcements and price movements in the equity and bond markets (The Wall Street Journal, 2006 and 2007, Bloomberg, 2006, and The New York Times, 2007).[11] Academic literature also demonstrates that the CDS market often leads other securities markets in price discovery (Blanco et al., 2005, Acharya and Johnson, 2007, Berndt and Ostrovnaya, 2007, and Qiu and Yu, 2012).[12] Blanco et

[10] The SEC alleged that Jon-Paul Rorech from Deutsche Bank Securities Inc. tipped off Renato Negrin, a portfolio manager at Millennium Partners L.P., about a contemplated change to the bond structure of VNU N.V, and that Negrin purchased a CDS contract on VNU N.V for the Millennium hedge fund.

[11] For example, on December 1st, 2006, when Kohlberg Kravis Roberts & Co (KKR) first approached First Data, the cost of insuring $10 million of First Data bonds against default was about $32,000. By December 19th, First Data swaps were trading at $49,000 (for $10 million notional) and on January 17th — the day First Data told KKR that the company's board wanted to pursue a deal — the cost jumped to $70,000. The public announcement of the deal did not happen till April 2nd, 2007, when the cost of insuring $10 million bonds exceeded $112,000 (The Wall Street Journal, 2007).

[12] Longstaff et al. (2005), and Norden and Weber (2007) also suggest that the CDS market plays an important role in equity and bond price discovery.

al. (2005) highlight that price discovery is more likely to occur in the market in which informed traders transact the most. The micro-structure of the CDS market, its synthetic nature, and liquidity provision from different credit holders seeking to hedge their exposure make it the primary forum for trading credit risk, thus leading to faster price discovery. Lenders trading on a borrowers' private information and the consequent prompt reflection of such information in CDS spreads should make the firms' withholding of information evident to investors. Thus, to mitigate the litigation and reputation risk associated with non-disclosure, we expect managers to enhance their voluntary disclosure practices.

2.2 The importance of CDS liquidity and empirical predictions

The main premise of our paper is that, due to lenders' informed trading, CDS spreads may reveal firms' private information ahead of public disclosures and price discovery in other markets. We expect the revelation of private information through CDS spreads to be pronounced mostly when CDS contracts are actively traded, i.e., when CDS contracts are highly liquid. While there is little evidence on the role of liquidity in price discovery in the CDS market, prior research shows that liquidity enhances price discovery in the stock market. Subrahmanyam and Titman (2001) and Khanna and Sonti (2004) show that liquidity stimulates trading by informed investors, thus making stock prices more informative. Liquid prices incorporate information on a more timely basis, increase the incorporation of private information, enhance the convergence of stock prices to fundamentals, and are more informative about a firm's future performance (e.g., Chordia et al., 2006, Sadka and Scherbina, 2006, Fang et al., 2009, and Kerr et al., 2013).

The high involvement of informed financial institutions in liquidity provision in the CDS market further supports the importance of liquidity in enhancing the information content of CDS spreads. Qiu and Yu (2012) show that the number of dealers providing CDS spread quotes is

determined to a large extent by the CDS reference entity's number of banking relationships. The authors infer that liquidity in the CDS market is provided by informed financial institutions. They further support their claim by showing that the reference entities that are traded most actively in the CDS market are associated with the highest level of informed trading, as measured by the incremental price discovery relative to the equity market.

Because spreads of liquid CDS contracts are likely to promptly and accurately reveal private information communicated by firms to their lenders, we hypothesize that the existence of liquid CDS trading will pressure managers to enhance voluntary disclosure to mitigate the litigation and reputation risks associated with non-disclosure. Further, we expect liquid CDSs to have a significant effect on the voluntary disclosure of *bad* news. While a number of studies show that firms tend to preempt large negative earnings surprises (e.g., Skinner, 1994, 1997, and Kasznik and Lev, 1995), Kothari et al. (2009) argue that career concerns and managers' wealth tied to a firm performance can induce managers to withhold the disclosure of bad news in the hope that subsequent favorable outcomes will obviate the need to disclose it. Survey evidence in Graham et al. (2005) also suggests that managers have strong incentives to withhold bad news. We argue that, because the information revelation of bad news is especially timely in the CDS market (Acharya and Johnson, 2007, and Qiu and Yu, 2012), managers' withholding of bad news should become evident to investors. Also, litigation and reputation concerns are greater when managers delay the disclosure of negative news (e.g., Skinner, 1994, 1997, and Baginski et al., 2002). Plaintiffs in class-action lawsuits typically claim large losses due to significant security price declines caused by managers not disclosing adverse information promptly. Therefore, we expect that the threat of lenders engaging in informed trading on negative private information in the CDS market will overshadow managers' career- and wealth-related incentives for delaying

bad news and lead to its prompt disclosure. In other words, we expect liquid CDSs to play a disciplining role by encouraging managers to reveal adverse information, thus contributing to an improved information environment.

To examine our hypotheses, we focus on one of the most important voluntary disclosure choices – management's decision to issue earnings forecasts. Beyer et al. (2010) show that, for the average firm, earnings forecasts account for 15.67% of the quarterly return variance and represent the main accounting-based information disclosure. Particular to our setting, earnings information is of significant importance to CDS market participants as well as to lenders. Shivakumar et al. (2011) find that earnings forecasts represent an important information event in the CDS market. In addition, private lenders frequently get management updates about expected earnings via private financial disclosures, covenant compliance reports and amendment and waiver requests, mainly because of the widespread use of earnings-based covenants in loan contracts. Lenders' access to upcoming earnings news and the threat that this news will be promptly revealed in the spreads of liquid CDSs via lenders' trading should incentivize managers to enhance their earnings forecasting activities. We thus predict that firms with liquid CDSs are more likely to inform investors via earnings forecasts relative to non-CDS firms or firms with low liquidity CDSs.

Because managers may level the playing field between informed and uninformed investors through additional disclosures, we supplement our analyses by examining another voluntary disclosure channel – firm-initiated press releases. We predict that firms with liquid CDS contracts have higher press release intensity relative to other sample firms. Across all earnings forecasts and press release disclosures, we expect liquid CDS trading to have a pronounced effect on the voluntary disclosure of bad news.

3. Sample, Data and Descriptive Statistics

3.1 Data sources and sample selection

We employ the First Call database to obtain management forecast characteristics.[13] The data on traded CDS contracts, including contract existence, the number of dealers and CDS spreads are from the Markit database, which covers the traded CDS contracts of U.S. firms starting in 2002. Data on firms' lending relationships is retrieved from the DealScan database provided by the Thomson Reuters Loan Pricing Corporation. Bond trading data is obtained from the TRACE (Trade Reporting and Compliance Engine) database and data on outstanding principal amounts and bond ratings are obtained from the Mergent Fixed Income Securities database. Data on firm-initiated press releases is from RavenPack News Analytics, which covers all news disseminated via Dow Jones Newswires. Data on firm characteristics is obtained from COMPUSTAT and CRSP. We obtain data on analyst coverage, equity issuances and institutional ownership from the I/B/E/S, Security Data Corporation's Global News Issues and Thomson-Reuters Institutional Holdings (13F) databases, respectively.

Table 1 summarizes the sample selection process. To align the availability of data from our two primary data sources, the First Call and Markit databases, we focus on the 2002-2010 period. For this period, First Call covers 8,702 firms, representing 57,396 firm-year observations. Requiring COMPUSTAT data on firm characteristics restricts our sample to 5,034 firms, representing 25,130 firm-year observations. After matching this final sample that we use in our tests with Markit, we obtain 775 firms with traded CDS contracts over the sample period, representing 4,517 firm-year observations.

[13] Chuck et al. (2013) demonstrate that the First Call database does not incorporate all management forecasts (relative to a sample of forecasts hand-collected through a search of firm press releases). Because our sample period starts in 2002, this issue is mitigated for our study, as Chuck et al. (2013) show that First Call's coverage is more comprehensive after 1997.

3.2 Descriptive statistics

Table 2 provides the descriptive statistics for our primary variables of interest. Our main CDS liquidity measure is estimated based on the number of distinct dealers providing CDS spread quotes for the firm on a given day and proxies for market depth (following Qiu and Yu, 2012). We focus our analyses on CDS contracts with a five year maturity and an MR (Modified Restructuring) clause, which represents the most commonly traded CDS contract type.[14] We estimate the annual average of the number of distinct dealers providing daily quotes for each firm in our sample (*Depth*). CDS quotes are provided, on average, by six dealers, with a standard deviation of 4.4 and an interquartile range of 5.9, suggesting substantial variation in market depth across firms. To account for the intertemporal evolution in the number of dealers providing spread quotes in the CDS market over our sample period, we define the *Liquid CDS* variable as equal to one if the firm's annual *Depth* measure in a given year is above the sample median depth in that year, zero otherwise (all variables are described in detail in the Appendix). The mean value of *Liquid CDS* indicates that 9% of firm-year observations in our sample have liquid CDS contracts (note that 18% of our firm-year observations have traded CDS contracts).

We define the *Forecast* variable to be equal to one if the firm issues at least one annual or quarterly forecast in a given year, zero otherwise.[15] The mean value of the *Forecast* variable is 0.43, which indicates that a considerable number of firm-year observations in our sample have management forecast activity. Kwak et al. (2012) report similar descriptive data for their 1997-

[14] CR (Cumulative Restructuring), MM (Modified-Modified Restructuring) and XR (Ex-Restructuring or Without Restructuring) clauses are substantially less prevalent relative to the MR clause. Similarly, five year contracts are significantly more commonly traded than other tenors. Moreover, Markit reports the number of distinct dealers providing CDS spread quotes for five year contracts only.

[15] Following previous studies (e.g., Ajinkya et al. 2005, and Houston et al., 2010), we exclude earnings forecasts issued between the fiscal-period end and the earnings announcement date, i.e., pre-announcements, because these forecasts are considered a part of the management's earnings announcement strategy rather than a voluntary disclosure activity. Our inferences remain the same when we include these pre-announcements in the measurement of forecast issuance and frequency (untabulated).

2009 sample period. *Number of Forecasts* is estimated as the number of annual and quarterly forecasts in a given year and has a sample mean of 2.05.

Sample firms are relatively large, as reflected by the mean and median values of total assets (*Firm Size*). The mean market-to-book ratio *(Market to Book)* is 3.063. The mean ratio of earnings before extraordinary items to total assets (*ROA*) is -0.003. As reflected by the standard deviation of *Return Volatility*, there is considerable variation in riskiness across sample firms. Sample firms have substantial institutional ownership and analyst following. A relatively small proportion (9.2%) of firm-year observations has equity issuances (*Equity Issuance*) and 32.7% of firm-year observations belong to high litigation industries (*High Litigation Industry)*.

4. Empirical Results

4.1 The impact of liquid CDS trading on the issuance of management forecasts

We begin our analyses by testing the relation between the issuance of management earnings forecasts and the existence of high-depth (liquid) CDS contracts for the firm, controlling for other firm characteristics that are likely to be associated with management's forecasting activity. We estimate the following Probit model:

$$Forecast = \beta_0 + \beta_1 Liquid\ CDS + \sum \beta_i Firm\ Control_i + \varepsilon \quad (1)$$

where *Forecast* is an indicator variable reflecting whether a firm has issued at least one earnings forecast in a given year. Our main variable of interest, *Liquid CDS*, captures the existence of liquid CDS contracts for a firm, as measured in the year preceding the forecast year. According to prior studies (e.g., Baginski et al., 2002, Ajinkya, 2005, Bergman and Roychowdhury, 2008, Rogers and Van Buskirk, 2009, and Kwak et al., 2012), we control for firm size, market-to-book ratio, profitability, return volatility, institutional ownership, analyst following, equity issuance

and membership in a high litigation industry.[16] Following prior research, except for profitability, return volatility and equity issuance, which relate to the forecast year, other determinants of forecast likelihood are measured in the year preceding the forecast year. In all analyses, standard errors are clustered at the firm level.[17]

We present our findings in column 1 of Table 3, Panel A. Consistent with our predictions, a significant and positive coefficient on *Liquid CDS* indicates that the likelihood of an earnings forecast is positively associated with the existence of a firm's liquid CDS contracts. This result is also economically significant – having liquid CDS contracts increases the likelihood of a management forecast by 14.0%. For comparison, a one standard deviation change in institutional ownership and analyst following increases this likelihood by 8.6% and 12.7%, respectively.

As an alternative measure of earnings forecast activity, we examine the number of management forecasts issued (*Number of Forecasts*). We estimate model 1 as a Poisson regression and present the results in column 2. Consistent with the strong association between *Liquid CDS* and the probability of a management forecast reported in column 1, we find that *Liquid CDS* is significantly associated with the number of management forecasts issued. The economic magnitude of this effect is sizable – the coefficient estimate of 0.395 on *Liquid CDS* in column 2 corresponds to an incidence rate ratio of 1.49, suggesting that management forecasts of firms with liquid CDSs are 1.49 times more frequent relative to management forecasts issued by other sample firms.[18]

The coefficient estimates on control variables are generally consistent with prior studies.

[16] Due to potential non-linearity in the relation between voluntary disclosure and firm size, in untabulated analyses, we also include a squared term of a firm's size measure. Our findings are unaffected by this additional control.

[17] In light of Greene's (2004) criticism relating to the inclusion of fixed effects in non-linear models, we do not incorporate year and industry fixed effects into the model. However, in untabulated robustness tests, when we add these fixed effects to the estimation, our findings and inferences are unchanged.

[18] In untabulated robustness tests, we exclude the crisis years of 2008 and 2009 due to very low CDS market liquidity in these years. Our findings with respect to both forecast likelihood and frequency remain unchanged.

Firms with higher profitability are more likely to voluntarily disclose earnings forecasts and issue a higher number of forecasts, while firms with a higher market-to-book ratio and higher stock return volatility are less likely to issue forecasts and forecast less frequently. Forecast activity is also increasing in institutional ownership and analysts' following and is higher for firms belonging to high litigation industries, but is negatively associated with equity issuances.[19]

In Panel B of Table 3, we replicate our tests with an alternative liquidity measure based on the number of distinct maturities (terms) of a firm's CDS contracts traded on a given day.[20] We acknowledge that this measure is a noisy proxy for market depth, as it is likely to be affected by a firm's debt maturity structure and by differences in investors' hedging demand for different debt terms. Hence, we view this analysis as a robustness check with respect to the tests presented in Panel A. We measure the annual average of the number of distinct terms for each firm in our sample. Sample firms have, on average, 7.6 distinct CDS contract terms. We set the term-count-based *Liquid CDS* variable to be equal to one if the firm's annual average term count measure in a given year is above the sample median term count in that year, zero otherwise. We continue to find that liquid CDSs are strongly positively associated with the likelihood of the issuance of a management forecast (column 1) and the number of management forecasts (column 2). The economic significance of the term-count-based liquidity measure is similar to that of the *Liquid CDS* variable used in our primary tests. Having liquid CDS contracts increases the likelihood of a management forecast by 13.7% and the incidence rate ratio for the management forecasts of firms with liquid CDS contracts relative to that of other sample firms is 1.47.

Overall, the results presented in Table 3 are consistent with our hypothesis that actively

[19] Our results are unchanged if the firms are assigned to a high litigation industry based on the measure developed by Kim and Skinner (2012) instead of the SIC-code-based measure used in our primary analyses.

[20] Saretto and Tookes (2013) use the daily number of CDS quotes as their primary liquidity measure, which represents a combination of distinct term counts provided by different dealers. While this measure is not provided by the Markit database, it is similar in spirit to our term-count-based measure.

traded CDSs enhance managers' voluntary disclosure activity. However, an important potential concern is the possibility that firms with liquid CDS contracts are different from non-CDS firms or from firms with low liquidity CDS contracts in ways that are systematically related to voluntary disclosure choices. To examine whether endogeneity is likely to be driving our main results, we employ three additional sets of tests, discussed in the next section: 1) propensity score matching, 2) instrumental variable approach, and 3) liquidity change analysis.[21]

4.2 The propensity score matching and instrumental variable approaches

4.2.1 What factors determine liquid CDS trading?

In this section, we mitigate endogeneity concerns by employing two empirical approaches that directly address the determinants of high CDS liquidity: propensity score matching (PSM) and the instrumental variable (IV) approach. To conduct PSM, we compare the disclosure choices of liquid CDS firms with a matched sample of non-CDS or non-liquid CDS firms. We construct a matched sample using PSM, as in Rosenbaum and Rubin (1983). PSM allows us to efficiently address the possibility that management forecasting behavior is correlated with observable firm characteristics that are substantially different for high CDS liquidity firms relative to other sample firms (e.g., Dehejia and Wahba, 2002, and Li and Prabhala, 2007). The instrumental variable approach further addresses endogeneity concerns arising from the potential association of unobservable firm characteristics with both high CDS liquidity and a management propensity to voluntarily disclose earnings forecasts. For parsimony, we use the same first-stage liquid CDS Probit model for both the PSM and IV approaches:

[21] In addition to using the propensity score matching and instrumental variable approaches, Saretto and Tookes (2013) address CDS trading endogeneity by augmenting their model with an indicator variable equal to one if there is a CDS market for the firm's debt at any time during their sample period. This variable captures time-invariant unobservable differences between CDS and non-CDS firms. This approach is not relevant to our setting because, while Saretto and Tookes (2013) examine the effect of the initiation of CDS trading, we test the effect of liquid CDS trading. However, in untabulated robustness tests, we augment model (1) with an indicator variable equal to one if there is a CDS market for the firm's debt at any time during our sample period and find robust results.

$$Liquid\ CDS = \beta_0 + \beta_1 Asset\ Maturity + \beta_2 Leverage + \beta_3 Market\text{-}to\text{-}Book + \beta_4 ROA + \beta_5 Tangibility + \beta_6 Firm\ Size + \beta_7 Earnings\ Volatility + \beta_8 Bond\ Investors'\ Demand\ [Industry\ Peers'\ Bond\ Trading\ Volume \text{ or } Investment\ Grade/Speculative\ Grade\ Frontier] + \beta_9 Number\ of\ Lenders + \varepsilon \quad (2)$$

Prior literature suggests that asset maturity, leverage, market-to-book ratio, profitability, tangibility, asset size and earnings volatility are associated with the existence of CDS trading in general and CDS liquidity in particular (e.g., Ashcraft and Santos, 2009, Qiu and Yu, 2012, Boehmer et al., 2013, Gong et al., 2011, and Saretto and Tookes, 2013). We also include instrumental variables that capture bond investors' hedging and speculative demand in the CDS market and the extent of insider trading in this market. These variables are not expected to be directly related to management's voluntary disclosure choices, as we elaborate below.

We use two alternative instruments based on bond investors' demand for hedging and speculative trading in the CDS market. First, we focus on the ease with which investors can accomplish their hedging and speculative objectives in the bond market without the need to trade in the CDS market. Oehmke and Zawadowski (2013) show that CDS markets are larger when the underlying bond securities are harder to trade. In other words, investors prefer the CDS market as the trading venue for their credit hedging and speculative needs when the bond market is characterized by trading frictions and low liquidity. Following Boehmer et al. (2013), we use the average bond trading volume of a firm's two-digit SIC industry peers to proxy for CDS trading demand. If investors need to trade the credit risk of a particular type of underlying asset (i.e., industry), the industry bond tradability is expected to affect the firm's CDS liquidity. Therefore, we expect a *negative* relation between industry peers' bond trading volume and the firm's CDS liquidity, as higher bond market liquidity should be associated with lower CDS trading needs.

At the same time, the bond trading volume of industry peers should not directly affect a firm's voluntary disclosure choices. While it is possible that some disclosure patterns may be

similar for firms in the same industry (e.g., Rogers et al., 2014), there is no obvious reason to expect a strong association between a firm's voluntary disclosure and its industry peers' bond trading volume. Also note that even if some omitted correlated factors can contribute to both a firm's enhanced disclosure and higher industry peers' bond market liquidity, a *negative* relation between the liquidity in the bond and CDS markets indicates that these factors cannot simultaneously explain the *positive* effect of CDS liquidity on voluntary disclosure.

For each firm in our sample, we use TRACE to retrieve the bond trading volume for all firms in the same two-digit SIC industry. We also obtain the face value of each bond on the issue date from the Mergent database. To account for size differences, we deflate the dollar volume of principal traded on a given day by the face value of the bond on the issue date. We then estimate the annual average bond trading volume of a firm's industry peers. We convert this measure into a decile rank bond trading volume measure (*Industry Peers' Bond Trading Volume*) to better reflect variation in bond market liquidity. As noted above, we predict a *negative* coefficient on this instrumental variable, as higher bond market liquidity is associated with lower bond investors' hedging and speculative demand in the CDS market.

Our alternative instrumental variable, designed to capture bond investors' trading demand in the CDS market, is based on the credit rating of the bonds of a CDS reference entity. Qiu and Yu (2012) document an inverse U-shaped relation between CDS liquidity and credit rating, with bond investors' hedging demand in the CDS market being the strongest for bonds on the investment grade/speculative grade frontier. While bonds with very high credit quality have little hedging demand because bond investors are not interested in insuring them, as credit quality declines, bond investors become more interested in purchasing credit protection. However, when the credit rating falls below investment grade, credit protection becomes too expensive and bond

investors may prefer to bear the risk instead of buying CDS contracts. In addition, many portfolio managers are forced to sell bonds when they reach speculative grade due to rating-based investment restrictions, further diminishing CDS hedging demand for speculative grade bonds.[22] Consistent with these arguments, Qiu and Yu (2012) show that the peak of CDS liquidity is concentrated around the investment grade/speculative grade frontier.

To construct this rating-based bond investors' demand measure, for each firm in our sample we use the Mergent database to retrieve the credit ratings of its bonds outstanding in a given year. If a firm has more than one bond outstanding, we average the credit ratings across all bonds. We then create an indicator variable, *Investment Grade/Speculative Grade Frontier*, which is equal to 1 if a firm's bonds outstanding in a given year have an average credit rating of BBB+, BBB, or BBB-, and zero otherwise. Following Qiu and Yu (2012), we predict a *positive* relation between CDS market liquidity and *Investment Grade/Speculative Grade Frontier*. We do not expect this measure to be directly related to a firm's voluntary disclosure choices. To the best of our knowledge, there is no evidence in the extensive disclosure literature that voluntary disclosure varies with credit rating in general, or that it peaks at the investment grade/speculative grade boundary, in particular. A disadvantage of this instrument is that it can be measured only for firms with rating data on bonds outstanding, thus resulting in a relatively smaller sample.

Our second instrument is designed to reflect the extent of insider trading in the CDS market. Major financial institutions are the primary dealers in the CDS market and often have access to a firm's private information through their lending and investment banking activities, which facilitates informed trading in the lightly regulated CDS market (e.g., Acharya and Johnson, 2007). Consistent with the positive association between CDS liquidity and the amount

[22] Qiu and Yu (2012) suggest that the lower CDS liquidity of risky firms may also be driven by the supply side. Dealers should be less willing to provide quotes for risky CDS reference entities, as these quotes are essentially open limit orders.

of informed CDS trading, Qiu and Yu (2012) find a strong positive relation between the number of distinct dealers providing CDS quotes and the number of lenders of a firm. Following Qiu and Yu (2012), we base our instrument on the number of distinct lenders involved in a firm's outstanding syndicated loan contracts (*Number of Lenders*). Based on prior evidence, we predict a *positive* relation between the liquidity of a firm's CDS contracts and the number of its lenders.

At the same time, we do not expect the number of financial institutions involved in a firm's loans to directly influence the manager's decision about whether or not to make public disclosure of earnings forecasts. Private lenders often obtain management updates about expected earnings via private financial disclosures, covenant compliance reports and amendment and waiver requests and therefore are unlikely to seek external disclosure of earnings forecasts. Although there is some evidence that lending practices may affect borrowers' disclosures, this evidence primarily pertains to substantial shocks to the lending environment, such as a significant deterioration in a lender's financial health (Lo, 2014) or its merger with another financial institution (Chen and Vashishtha, 2014). We consider it unlikely that the simple variation in the number of lenders involved in outstanding loan contracts will affect borrowers' management forecasting practices, especially in routine circumstances.

We utilize DealScan to obtain the number of lenders involved in a firm's syndicated loans. For each firm in our sample, we identify the loans outstanding in a given year and estimate the number of unique lenders involved in these loans. We then convert this count measure into a decile rank measure (*Number of Lenders*) to mitigate measurement error and to better capture variation in the lenders count. We base this measure on all the lenders involved in a syndicate, as opposed to only lead arrangers, because many syndicate participants are either large financial institutions who often act as dealers in the CDS market or non-bank institutional investors who

actively engage in speculative CDS trading. However, in robustness tests, we replicate the relevant tests using only the number of lead arrangers of loans and find similar results.

We present the results of the liquid CDS Probit model in Panel A of Table 4. We use *Industry Peers' Bond Trading Volume* and *Investment Grade/Speculative Grade Frontier* as proxies for bond investors' trading demand in columns 1 and 2, respectively. In column 1, the coefficient on *Industry Peers' Bond Trading Volume* is negative and significant, consistent with lower demand for a liquid CDS market when bond trading is more liquid. As expected, we find a positive and highly significant coefficient on the *Number of Lenders* variable. This finding is in line with the conjecture in Qiu and Yu (2012) that CDS liquidity is strongly related to the number of lenders with access to a borrower's private information. Despite the substantial decrease in sample size in column 2, we find significant coefficients on both instrumental variables. The positive coefficient on *Investment Grade/Speculative Grade* is consistent with higher CDS liquidity when the outstanding bonds of a CDS reference entity are near the investment grade/speculative grade boundary.While, to the best of our knowledge, Stock-Yogo thresholds for testing instrument validity do not exist for Probit models,[23] we evaluate the incremental explanatory power of the instruments with a Wald Chi^2 test. The Chi^2 test statistic is highly significant in both specifications (103.94 with a p-value of <0.001 when we use *Industry Peers' Bond Trading Volume* and 31.00 with a p-value of <0.001 when we use *Investment Grade/Speculative Grade Frontier*), suggesting strong instrumental variables. The partial pseudo-R^2s of 4.9% and 2.23% in columns 1 and 2, respectively, suggest that our instruments have a reasonable explanatory power. In addition, the liquid CDS Probit model's relatively high pseudo-R^2s of 46.7% and 31.5% in columns 1 and 2 suggests a well-specified first-stage model.

[23] Thresholds for F-statistics provided by Stock and Yogo (2005) are relevant only for the standard two-stage least squares estimation with a linear first-stage model. There are no similar benchmarks available for estimations with the first-stage Probit model, as in our case.

4.2.2 Propensity score matching and instrumental variable tests

We present the results of PSM estimation in Panels B and C of Table 4. We match treatment observations (i.e., firm-year observations with liquid CDSs) with control observations (firm-year observations without CDSs or with non-liquid CDSs) based on the probability (i.e., the "propensity score") of *Liquid CDS*, as estimated in column 1 of Panel A (we do not perform a PSM analysis when the model is based on the *Investment Grade/Speculative Grade Frontier* variable because of the small sample size). We employ the commonly used "nearest neighbor matching" approach, with the further restriction that the absolute difference in the propensity scores of matched observations be below a pre-specified threshold (i.e., "caliper distance"). More specifically, we match without replacement and, to ensure appropriately matched samples, if no untreated observations have propensity scores within the specified caliper distance, the treated observation is left unmatched and is excluded from the matched sample. We were able to successfully match 1,005 liquid CDS observations to the control group, yielding 2,010 firm-year observations for our analyses. We also test the matched samples for covariate balancing. The differences in variable means between the high CDS liquidity sample and the control sample are insignificant for all firm characteristics employed in the liquid CDS Probit model (Panel B).

We present the regression analysis for the matched samples in Panel C of Table 4. Despite a substantially smaller sample size relative to the one employed in our primary tests, we find a statistically significant effect of *Liquid CDS* on earnings forecasts disclosure. This result holds for both the likelihood of issuing a management forecast and the number of management forecasts. In untabulated robustness analyses, we employ coarser caliper distances that yield slightly unbalanced but larger samples; we find that our inferences are unchanged.

Our instrumental variables approach is based on the simultaneous estimation of the

management forecast activity model (model 1) and the CDS liquidity model (model 2). We present our findings in Panel D of Table 4. The first two columns report results of the estimation where the CDS liquidity model is based on *Industry Peers' Bond Trading Volume*, while the third and fourth columns report results based on *Investment Grade/Speculative Grade Frontier*. In all four specifications, we continue to find that managers of firms with liquid CDSs are more likely to voluntarily disclose earnings news.[24]

4.3 Change in CDS liquidity and voluntary disclosure

While the PSM- and IV-based analyses suggest that systematic differences between firms with liquid CDSs and other sample firms are unlikely to explain our main findings, we realize that it is always challenging to rule out endogeneity concerns. In particular, because prior literature shows that higher disclosure quality leads to more liquid equity trading due to reduced information asymmetry (e.g., Diamond and Verrecchia, 1991, and Leuz and Verrecchia, 2000), there is a concern of reverse causality, i.e., that voluntary disclosure could also affect liquidity in the CDS market. We would like to emphasize that in the CDS market, liquidity is provided primarily by informed financial institutions with access to a firm's private information (Qiu and Yu, 2012). Therefore, it is unlikely that a firm's public disclosures would affect the liquidity provision by these institutions. However, to rigorously address the reverse causality issue and further address the endogeneity concerns associated with potentially systematically different characteristics of liquid CDS firms, we perform a number of tests that examine how an increase in CDS liquidity affects voluntary disclosure. [25]

[24] The IV estimation is not sensitive to using the quintile and quartile rank measures of our instrumental variables instead of the decile-based measures used in the tabulated tests (untabulated). The same applies to the PSM estimation.

[25] While a number of studies address endogeneity by examining the effect of CDS initiation on the construct of interest, because our main variable of interest is liquid CDS trading and not the existence of CDS trading, we focus on the switch to high CDS liquidity.

4.3.1 Management forecast activity following a switch to high CDS liquidity

In the first set of our analyses, we examine whether firm's voluntary disclosure is more extensive following a switch from low to high CDS liquidity. We begin by identifying a sub-sample of firms that experienced an increase in CDS liquidity. For each firm, we isolate the year in which CDS liquidity changed from low to high for the first time during the sample period (year *t*) and then compare managers' voluntary disclosure in the pre- and post-change periods. We focus on the three-year period starting the year of the CDS liquidity change (years *t* to *t+2)* versus the three-year period prior to the change (years *t-3* to *t-1*). Note that CDS liquidity remains relatively stable after the switch to high liquidity. The vast majority of firms that experience a switch from low to high liquidity CDS trading do not revert back to low liquidity in subsequent years. We estimate the following model:

$$Forecast\ (Number\ of\ Forecasts) = \beta_0 + \beta_1 CDS\ Liquidity\ Switch + \sum \beta_i Firm\ Control_i + \varepsilon \quad (3)$$

where *Forecast* and *Number of Forecasts* are defined as in previous analyses. Our main variable of interest, *CDS Liquidity Switch*, captures the switch from low to high CDS liquidity. This indicator variable takes the value of 1 in the post-change period (years *t* to *t+2)* and zero in the pre-change period (years *t-3* to *t-1*). We include the same controls as in our primary tests.

We present the results of estimating model 3 in columns 1 and 2 of Table 5, Panel A. Consistent with our expectations, we find that the management forecast activity is significantly more intensive following a switch to high CDS liquidity (Table 5, Panel A). Economically, the likelihood of a management forecast is higher by 5.3%. The incidence rate ratio for management forecasts following a switch to high liquidity relative to that of the previous period is 1.54.

We acknowledge that the increase in CDS liquidity from the low to high category may be driven by changes in firm fundamentals and that the observed increase in voluntary disclosure

activity could be caused by these changes in fundamentals as well. If an increase in CDS liquidity is driven primarily by changes in firm fundamentals, we expect that these changes would also significantly increase liquidity in the equity market. Accordingly, we examine whether firms that experience an increase in CDS liquidity also experience an increase in stock market liquidity in the same year (year *t*). We measure stock market liquidity by equity trading volume. We classify firms as having an increase in stock market liquidity if their annual average stock trading volume in year *t* is above the sample median in that year, while it was below the sample median in the previous year (consistent with our median-based cut-off for measuring the change from low to high CDS liquidity). We then exclude these firms from the analyses and re-run our tests.

An additional benefit of the analyses that exclude firms that experience an increase in stock market liquidity in year *t* is that they help address the reverse causality concern. If an increase in management forecast activity is the primary driver of an increase in CDS liquidity, it will also likely increase the liquidity of a firm's equity (e.g., Diamond and Verrecchia, 1991, and Leuz and Verrecchia, 2000). Therefore, by focusing on firms that do not experience an increase in stock market liquidity simultaneously with an increase in CDS liquidity, it is more likely that our results are capturing the effect of an increase in CDS liquidity on voluntary disclosure activity, rather than the other way around.

We present the results of this estimation in columns 3 and 4 of Panel A. We find that restricting our sample to firms that experience an increase in CDS liquidity but no simultaneous increase in equity market liquidity does not affect our findings. The coefficient estimates on *Liquid CDS Switch* are similar in both statistical and economic significance to those presented in columns 1 and 2. In unreported robustness tests, we measure equity market liquidity based on the

firms' equity bid-ask spread and find very similar results.

4.3.2 Changes analyses

To further mitigate endogeneity concerns in general, and reverse causality in particular, we estimate a changes specification, where we relate changes in forecast activity to the change in CDS liquidity. Because it is challenging to define the change in forecast activity based on *Forecast*, which is an indicator variable, we focus on the change in the number of management forecasts in these analyses. We examine the same sample of firms that experience an increase in CDS liquidity that we employ in Panel A and estimate the following model:

$$\Delta \text{ Number of Forecasts} = \beta_0 + \beta_1 \Delta \text{ Liquid CDS} + \sum \beta_i \Delta \text{ Firm Control}_i + \varepsilon \qquad (4)$$

where *Δ Number of Forecasts* is the change in the number of forecasts relative to the previous year. Our main variable of interest, *Δ Liquid CDS*, takes the value of 1 in the year of CDS liquidity change (year *t*), zero otherwise. We include changes in all the control variables used in previous tests. For each control variable, the change is measured relative to the previous year.

We present the results in column 1 of Table 5, Panel B. We find that the coefficient on *Δ Liquid CDS* is positive and highly significant. In terms of economic significance, an increase in CDS liquidity from low to high increases the number of earnings forecasts by 0.47, which represents 22.8% of the sample mean. Although our changes specification controls for changes in firm characteristics, in column 2, we repeat the estimation after excluding firms that experience an increase in stock market liquidity in the year in which CDS liquidity increases. This test allows us to further control for firm characteristics that can potentially simultaneously affect changes in firm disclosures and in the liquidity of its securities. The coefficient estimate on *Δ Liquid CDS* remains significant.

4.4 High CDS liquidity and bad news management forecasts

4.4.1. The disciplining effect of CDS liquidity on bad news disclosure

Having reported robust results showing that liquid CDSs are associated with the manager's decision to issue earnings forecasts, we next explore whether liquid CDSs affect the voluntary disclosure of bad news. We expect the disciplining effect of liquid CDS trading to pressure managers to enhance the voluntary disclosure of bad news, despite managers' career- and wealth-related incentives for delaying the revelation of adverse information. To test our prediction, we limit our sample to forecasting firms (firm-year observations with at least one management forecast) and examine the frequency of bad news management forecasts. We estimate the following model:

$$\textit{Bad News Forecast Frequency Measure} = \beta_0 + \beta_1 \textit{Liquid CDS} + \sum \beta_i \textit{Firm Control}_i + \varepsilon \quad (5)$$

where *Bad News Forecast Frequency Measure* is one of the following two variables: *Bad News Forecast Frequency* and *Relative Bad News Forecast Frequency*, reflecting the number of bad news management forecasts within a given year and the proportion of bad news forecasts to the total number of forecasts within a given year, respectively. We identify bad news earnings forecasts by comparing the management forecast with the most recent consensus analyst forecast (e.g., Anilowski et al., 2007), after adjusting for bundled forecasts following the procedure in Rogers and Van Buskirk (2013). On average, the forecasting firms in our sample issue 1.77 bad news forecasts per year; the relative frequency of bad news forecasts to total forecasts is 37.3%. As in previous analyses, *Liquid CDS* reflects whether a firm has liquid CDS trading. We include the same set of firm-level controls as in our other tests.

We find strong support for our predictions: the coefficient on *Liquid CDS* is positive and

significant when estimating both the absolute and relative frequency of bad news forecasts (Table 6, Panel A, columns 1 and 2). Economically, the incidence rate ratio of bad news forecasts for firms with liquid CDSs relative to that of other sample firms is 1.19. The proportion of bad news forecasts is higher by 5.1% for high CDS liquidity firms, which represents 13.6% of the mean bad news relative frequency for the sample firms. These results are consistent with our prediction that liquid CDSs have a disciplining effect on managers' voluntary disclosure of negative earnings news.

In columns 3 and 4, we seek to provide further support for this inference by testing whether the effect of liquid CDSs on the frequency of bad news earnings forecasts is stronger when there is more negative credit news. If the threat of informed lenders trading on private information incentivizes managers to level the playing field between informed and uninformed investors, we expect this effect to be stronger when CDS spread changes are high, conveying to investors that lenders have received negative credit news.[26] To conduct these tests, we employ our bad news forecast frequency model (model 4) and substitute *Liquid CDS* with two variables: *Liquid CDS High Spread Change* and *Liquid CDS Low Spread Change*. *Liquid CDS High Spread Change* (*Liquid CDS Low Spread Change*) is an indicator variable taking the value of one if a firm with liquid CDSs experiences an annual CDS spread change that falls in the top tercile (bottom two terciles) of CDS spread changes in a given forecast year, zero otherwise. To capture firm specific news, we base the CDS spread change measure on a firm's abnormal CDS spread change relative to the average CDS spread change of all firms in the firm's credit rating category (we use four

[26] Our tests presume that high CDS spread changes convey negative news to both debt and equity investors. While it is possible that what is negative news to debt holders, as estimated by CDS spreads, may represent positive news to equity holders, this possibility is most likely to occur around events associated with debt-equity conflicts of interest, such as mergers and acquisitions, debt issuances, share repurchases, or dividend payments (e.g., De Franco et al., 2013). This is less likely to occur with respect to earnings news.

common credit rating categories: AAA to AA-, A+ to BBB+, BBB to BB and BB- to D).[27]

For both the absolute and relative frequency of bad news forecasts, we find that the effect of liquid CDSs on the frequency of bad news disclosure is substantially stronger when firms experience high CDS spread changes (an F-test indicates that the coefficients on *Liquid CDS High Spread Change* are significantly higher relative to those on *Liquid CDS Low Spread Change*). We view these CDS-spread-based results as further supporting the disciplining role of liquid CDS trading. The amplifying effect of high CDS spread changes on the impact of liquid CDSs on earnings forecasts also highlights that enhanced forecast disclosure is unlikely to be explained by the systematically different characteristics of firms with liquid CDSs.

4.4.2. The effect of CDS liquidity, conditional on the existence of negative news

To further validate that it is liquid CDSs that drive enhanced bad news forecast disclosure, we conduct our analyses for the sub-samples of firms that experience negative news. The ideal experiment would be to compare two firms with the same level of negative news that is known to insiders, such as managers and private lenders, but unobservable to outsiders, with only one of the firms having actively traded CDSs. Then, controlling for other determinants of forecast disclosure, if the firm with liquid CDSs is found to have stronger bad news forecast activity than the firm without liquid CDSs, we would infer that active CDS trading indeed encourages managers to disclose bad earnings news. Absent an opportunity to perform this ideal experiment, we focus on realized negative news, relying on the plausible presumption that this news are observed by insiders prior to when they become available to outside investors.

We employ a matching approach to identify a control firm for each sample firm with liquid CDSs that experiences negative news in the forecast year. We match each of these treatment

[27] In untabulated robustness tests, we base *Liquid CDS High Spread Change (Liquid CDS Low Spread Change)* on the median value of abnormal CDS returns in a given year. We find that our results are similar.

firms with a firm without liquid CDSs based on the magnitude of negative news. We measure negative news by two proxies: negative earnings surprise and an increase in abnormal CDS spreads in the year in which we measure management forecast activity. The advantage of the first measure is that it is strongly related to management forecast activity and is available for all firms in the sample. Our second proxy, the change in CDS spreads, precisely measures the extent of negative credit news, but is available only for firms with traded CDS contracts, which results in control firms being sampled out from this population only.[28] These analyses based on the negative news matched samples also allow us to ensure that the bad news forecast disclosure is driven by liquid CDSs and not by firm characteristics potentially associated with negative news.

We re-estimate model 5 for the matched samples and present the results of our analyses in Table 6, Panel B. As proxies for negative news, we use a negative earnings surprise in columns 1 and 2 and an increase in abnormal CDS spreads in columns 3 and 4. Supporting the disciplining role of liquid CDSs in the voluntary disclosure of bad earnings news, we find positive and significant coefficient estimates on *Liquid CDS* in all four specifications, suggesting that active CDS trading significantly increases both the absolute and relative frequency of bad news forecasts. For specifications based on a negative earnings surprise, we find that the incidence rate ratio of bad news forecasts for firms with liquid CDSs relative to that of control sample firms is 1.50. The proportion of bad news forecasts is higher by 8.3% for firms with liquid CDSs, which represents 20.6% of the mean relative frequency of bad news for the firms employed in this analysis. The economic significance is similar when we proxy for negative news by the change

[28] We measure earnings surprise as the difference between actual EPS minus the mean analyst consensus forecast, deflated by the beginning stock price. The mean analysts' consensus is based on the first summary forecast following the date of the previous year's earnings announcement. We measure the abnormal CDS spread change relative to the average CDS spread change of all firms in the firm's credit rating category (we use four common credit rating categories: AAA to AA-, A+ to BBB+, BBB to BB and BB- to D).

in abnormal CDS spread. The incidence rate ratio of bad news forecasts for firms with liquid CDSs relative to that of control sample firms is 1.34, while the proportion of bad news forecasts for firms with liquid CDSs is higher by 7.1%.

4.4.3. Liquid CDSs and the frequency of unbundled bad news management forecasts

To provide further support for the disciplining effect of liquid CDSs on bad news forecast disclosure, in the next set of analyses, we focus on the frequency of unbundled bad news earnings forecasts (forecasts that are not bundled with earnings announcements). Although issuing earnings forecasts in conjunction with earnings announcements has become a common practice in recent years (Anilowski et al., 2007, and Rogers and Van Buskirk, 2009), unbundled forecasts are typically more salient and likely to provide more timely earnings expectation updates to investors (e.g., Atiase et al., 2005, and Baginski et al., 2012). Consequently, if active CDS trading pressures managers to promptly disclose adverse information, we predict that firms with liquid CDSs have a higher frequency of unbundled bad news earnings forecasts.

We estimate model 5 above by using the number of unbundled bad news management forecasts – *Unbundled Bad News Forecast Frequency* and *Relative Unbundled Bad News Forecast Frequency* – as the dependent variables. The results reported in Table 7 reveal a positive and significant relation between *Liquid CDS* and the frequency of unbundled bad news earnings forecasts. In terms of economic significance, the incidence rate ratio of unbundled bad news forecasts for firms with liquid CDSs relative to that of other firms is 1.19 and the proportion of unbundled bad news forecasts is higher by 5.5% for liquid CDS firms. This evidence, that liquid CDSs induce the timely updating of earnings expectations via unbundled forecasts disclosure, further supports the disciplining role of active CDS trading. [29]

[29] In untabulated tests, we examine two additional aspects of managers' forecast choices, forecast precision and accuracy. It is possible that due to CDS market pressure, managers are not only more likely to issue earnings

4.5. Liquid CDSs and firm-initiated press releases as an additional disclosure channel

While earnings forecasts remain a firm's primary voluntary disclosure device (Beyer et al., 2010), managers may also convey information to investors via other channels. To provide a more complete picture of the effect of active CDS trading on disclosure, in this section we examine the relation between a firm's liquid CDSs and its disclosures via press releases. We acknowledge that quantifying voluntary disclosure via press release is challenging for two reasons. First, some press releases may accompany mandatory SEC filings, but, short of reading all the press releases issued by the sample firms, we cannot distinguish these press releases from the voluntary ones. Second, the estimation of the sign of the press release news is mainly qualitative and relies on linguistic analyses, resulting in a less precise news measure than earnings forecast news. We therefore view our press release tests as largely supplementary to our earnings forecast analyses.

We obtain press release data from the RavenPack database. RavenPack reports press releases disseminated via Dow Jones Newswires and employs a variety of advanced textual analysis techniques to create news sentiment scores for each press release. To ensure that we are capturing firm-initiated press releases, we only include press releases with a relevance score of 90 or greater. The relevance score is assigned by RavenPack to indicate how strongly the firm is related to the underlying news story; press releases with a relevance score below 90 often relate to cases where the firm is mentioned in press releases of other firms. To measure whether a press release conveys positive or negative news, we employ RavenPack's Composite Sentiment Score (CSS), which reflects the strength of the news sentiment in a press release. CSS scores range from 0 to 100, with 50 indicating the cutoff between positive and negative news. To create a

---

forecasts, but also to enhance the informativeness of earnings forecasts by improving forecast precision and accuracy. However, we do not find a significant relation between these forecast characteristics and liquid CDSs. With respect to precision, 96.4% of our sample firms issue point or range forecasts (versus open-ended or qualitative forecasts), which can explain, at least partially, the lack of power in our precision tests.

sharper differentiation between negative and positive press releases, we allow for a neutral news range. We define press releases with a score above 51 as indicating positive news, press releases with a score below 49 as indicating negative news and press releases with a score between 49 and 51 as indicating neutral news. Our findings and inferences are robust to alternative cutoffs for the neutral news range (untabulated).[30]

After matching our sample to RavenPack, we identify press release data for the vast majority of the sample firms (23,555 firm-year observations). Untabulated descriptive statistics suggest that the mean (median) value of the number of press releases issued by the sample firms during a given year is 43.5 (34). We begin by investigating the effect of liquid CDSs on the number of press releases within a given year (because all firms in our sample have at least one press release per year, we do not estimate the likelihood of press releases). We estimate model 1 with the *Number of Press Releases* as the dependent variable. We present the results of this estimation in column 1 of Table 7. We find a positive and significant coefficient estimate on *Liquid CDS*, suggesting that firms with actively traded CDS contracts issue a higher number of press releases. This effect is also economically significant – the incidence rate ratio for press releases issued by firms with liquid CDSs relative to that of other sample firms is 1.30.

We next examine whether active CDS trading disciplines managers to voluntarily disclose negative press releases (Table 7, Panel B). Untabulated descriptive statistics reveal that managers

[30] CSS combines 5 sentiment scores (PEQ, BEE, BMQ, BCA and BAM), while ensuring that there is no sentiment disagreement amongst these scores. The PEQ score represents the news sentiment of a given news item according to the PEQ classifier, which identifies positive and negative words and phrases in articles about firms with publicly traded equity. The BEE score represents the news sentiment of a given story according to the BEE classifier, which identifies sentiment in news stories about earnings evaluations. The BMQ score represents the news sentiment of a given story according to the BMQ classifier, which specializes in short commentary and editorials on global equity markets. The BCA score represents the news sentiment of a given news story according to the BCA classifier, which specializes in reports on corporate action announcements. The BAM score represents the news sentiment of a given story according to the BAM classifier, which specializes in news stories about mergers, acquisitions and takeovers. The PEQ and BEE classifiers are dictionary-based measures, while the BMQ, BCA and BAM classifiers are based on the Bayesian learning approach. All five of the sentiment scores are applied to the news item when evaluating its CSS score.

tend to communicate primarily positive and neutral news via press releases. Sample firms issue, on average, 20.36 and 19.88 positive and neutral press releases per year, respectively, while issuing only 2.95 negative press releases per year. We employ model 5 above to estimate the frequency of negative press releases. We employ two frequency measures: *Bad News Press Release Frequency* and *Relative Bad News Press Release Frequency*, reflecting the number of bad news press releases within a given year and the proportion of bad news press releases to the total number of press releases within a given year, respectively. We present the results in columns 2 and 3 of Table 7. The coefficient estimates on *Liquid CDS* are positive and significant in both columns. The incidence rate ratio of bad news press releases issued by firms with liquid CDSs relative to that of other sample firms is 1.36. In terms of relative frequency, the proportion of bad news press releases is higher by 1.0% for firms with high CDS liquidity. While this effect may seem to be modest, given the extremely low frequency of bad news press releases, it represents 15.8% of the average annual bad news press release frequency for the sample firms.

Overall, our tests of firm-initiated press releases supplement our management forecast analyses and provide further support for the role of liquid CDSs in determining voluntary disclosure choices. These tests also suggest that the pressure exerted by a liquid CDS market to level the playing field between informed and uninformed investors may enhance voluntary disclosures through multiple channels.

5. Conclusion

The development of the CDS market is perhaps one of the most significant innovations in the financial institutional environment. The CDS market has grown rapidly in the last two decades, transacting trillions of dollars in notional amounts. However, a frequently expressed concern is the market's susceptibility to insider trading, given that large financial institutions, the

biggest participant group in the market, often have access to privileged information about the CDS reference entities with whom they have lending relationships. CDS spreads reflect a substantial amount of private information transmitted via lenders' informed trading, with changes in CDS pricing providing more timely feedback on a firm's performance than its bond or equity pricing (e.g., Acharya and Johnson, 2007, and Whitehead, 2012). We predict that the threat of lenders trading on private information in the CDS market and the consequent prompt reflection of such information in CDS spreads will pressure managers into enhancing their voluntary disclosures in order to mitigate the litigation and reputation risks associated with non-disclosure. We expect this effect on managers' voluntary disclosure to be evident mostly for firms with liquid CDSs, given that prices are likely to be more informative when securities are actively traded.

Consistent with our hypothesis, we find that firms with actively traded CDS contracts are more likely to inform investors via earnings forecasts. We further find that these firms exhibit a higher frequency of bad news management forecasts and of unbundled bad news forecasts, in particular. In addition to eliciting management forecasts, we also find that liquid CDSs prompt enhanced disclosures via firm-initiated press releases. Overall, our evidence suggests that active CDS trading plays a disciplining role by pressuring managers into promptly revealing their private information, thus enriching the information environment in capital markets.

Our paper sheds light on how changes in the institutional environment affect changes in managerial disclosure behavior. Prior empirical evidence shows that the majority of Compustat/CRSP firms do not issue even a single management earnings forecast in a year (Beyer et al., 2010). Moreover, prior empirical and survey research finds that managers prolong the release of bad news to investors due to career- and wealth-related concerns. The advent of CDSs

on the financial landscape has introduced an alternate information source that reveals private information before it is impounded in equity and bond prices. Our findings show that this alternate information source (i.e., insider trading in the CDS market), although itself a cause for concern, results in a positive externality for capital markets. It helps to alleviate managers' reluctance to issue management forecasts, particularly bad news forecasts, and encourages prompt disclosure of material price-sensitive information to market participants.

Acharya and Johnson (2007) question whether there is a case for the current regulatory response to curb insider trading in the CDS market, in view of the lack of evidence of any adverse effects on prices or liquidity in either the equity or credit markets. Our evidence suggests another potential unintended consequence of such regulatory action. Restricting insider trading in the CDS market may adversely impact the information environment in capital markets by displacing an effective incentive for managers' voluntary disclosures.

References

Acharya, V., and T. Johnson, 2007, Insider trading in credit derivatives, *Journal of Financial Economics*, 84: 110-141.

Ajinkya, B., S. Bhojraj, and P. Sengupta, 2005, The association between outside directors, institutional investors and the properties of management earnings forecasts, *Journal of Accounting Research*, 43: 343-376.

Ajinkya, B., and M. Gift, 1984, Corporate managers' earnings forecasts and symmetrical adjustments of market expectations, *Journal of Accounting Research*, 22: 425-444.

Anilowski, C., M. Feng, and D. Skinner, 2007, Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance, *Journal of Accounting and Economics*, 44: 36-63.

Ashcraft, A., and J. Santos, 2009, Has the CDS market lowered the cost of corporate debt?, *Journal of Monetary Economics*, 56: 514-523.

Atiase, R., H. Li, S. Supattarakul, and S. Tse, 2005, Market reaction to multiple contemporaneous earnings signals: Earnings announcement and future earnings guidance, *Review of Accounting Studies*, 10: 497-525.

Baginski, S., J. Hassell, and M. Kimbrough, 2002, The effect of legal environment on voluntary disclosure: Evidence from management earnings forecasts issued in U.S. and Canadian markets, *The Accounting Review*, 77: 25-50.

Baginski, S., E. Demers, C. Wang and J. Yu, 2012, The pricing of language in management forecast press releases, *SSRN eLibrary.*

Bank of England, 2008, Financial Stability Report 23, Available at: http://www.bankofengland.co.uk/publications/.

Bergman, N., and S. Roychowdhury, 2008, Investor sentiment and corporate disclosure, *Journal of Accounting Research*, 46: 1057-1083.

Berndt. A., and A. Ostrovnaya, 2007, Information Flow between Credit Default Swap, Option and Equity Markets, Working Paper.

Beyer, A., D. Cohen, T. Lys, and B. Walther, 2010, The financial reporting environment: Review of the recent literature, *Journal of Accounting and Economics,* 50: 296-343.

Blanco, R., S. Brennan, and I. Marsh, 2005, An empirical analysis of the dynamic relationship between investment grade bonds and credit default swaps, *Journal of Finance,* 60: 2255-2281.

Bloomberg, 2006, Credit-Default Swaps may incite regulators over insider trading, October 10.

Boehmer, E., S. Chava, and H. Tookes, 2013, Related securities and equity market quality: The case of CDS, *SSRN eLibrary*.

Bolton, P., and M. Oehmke, 2011, Credit default swaps and the empty creditor problem, *Review of Financial Studies,* 24: 2617-2655.

Bozanic, Z., D. Roulstone, and A. Van Buskirk, 2013, Management earnings forecasts and forward-looking statements, *SSRN eLibrary*.

Bushman, R., A. Smith, and R. Wittenberg-Moerman, 2010, Price discovery and dissemination of private information by loan syndicate participants, *Journal of Accounting Research*, 48: 921- 972.

Chakravarty, S., H. Gulen, and S. Mayhew, 2004, Informed trading in stock and option markets, *Journal of Finance*, 59: 1235-57.

Chen, Q., and Vashishtha, R., 2014, The effects of bank mergers on corporate information disclosure, *SSRN eLibrary*.

Chordia, T. and L. Shivakumar, 2006, Earnings and price momentum, *Journal of Financial Economics,* 80: 627-656.

Chuck, E., D. Matsumoto, and G. Miller, 2013, Assessing methods of identifying management forecasts: CIG vs. researcher collected, *Journal of Accounting and Economics,* 55: 23-42.

Coller, M., and T. Yohn, 1997, Management forecasts and information asymmetry: An examination of bid-ask spreads, *Journal of Accounting Research,* 35: 181-191.

Dehejia, R., and S. Wahba, 2002, Propensity score matching methods for nonexperimental causal studies, *Review of Economics and Statistics*, 84: 151–161.

De Franco, G., F. Vasvari, D. Vyas and R. Wittenberg-Moerman, 2014, A debt analysts' view of debt-equity conflicts of interest, *The Accounting* Review, 89: 571-604.

Diamond, D., and R. Verrecchia, 1991, Disclosure, liquidity, and the cost of capital, *The Journal of Finance*, 46: 1325-1359.

Fang, V., T. Noe, and S. Tice, 2009, Stock market liquidity and firm value, *Journal of Financial Economics*, 94: 150-169.

Financial Times, 2005, Banks warned about insider trading in credit derivatives, April 25.

Financial Times, 2009, SEC launches first ever CDS insider trading case, May 5.

Gong, G., X. Martin, and S. Roychowdhury, 2011, Do financial market developments influence accounting practices? Credit default swaps and borrowers' reporting conservatism, *SSRN eLibrary*.

Graham, J., C. Harvey, and S. Rajgopal, 2005, The economic implications of corporate financial reporting, *Journal of Accounting and Economics*, 40: 3–73.

Greene, W., 2004, The behavior of the maximum likelihood estimator of limited dependent variable models in the presence of fixed effects*, Econometrics Journal*, 7: 98–119.

Greenspan, A., 2004, Risk and uncertainty in monetary policy, *The American Economic Review*, 94, Papers and Proceedings of the One Hundred Sixteenth Annual Meeting of the American Economic Association San Diego, CA: 33-40.

Houston, J., B. Lev, and J. W. Tucker, 2010, To guide or not to guide? Causes and consequences of stopping quarterly earnings guidance, *Contemporary Accounting Research*, 27(1): 143-185.

Hu, H., and B. Black, 2008, Debt, equity, and hybrid decoupling: Governance and systemic risk implications, *European Financial Management*, 14: 663-709.

ISDA, 2003, Statement of principles and recommendations regarding the handling of material nonpublic information by credit market participants.

Ivashina, V. and Z. Sun, 2011, Institutional stock trading on loan market information, *Journal of Financial Economics*, 100: 284-303.

Kang, D., and D. Mullineaux, 2011, The impact of non-bank lending on mergers and acquisitions, *SSRN eLibrary*.

Kasznik, R., and B. Lev, 1995, To warn or not to warn: Management disclosures in the face of an earnings surprise, *The Accounting Review*, 70: 113-134.

Kerr, J., G. Sadka and R. Sadka, 2014, Illiquidity and earnings predictability, *Working Paper.*

Khanna, N., and R. Sonti, 2004, Value creating stock manipulation: Feedback effect of stock prices on firm value, *Journal of Financial Markets,* 7: 237-270.

Kim, I., and D. Skinner, 2012, Measuring securities litigation risk, *Journal of Accounting and Economics*, 53: 290-310.

Kothari, S., S. Shu, and P. Wysocki, 2009, Do managers withhold bad news?, *Journal of Accounting Research,* 47: 241-276.

Kwak, B., B. Ro, and I. Suk, 2012, The composition of top management with general counsel and voluntary information disclosure, *Journal of Accounting and Economics,* 54: 19-41.

Levene, D., 2012, Credit default swaps and insider trading, *Virginia Law & Business Review*, 7: 231 - 300.

Leuz., C, and R. Verrecchia, 2000, The economic consequences of increased disclosure, *Journal of Accounting Research*, 38: 91–124.

Li, Y., A. Saunders, and P. Shao, 2013, Did regulation fair disclosure affect credit markets?, *SSRN eLibrary.*

Li, K., and N. Prabhala, 2007, Self-Selection models in corporate finance. In: *Handbook of Corporate Finance: Empirical Corporate Finance*. Handbooks in Finance Series, Oxford, UK: Elsevier/North Holland.

Lo, A., 2014, Do declines in bank health affect borrowers' voluntary disclosures? Evidence from international propagation of banking shocks, *Journal of Accounting Research*, 52: 542-581.

Loan Syndication and Trading Association (LSTA), 2007a, Application of Regulation FD to syndicated loan market, New York.

Loan Syndication and Trading Association (LSTA), 2007b, The Handbook of Loan Syndications and Trading, A. Taylor and A. Sansone, Editors, New York: McGraw-Hill.

Longstaff, F., S. Mithal, and E. Neis, 2005, Corporate yield spreads: Default risk or liquidity? New evidence from the credit default swap market, *The Journal of Finance*, 60: 2213-2253.

Massoud, N, D. Nandy, A. Saunders and K. Song, 2011, Do hedge funds trade on private information? Evidence from syndicated lending and short-selling, *Journal of Financial Economics*, 99: 477-499.

Norden, L., and M. Weber, 2009, The co-movement of credit default swap, bond and stock markets: An empirical analysis, *European Financial Management,* 15: 529-562.

Oehmke, M. and A. Zawadowski, 2013, The anatomy of the CDS market, *Available at SSRN 2023108*.

Qiu, J., and F. Yu, 2012, Endogenous liquidity in credit derivatives, *Journal of Financial Economics*, 103: 611-631.

Rogers, J., and A. Van Buskirk, 2009, Shareholder litigation and changes in disclosure behavior, *Journal of Accounting and Economics,* 47: 136-156.

Rogers, J., and A. Van Buskirk, 2013, Bundled forecasts in empirical accounting research, *Journal of Accounting and Economics*, 55: 43-65.

Rogers, J., C. Schrand, and S. Zechman, 2014, Do managers tacitly collude to withhold industry-wide bad news?, *SSRN eLibrary.*

Rosenbaum, P. and D. Rubin, 1983, The central role of the propensity score in observational studies for causal effects, *Biometrika*, 70: 41-55.

Sadka, R., and A. Scherbina, 2007, Analyst disagreement, mispricing, and liquidity, *The Journal of Finance,* 62: 2367-2403.

Saretto, A. and H. Tookes, 2013, Corporate leverage, debt maturity, and credit supply: The role of credit default swaps, *Review of Financial Studies,* 26: 1190-1247.

Shivakumar, L., O. Urcan , F. Vasvary, and L. Zhang, 2011, The debt market relevance of management earnings forecasts: Evidence from before and during the credit crisis, *Review of Accounting Studies*, 16: 464-486.

Skinner, D., 1990, Options markets and the information content of accounting earnings releases, *Journal of Accounting and Economics*, 13: 191-211.

Skinner, D., 1994, Why firms voluntarily disclose bad news, *Journal of Accounting Research,* 32: 38-38.

Skinner, D., 1997, Earnings disclosures and stockholder lawsuits, *Journal of Accounting and Economics,* 23: 249-282.

Standard & Poor's, 2007, A Guide to the Loan Market, New York: Standard & Poor's.

Stanton, R., and N. Wallace, 2009, ABX.HE Indexed Credit Default Swaps and the valuation of subprime MBS, *Fisher Center for Real Estate & Urban Economics*.

Subrahmanyam, A., and S. Titman, 2001, Feedback from stock prices to cash flows, *The Journal of Finance,* 56: 2389-2413.

Subrahmanyam, M., D. Tang, and S. Wang, 2012, Does the tail wag the dog? The effect of credit default swaps on credit risk. *SSRN eLibrary.*

The Economist, 2003, Pass the parcel – Credit derivatives, January 18.

The New York Times, 2007, S.E.C. is looking at stock trading, February 6.

The Wall Street Journal, 2006, Can anyone policy the swaps? August 31.

The Wall Street Journal, 2007, Secrets to keep: Insider trading hits golden age, June 19.

Verrecchia, R. 1983, Discretionary disclosure, *Journal of Accounting and Economics*, 5: 179-194.

Waymire, G., 1985, Additional evidence on the information content of management earnings forecasts, *Journal of Accounting Research* 22 (2):703-718.

Whitehead, C., 2012, Creditors and debt governance, *Research Handbook on the Economics of Corporate Law*, Claire Hill & Brett McDonnell, eds., Northampton, MA: Edward Elgar Publishing.

Yadav, Y., 2013, Insider trading in the derivatives market (And what it means for everyone else), *Vanderbilt Law and Economics Research Paper No. 13-24*.

APPENDIX
Variable Definitions

Variable		Definition
Analyst Following	=	Analyst coverage at the end of the fiscal year, calculated as log (1 + the number of I/B/E/S analysts who issue annual earnings forecasts for the firm).
Asset Maturity	=	Weighted maturity of the firm's assets, defined as (gross PPE divided by depreciation expense × gross PPE divided by total assets) + (current assets divided by cost of goods sold × current assets divided by total assets).
Bad News Forecast Frequency	=	Number of bad news management forecasts issued during the year.
Bad News Press Release Frequency	=	Number of bad news press releases issued during the year, estimated by the press releases covered by the RavenPack database, with a relevance score of 90 or greater. Bad news press releases are defined as those with RavenPack's Composite Sentiment Score (CSS) below 49.
Equity Issuance	=	An indicator variable equal to one if the firm issues equity during the forecast year, zero otherwise.
Forecast	=	An indicator variable equal to one if the firm issues at least one earnings forecast during the year, zero otherwise.
High Litigation Industry	=	An indicator variable that equals one for high litigation industries (SIC codes: 2844-2836, 3570-3577, 7370-7374, 3600-3674, 5200-5961, and 8731-8734), zero otherwise.
Industry Peers' Bond Trading Volume	=	One of the two proxies for bond investors hedging and speculative demand in the CDS market. This measure is based on the decile rank measure of the average annual bond trading volume for a firm's two-digit SIC industry peers.
Institutional Ownership	=	Institutional ownership (%) at the end of a given fiscal year, measured as the fraction of total shares outstanding held by institutional investors.
Investment Grade/Speculative Grade Frontier	=	One of the two proxies for bond investors hedging and speculative demand in the CDS market. This measure is an indicator variable equal to 1 if a firm's bonds outstanding in a given year have an average credit rating of BBB-, BBB, or BBB+, zero otherwise.
Leverage	=	Total debt plus debt in current liabilities divided by total assets.
Liquid CDS	=	An indicator variable equal to one if the firm's annual *Depth* measure in a given year is above the sample median depth in that year, zero otherwise. *Depth* is the number of distinct dealers providing CDS spread quotes for the firm on a given day, averaged over the year. For the analyses in Table 3, Panel B, this indicator variable is equal to one if the firm's annual *Term Count* measure in a given year is above the sample median term count in that year, zero otherwise. *Term Count* is the count of distinct maturities (terms) of a firm's CDS contracts traded on a given day, averaged over the year.
Δ Liquid CDS	=	Indicator variable that takes the value of one in the year when CDS liquidity increases from low to high, zero otherwise.

APPENDIX A (continued)

Variable		Definition
Liquid CDS Switch	=	An indicator variable that takes the value of one in the post-CDS liquidity switch period (i.e., the year in which a firm's CDS liquidity switches from low to high and the following two years) and zero in the pre-switch period (i.e., three years prior to the year in which a firm's CDS liquidity switches from low to high).
Liquid CDS High Spread Change (Liquid CDS Low Spread Change)	=	An indicator variable equal to one if a firm with liquid CDSs experiences an annual CDS spread change that falls in the top tercile (bottom two terciles) of the CDS spread changes in a given forecast year, zero otherwise. To capture firm specific news, the CDS spread change measure is based on a firm's abnormal CDS spread change relative to the average CDS spread change of all firms in the firm's credit rating category (we use four common credit rating categories: AAA to AA-, A+ to BBB+, BBB to BB, and BB- to D).
Log (Total Assets)	=	Natural logarithm of total assets at the end of a fiscal year.
Market to Book	=	Ratio of market value to book value of equity at the fiscal year end.
Number of Forecasts	=	Number of management earnings forecasts issued during the year.
Δ Number of Forecasts	=	Annual change in the number of earnings forecasts issued.
Number of Lenders	=	The decile rank measure of the number of unique lenders involved in a firm's outstanding syndicated loans in a given year, identified using the DealScan database.
Number of Press Releases	=	The number of press releases issued by a firm during a given year, estimated by the press releases covered by the RavenPack database, with a relevance score of 90 or greater.
Relative Bad News Forecast Frequency	=	The relative frequency of bad news management earnings forecasts issued during the year, defined as the number of bad news forecasts divided by the total number of forecasts.
Relative Bad News Press Release Frequency	=	The relative frequency of bad news press releases issued during the year, defined as the number of bad news press releases divided by the total number of press releases.
Relative Unbundled Bad News Forecast Frequency	=	The relative frequency of unbundled bad news management earnings forecasts issued during the year, defined as the number of unbundled bad news forecasts divided by the total number of forecasts.
Return Volatility	=	Standard deviation of the firm's daily stock returns measured over the forecast year (multiplied by 100 for scaling purposes).
ROA	=	Return on assets, calculated as income before extraordinary items divided by total assets.
Tangibility	=	Net PPE divided by total assets
Unbundled Bad News Forecast Frequency	=	Number of unbundled bad news management forecasts iisued during the year. Unbundled forecasts are defined as management forecasts that are not bundled with earnings announcements (i.e., forecasts issued outside of the two day window around an earnings announcement).
Volatility of Earnings	=	Standard deviation of annual changes in earnings divided by total assets calculated over five years prior to the forecast measurement.

TABLE 1
Sample Selection and Composition

This table presents the sample selection process.

	# of firms	# of firm-years
(1) Observations with First Call coverage from 2002 to 2010	8,702	57,396
(2) Sample after eliminating observations with missing data	5,034	25,130
Of these, observations with traded CDS contracts	775	4,517

TABLE 2
Descriptive Statistics

This table provides descriptive statistics (see Table 1 for the sample selection procedure). Variables are defined in the Appendix.

Variable	N	Mean	Std Dev	Q1	Median	Q3
Depth	4,517	6.045	4.405	2.644	4.568	8.596
Liquid CDS	25,130	0.090	0.286	0	0	0
Forecast	25,130	0.425	0.494	0	0	1
Number of Forecasts	25,130	2.050	3.009	0	0	4
Log (Total Assets)	25,130	7.091	1.888	5.703	6.957	8.275
Market to Book	25,130	3.063	3.092	1.411	2.135	3.470
ROA	25,130	-0.003	0.172	0.000	0.031	0.073
Return Volatility	25,130	3.039	1.651	1.865	2.605	3.754
Institutional Ownership (%)	25,130	51.313	34.246	19.934	56.679	81.016
Analyst Following	25,130	1.956	0.621	1.386	1.946	2.398
Equity Issuance	25,130	0.092	0.288	0	0	0
High Litigation Industry	25,130	0.327	0.469	0	0	1

TABLE 3
The Relation between Active CDS Trading and Management Forecasts

This table presents the analyses of the association between liquid CDS trading and management forecasting behavior. The analyses in Panel A utilize our primary CDS liquidity measure based on the *Depth* of a firm's traded CDS contracts. The analyses in Panel B utilize an alternative CDS liquidity measure based on the *Term Count* of a firm's traded CDS contracts. In both panels, specification 1 presents a Probit regression of the likelihood of a firm issuing at least one earnings forecast during the year, while specification 2 presents a Poisson regression of the count of the number of management forecasts within the year. Robust z-statistics are in brackets and are clustered by firm.

Panel A: Liquid CDSs and the Likelihood and Number of Management Forecasts

	Forecast	*Number of Forecasts*
	(1)	(2)
Liquid CDS	**0.359*** **	**0.395*** **
	[5.39]	**[6.80]**
Log (Total Assets)	-0.132***	-0.092***
	[-11.71]	[-7.14]
Market to Book	-0.018***	-0.009*
	[-3.77]	[-1.73]
ROA	1.093***	1.771***
	[12.11]	[13.94]
Institutional Ownership	0.006***	0.008***
	[13.33]	[13.11]
Analyst Following	0.524***	0.506***
	[16.79]	[15.65]
Return Volatility	-0.090***	-0.113***
	[-11.87]	[-12.28]
Equity Issuance	-0.204***	-0.191***
	[-5.61]	[-4.23]
High Litigation Industry	0.201***	0.219***
	[5.09]	[5.48]
Number of obs.	25,130	25,130
Pseudo R^2	0.118	0.138

(continued)

TABLE 3 (continued)
The Relation between Active CDS Trading and Management Forecasts

Panel B: Alternative Measure of CDS Liquidity		
	Forecast	*Number of Forecasts*
	(1)	(2)
Liquid CDS	**0.353*** **	**0.387*** **
	[5.48]	**[6.90]**
Log (Total Assets)	-0.132***	-0.090***
	[-11.76]	[-7.01]
Market to Book	-0.018***	-0.008
	[-3.72]	[-1.62]
ROA	1.097***	1.783***
	[12.13]	[13.99]
Institutional Ownership	0.006***	0.008***
	[13.31]	[13.13]
Analyst Following	0.527***	0.510***
	[16.90]	[15.81]
Return Volatility	-0.091***	-0.114***
	[-11.97]	[-12.37]
Equity Issuance	-0.206***	-0.195***
	[-5.68]	[-4.31]
High Litigation Industry	0.201***	0.220***
	[5.10]	[5.50]
Number of obs.	25,130	25,130
Pseudo R^2	0.118	0.138

TABLE 4

Propensity Score Matching and Instrumental Variable Analyses

This table presents the propensity score matching (PSM) and instrumental variable (IV) analyses. Panel A presents the first stage Probit model of liquid CDS trading, with *Liquid CDS* as the dependent variable. Specification (1) incorporates the *Bond Investors' Demand* measure based on industry peers' bond trading volume (the *Industry Peers' Bond Trading Volume* variable), while specification (2) incorporates this measure based on bonds average credit rating range (*Investment Grade/Speculative Grade Frontier*). Panel B reports differences for explanatory variables between the liquid CDS sample and matched-firm sample to provide evidence of covariate balancing in the PSM estimation (based on the Liquid CDS model presented in Column (1) of Panel A). Panel C presents a PSM model estimation (based on the Liquid CDS model presented in Column (1) of Panel A); specification (1) presents a Probit regression of the likelihood of a firm issuing at least one earnings forecast during the year, while specification (2) presents a Poisson regression of the count of the number of management forecasts within the year. Panel D presents the second-stage results using the IV technique. Specifications (1) and (2) are based on the *Liquid CDS* model presented in Column (1) of Panel A, while specifications (3) and (4) are based on the *Liquid CDS* model presented in Column (2) of Panel A. Specifications (1) and (3) present a Probit regression of the likelihood of a firm issuing at least one earnings forecast during the year and specifications (2) and (4) present a Poisson regression of the count of the number of management forecasts within the year. Robust z-statistics are in brackets and are clustered by firm.

Panel A: CDS Liquidity Probit Model

	Liquid CDS (1)	*Liquid CDS* (2)
Asset Maturity	0.010*	0.003
	[1.74]	[0.38]
Leverage	0.329	-0.752**
	[1.44]	[-2.49]
MTB	0.026***	0.043***
	[2.81]	[4.22]
ROA	0.033	-0.185
	[0.09]	[-0.37]
Tangibility	-0.409	-0.324
	[-1.55]	[-0.99]
Log (Total Assets)	0.643***	0.685***
	[21.14]	[16.14]
Volatility of Earnings	-0.74	-0.832
	[-1.54]	[-1.56]
Industry Peers' Bond Trading Volume	-0.042***	
	[-3.47]	
Investment Grade/Speculative Grade Frontier		0.240**
		[2.44]
Number of Lenders	0.180***	0.123***
	[9.67]	[5.04]
Wald Chi^2 test	103.94	31.00
(p-value)	[0.00]	[0.00]
Number of obs.	19,340	5,507
Pseudo R^2	0.467	0.315

(continued)

TABLE 4 (continued)
Propensity Score Matching and Instrumental Variable Analyses

Panel B: Covariate Balancing

	Means		Difference in means
	Liquid CDS =1	*Liquid CDS =0*	[t-stats]
Asset Maturity	11.58	12.19	-0.61
			[1.32]
Leverage	0.28	0.28	-0.01
			[0.98]
MTB	3.17	3.18	-0.01
			[0.05]
ROA	0.05	0.05	0.00
			[0.11]
Tangibility	0.35	0.36	-0.02
			[1.57]
Log (Total Assets)	9.06	9.10	-0.04
			[0.79]
Volatility of Earnings	0.04	0.04	0.00
			[0.72]
Industry Peers' Bond Trading Volume	6.19	6.20	0.00
			[0.01]
Number of Lenders	8.36	8.23	0.14
			[-1.42]
Number of obs.	1,005	1,005	

TABLE 4 (continued)
Propensity Score Matching and Instrumental Variable Analyses

Panel C: Propensity Score Matching

	Forecast	*Number of Forecasts*
	(1)	(2)
Liquid CDS	**0.326*** **	**0.304*** **
	[3.28]	**[3.77]**
Log (Total Assets)	-0.199***	-0.110***
	[-4.24]	[-2.84]
Market to Book	-0.010	0.008
	[-0.67]	[0.67]
ROA	-0.731	0.048
	[-1.40]	[0.12]
Institutional Ownership	0.008***	0.007***
	[5.11]	[4.41]
Analyst Following	0.410***	0.390***
	[4.86]	[5.59]
Return Volatility	-0.190***	-0.183***
	[-6.73]	[-7.18]
Equity Issuance	-0.148	-0.197
	[-1.03]	[-1.47]
High Litigation Industry	0.105	0.066
	[0.96]	[0.78]
Number of obs.	2,010	2,010
Pseudo R^2	0.150	0.122

(continued)

TABLE 4 (continued)
Propensity Score Matching and Instrumental Variable Analyses

Panel D: Instrumental Variable Approach

	Forecast	*Number of Forecasts*	*Forecast*	*Number of Forecasts*
	(1)	(2)	(3)	(4)
Liquid CDS	**2.303*** **	**2.614*** **	**1.585*** **	**1.689*** **
	[6.52]	**[5.12]**	**[4.53]**	**[4.06]**
Log (Total Assets)	-0.227***	-0.239***	-0.290***	-0.325***
	[-8.50]	[-5.61]	[-5.52]	[-4.38]
Market to Book	-0.030***	-0.030***	-0.013**	-0.006
	[-8.27]	[-4.40]	[-2.12]	[-0.54]
ROA	1.149***	1.759***	-0.217	0.257
	[14.37]	[11.48]	[-0.95]	[0.72]
Institutional Ownership	0.006***	0.007***	0.003***	0.003***
	[14.95]	[11.36]	[3.37]	[2.88]
Analyst Following	0.289***	0.463***	0.058	0.244**
	[11.36]	[9.47]	[0.86]	[2.56]
Return Volatility	-0.097***	-0.112***	-0.180***	-0.180***
	[-11.47]	[-8.06]	[-11.93]	[-8.17]
Equity Issuance	-0.150***	-0.111*	-0.249***	-0.245***
	[-4.16]	[-1.91]	[-4.32]	[-2.65]
High Litigation Industry	0.153***	0.153***	0.123***	0.104
	[8.50]	[3.10]	[3.12]	[1.25]
Number of obs.	19,340	19,340	5,507	5,507

TABLE 5
Change in CDS Liquidity

This table presents analyses of CDS liquidity changes. The sample period is restricted to the three-year period prior to the year of the liquidity change and the three-year period starting with the year of the liquidity change. Panel A presents analyses of the switch in CDS liquidity from low to high category. Columns (1) and (2) present the analyses for all firms that experience a switch in liquidity over our sample period. In Columns (3) and (4), the sample is restricted to those firms that do not experience an *increase* in stock market liquidity in the year when CDS liquidity increases. Specifications (1) and (3) present Probit regressions of the likelihood of a firm issuing at least one earnings forecast during the year, while specifications (2) and (4) present Poisson regressions of the number of management forecasts within the year. Panel B presents changes specification using OLS, where we relate *changes* in forecast activity to the change in CDS liquidity. Column (1) presents the analyses for all firms that experience an increase in liquidity over our sample period. In Column (2), the sample is restricted to firms that do not experience an increase in stock market liquidity in the year when CDS liquidity increases. Robust z-statistics (t-statistics) are in brackets and are clustered by firm.

Panel A: Liquidity Switch Analyses

	Forecast	*Number of Forecasts*	*Forecast*	*Number of Forecasts*
	(1)	(2)	(3)	(4)
Liquid CDS Switch	**0.140****	**0.433*****	**0.140****	**0.437*****
	[2.42]	**[8.15]**	**[2.31]**	**[7.97]**
Log (Total Assets)	-0.077*	-0.055	-0.062	-0.039
	[-1.69]	[-1.39]	[-1.30]	[-0.94]
Market to Book	0.046***	0.034***	0.049***	0.037***
	[2.94]	[4.23]	[2.93]	[4.36]
ROA	-0.523	0.522	-0.844	0.239
	[-0.87]	[1.13]	[-1.28]	[0.50]
Institutional Ownership	0.004**	0.002	0.004**	0.002
	[2.32]	[1.50]	[2.25]	[1.53]
Analyst Following	0.216**	0.105	0.163	0.083
	[1.97]	[1.26]	[1.43]	[0.93]
Return Volatility	-0.022	-0.074**	-0.022	-0.073**
	[-0.63]	[-2.37]	[-0.56]	[-2.24]
Equity Issuance	-0.292**	-0.198*	-0.293**	-0.188
	[-2.52]	[-1.68]	[-2.41]	[-1.50]
High Litigation Industry	0.147	0.222**	0.108	0.191**
	[1.15]	[2.43]	[0.80]	[1.98]
Number of obs.	2,292	2,292	2,083	2,083
Pseudo R^2	0.034	0.054	0.0300	0.0509

TABLE 5 (continued)

Change in CDS Liquidity

Panel B: Changes Analyses

	Δ Number of Forecasts	*Δ Number of Forecasts*
	(1)	(2)
Δ Liquid CDS	**0.467*** **	**0.447*** **
	[2.97]	**[2.78]**
Δ Log (Total Assets)	0.929***	0.865***
	[3.50]	[3.11]
Δ Market to Book	0.095***	0.093***
	[3.18]	[2.92]
Δ ROA	1.068	0.689
	[1.33]	[0.72]
Δ Institutional Ownership	0.003	0.003
	[1.02]	[1.02]
Δ Analyst Following	-0.153	-0.202
	[-0.72]	[-0.88]
Δ Return Volatility	0.05	0.023
	[0.83]	[0.34]
Δ Equity Issuance	0.053	0.028
	[0.33]	[0.16]
Number of obs.	2,073	1,885
Adjusted R^2	0.0154	0.0130

TABLE 6
Active CDS Trading and the Frequency of Bad News Management Forecasts

This table presents the analyses of the relation between liquid CDS trading and the frequency of bad news earnings forecasts. The analyses in this table are restricted to forecasting firms (i.e., firm-year observations with at least one management forecast). Columns (1) and (2) of Panel A present the analyses of the frequency of bad news earnings forecasts, while Columns (3) and (4) present the analyses of the frequency of bad news earnings forecasts, conditional on credit news (measured by the magnitude of the abnormal annual CDS spread change). Specifications (1) and (3) present Poisson regressions of the frequency of bad news management forecasts, while specifications (2) and (4) present Tobit regressions of relative frequency of bad news earnings forecasts (i.e., the ratio of bad news to the total number of management forecasts). Panel B presents analyses for the sample of liquid CDS firms with negative news in the forecast year and their matched control firms. For each sample firm with liquid CDSs that experiences negative news we match a firm without liquid CDSs based on the magnitude of negative news. In Columns (1) and (2) we match firms based on the magnitude of negative earnings surprise. In Columns (3) and (4) we match firms based on the magnitude of an increase in abnormal CDS spread. Robust z-statistics are in brackets and are clustered by firm.

Panel A: Liquid CDSs and the Frequency of Bad News Management Forecasts

	Bad News Forecast Frequency	*Relative Bad News Forecast Frequency*	*Bad News Forecast Frequency*	*Relative Bad News Forecast Frequency*
	(1)	(2)	(3)	(4)
Liquid CDS	**0.177*** **	**0.051** **		
	[3.31]	**[2.35]**		
Liquid CDS Low Spread Change			**0.119** **	**0.032**
			[1.97]	**[1.37]**
Liquid CDS High Spread Change			**0.276*** **	**0.084*** **
			[4.67]	**[3.28]**
Log (Total Assets)	-0.017	-0.029***	-0.016	-0.029***
	[-1.32]	[-4.93]	[-1.29]	[-4.92]
Market to Book	-0.010**	-0.009***	-0.010**	-0.009***
	[-2.16]	[-4.37]	[-2.14]	[-4.36]
ROA	0.151	-0.343***	0.154	-0.342***
	[1.42]	[-5.78]	[1.45]	[-5.78]
Institutional Ownership	0.004***	0.001***	0.004***	0.001***
	[7.69]	[4.84]	[7.71]	[4.84]
Analyst Following	0.024	-0.044***	0.024	-0.044***
	[0.78]	[-3.14]	[0.79]	[-3.14]
Return Volatility	-0.006	0.004	-0.006	0.003
	[-0.58]	[0.69]	[-0.63]	[0.66]
Equity Issuance	0.005	0.03	0.004	0.03
	[0.13]	[1.39]	[0.11]	[1.38]
High Litigation Industry	-0.017	-0.060***	-0.016	-0.060***
	[-0.47]	[-4.12]	[-0.46]	[-4.12]
F-test: *Liquid CDS High Spread Change* vs. *Liquid CDS Low Spread Change [p-value]*			0.157	0.051
			[0.006]	[0.034]
Number of obs.	10,692	10,692	10,692	10,692
Pseudo R^2	0.009	0.018	0.009	0.018

TABLE 6 (continued)
Active CDS Trading and the Frequency of Bad News Management Forecasts

Panel B: Negative news sample

	Bad News Forecast Frequency	*Relative Bad News Forecast Frequency*	*Bad News Forecast Frequency*	*Relative Bad News Forecast Frequency*
	(1)	(2)	(3)	(4)
Liquid CDS	**0.407*** **	**0.083***	**0.290*** **	**0.071** **
	[4.54]	**[1.79]**	**[3.69]**	**[2.19]**
Log (Total Assets)	-0.078***	-0.050***	-0.071*	-0.037**
	[-2.94]	[-3.30]	[-1.83]	[-2.11]
Market to Book	-0.008	-0.011**	-0.023*	-0.006
	[-0.86]	[-2.28]	[-1.71]	[-1.24]
ROA	0.581*	-0.095	0.233	-0.561*
	[1.88]	[-0.54]	[0.40]	[-1.74]
Institutional Ownership	0.002*	0.001*	0.003*	0.001**
	[1.83]	[1.80]	[1.73]	[2.10]
Analyst Following	-0.015	-0.055	0.031	-0.038
	[-0.23]	[-1.45]	[0.39]	[-1.04]
Return Volatility	0.003	-0.004	0.013	-0.002
	[0.12]	[-0.34]	[0.40]	[-0.11]
Equity Issuance	-0.157	-0.049	-0.153	0.068
	[-1.31]	[-0.74]	[-1.22]	[1.08]
High Litigation Industry	0.111*	-0.009	-0.124	-0.091***
	[1.67]	[-0.26]	[-1.33]	[-2.64]
Number of obs.	1,150	1,150	1,122	1,122
Pseudo R^2	0.0160	0.0251	0.0158	0.0305

TABLE 7

Active CDS Trading and the Frequency of *Unbundled* Bad News Management Forecasts

This table presents the analyses of the relation between liquid CDS trading and the frequency of *unbundled* bad news earnings forecasts (i.e., forecasts that are not issued in conjunction with earnings announcements). Specification (1) presents a Poisson regression of the frequency of bad news management forecasts, while specification (2) presents a Tobit regression of relative frequency of bad news earnings forecasts (i.e., the ratio of bad news to the total number of management forecasts). Robust z-statistics are in brackets and are clustered by firm.

	Unbundled Bad News Forecast Frequency (1)	*Relative Unbundled Bad News Forecast Frequency* (2)
Liquid CDS	**0.177*** **	**0.055** **
	[2.74]	**[2.36]**
Log (Total Assets)	0.032**	-0.005
	[2.12]	[-0.77]
Market to Book	0.007	-0.000
	[1.22]	[-0.01]
ROA	0.401**	-0.135**
	[2.46]	[-2.14]
Institutional Ownership	0.003***	0.000**
	[4.43]	[2.01]
Analyst Following	-0.043	-0.058***
	[-1.08]	[-3.91]
Return Volatility	-0.039***	-0.010*
	[-2.80]	[-1.89]
Equity Issuance	-0.210***	-0.063**
	[-3.43]	[-2.57]
High Litigation Industry	0.034	-0.012
	[0.77]	[-0.79]
Number of obs.	10,692	10,692
Pseudo R^2	0.009	0.004

TABLE 8
Active CDS Trading and Voluntary Disclosure via Press Releases

This table presents the analyses of the association between liquid CDS trading and voluntary disclosure via press releases. Column (1) presents the Poisson regression analysis of the number of press releases. Column (2) presents Poisson regression of the frequency of negative press releases. Column (3) presents a Tobit regression of the relative frequency of negative press releases (the ratio of negative press releases to the total number of press releases). Robust z-statistics are in brackets and are clustered by firm.

	Number of Press Releases	*Bad News Press Release Frequency*	*Relative Bad News Press Release Frequency*
	(1)	(2)	(3)
Liquid CDS	**0.264*** **	**0.307*** **	**0.010*** **
	[7.79]	**[6.86]**	**[2.62]**
Log (Total Assets)	0.179***	0.296***	0.018***
	[22.11]	[28.93]	[20.05]
Market to Book	0.019***	0.007	-0.001
	[6.22]	[1.34]	[-1.60]
ROA	-0.282***	-0.509***	-0.045***
	[-7.42]	[-6.48]	[-7.05]
Institutional Ownership	0.001*	0.001**	0
	[1.89]	[2.36]	[0.81]
Analyst Following	0.205***	0.102***	-0.007***
	[10.93]	[3.33]	[-2.70]
Return Volatility	0.015***	0.090***	0.009***
	[4.35]	[14.60]	[12.81]
Equity Issuance	0.098***	0.144***	0.006*
	[5.82]	[4.50]	[1.91]
High Litigation Industry	0.247***	0.203***	0.006**
	[10.41]	[5.05]	[2.07]
Number of obs.	23,555	23,555	23,555
Pseudo R^2	0.344	0.182	0.178