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Abstract

We investigate the effect of the development of the credit default swap (CDS) market on 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 hypothesis, we find that managers are more likely to issue earnings forecasts when 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 elicit disclosure via firm-initiated press releases. Our findings suggest that informed trading by lenders in the CDS market results in a positive externality for the 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 that 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, 2011) and decreasing the efficiency of lender monitoring (e.g., Ashcraft and Santos, 2009, and Gong et al., 2013). An important additional criticism of the CDS market is its vulnerability to insider trading, given that large financial institutions, the common counterparties in CDS contracts, often trade on inside information about CDS obligors obtained through their lending activities (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, and also serve as dealers, often supplying spread quotes for firms to which they have loan exposure. Because lenders typically do not have perfect Chinese walls between their lending and trading activities, material non-public information is frequently traded on in the lightly-regulated CDS market.[2] Thus, CDS spreads often reflect private information ahead of public disclosures

[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 referenced entity and/or its credit instruments experience a "credit event" specified in the contract, such as default, restructuring, bankruptcy or a credit rating downgrade.

[2] The Commodity Futures Modernization Act of 2000 excluded swaps from the definition of "securities", thus largely exempting CDSs from the restrictions of SEC's Rule 10b-5. The 2010 Dodd-Frank Act extends the reach of Rule 10b-5 to the over-the-counter derivatives markets, including the CDS market. However, legal scholars

and price discovery in the equity and bond markets (e.g., Standard and Poor's, 2007, Acharya and Johnson, 2007, Qiu and Yu, 2012, and Whitehead, 2012). We expect that the threat of lenders trading on private information in the CDS market and the consequent prompt reflection of such information in CDS spreads impose pressure on managers to enhance their voluntary disclosures to mitigate the litigation and reputation risks associated with non-disclosure.[3]

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, by stimulating trade by informed investors, liquidity enhances price discovery in the stock market (e.g., Subrahmanyam and Titman, 2001, Khanna and Sonti, 2004, and Chordia et al., 2006). Liquid prices are more informative to investors due to their timely incorporation of information, increased incorporation of private information and quicker convergence to fundamentals (e.g., Chordia et al., 2006, Sadka and Scherbina, 2006, and Fang et al., 2009). Further supporting the importance of liquidity in enhancing the information content of CDS spreads, Qiu and Yu (2012) find that informed lenders are the primary liquidity providers in the CDS market. They show that the number of CDS dealers is strongly associated with the number of banking relationships of the CDS obligor and 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 CDS liquidity by the CDS market depth, proxied by the number of distinct dealers providing CDS spread quotes.[4]

To empirically 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.,

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acknowledge that enforcement of Rule 10b-5 will be substantially more challenging in the CDS market, as the rule must accommodate the distinctive features of trading in credit derivatives (e.g., Yadav, 2014, and Levene, 2013).

[3] Firms are frequently asked by market participants to comment on their CDS spread changes when substantial movements in CDS spreads are unaccompanied by public information disclosure (Bloomberg, 2006, and WSJ, 2006).

[4] 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 traded CDS contracts with distinct maturities for a firm.

2010). 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 low liquidity CDS contacts. Economically, having liquid CDSs increases the likelihood of a management forecast by 14.0%. We reaffirm this finding and show that liquid CDS trading is strongly associated with the number of management forecasts issued; the incidence rate ratio for management forecasts of firms with liquid CDSs relative to that of other sample firms is 1.49. While these findings are consistent with our hypothesis that actively traded CDSs enhance managers' voluntary disclosure, it is possible that firms with liquid CDS contracts are different from non-CDS firms or from firms with low liquidity CDSs in ways that are systematically related to their voluntary disclosure choices. To mitigate endogeneity concerns, we conduct a battery of tests.

First, we perform a comparative analysis of liquid CDS firms with a matched-firm sample constructed using the propensity score methodology (PSM). Despite the substantially smaller sample size in this analysis relative to the one employed in our primary tests, we continue to find a significant effect of liquid CDSs on both the likelihood and the number of management forecasts issued. Second, to tackle the endogeneity concerns associated with unobservable firm characteristics, we employ an instrumental variables approach. Following Qiu and Yu (2012), who show a strong positive relation between CDS liquidity and the number of lenders of the CDS obligor, our first instrument is based on the number of lenders in a firm's outstanding loans. Because private lenders often get management updates about expected earnings via private financial disclosures, they are unlikely to seek public disclosure of earnings forecasts, suggesting that the variation in the number of lenders in a firm's loans should not directly influence the managers' earnings forecast decisions. Our second instrument reflects 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 (2012) show that when the bond market is characterized by trading frictions and low liquidity, investors prefer the CDS market as the trading venue for their hedging and speculative needs. Following Boehmer et al. (2013), we use the bond trading volume of a firm's industry peers to proxy for CDS trading demand, implying that stronger trading demand will drive higher CDS liquidity. At the same time, there are no obvious reasons to expect a strong association between a firm's voluntary disclosures and an industry peer's bond trading volume.[5] The results of IV tests also suggest that firms with liquid CDSs are more likely to voluntarily disclose earnings news via management forecasts.

To further mitigate endogeneity concerns, we exclude non-CDS firms from the analysis, because liquid CDSs firms are more likely to systematically differ from firms without any CDS trading than from illiquid CDS firms. The comparison of liquid CDS firms to firms with illiquid CDSs reveals that the former are more likely to inform investors via earnings forecasts. Finally, we examine firms' earnings forecast disclosures around the change from low to high CDS liquidity. We find that both the forecast likelihood and the number of forecasts are significantly higher following the increase in CDS liquidity, further suggesting that systematic differences between liquid CDS firms and other sample firms are unlikely to explain our main findings.

Having shown that firms with active CDS trading are more likely to engage in earnings forecast activity, we next examine whether liquid CDSs affect the voluntary disclosure of bad news. Because the information revelation of bad news is especially timely in the CDS market and often leads price discovery in the equity market (Acharya and Johnson, 2007, and Qiu and Yu, 2012), managers' withholding of bad news will promptly become transparent to investors. Further, the threat of litigation and the loss of reputation arising from non-disclosure are higher when managers delay the disclosure of adverse information (e.g., Skinner, 1994, 1997, and

[5] We provide a more detailed discussion of the instrumental variables in Section 4.2.

Baginski et al., 2002). Thus, we expect actively traded CDSs to pressure managers to voluntarily disclose bad news, despite managers' career- and wealth-related incentives for delaying the revelation of adverse information (Graham et al., 2005, and Kothari et al., 2009).

We identify bad news earnings forecasts by comparing a management forecast with the most recent consensus analyst forecast (e.g., Anilowski et al., 2007) and examine their frequency for the sample of forecasting firms (i.e., firm-year observations with at least one management forecast). We 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 earnings forecasts in a given year. In addition, we show that liquid CDSs are associated with a higher frequency of unbundled bad news forecasts (forecasts that are not bundled with earnings announcements). Because unbundled forecasts are typically more salient and are likely to provide more timely earnings expectation updates to investors (e.g., Atiase et al., 2005, and Baginski et al., 2012), we view this evidence as providing further support for the disciplining effect of active CDS trading on managers' voluntary disclosure of negative earnings news.

Next, we examine whether the effect of liquid CDSs on bad news disclosure strengthens with negative credit news, as revealed through CDS spread changes. If the threat of informed lenders trading on private information incentivizes managers to level the playing field between informed and uninformed investors, we expect the effect of CDS liquidity on the frequency of bad news forecasts to be stronger when CDS spread changes are high, conveying the arrival of negative news to investors. We find that the relation between liquid CDSs and the frequency of bad news forecasts is indeed stronger when firms experience high CDS spread changes, although this result is only marginally significant for unbundled forecasts.

In our final set of analyses, because managers may convey information to investors through

multiple disclosure channels, we explore the association between a firm's liquid CDS trading and its voluntary disclosure via press releases. As 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 our press release tests as mainly supplementary to our earnings forecast analyses. Using press releases disseminated via Dow Jones Newswires, we find that firms with liquid CDSs issue a higher number of press releases and have a higher frequency of negative press releases. Consistent with our tests of earnings forecast frequency, we also find that the effect of CDS liquidity on the frequency of negative press releases is stronger when CDS returns reflect negative credit news. Our findings suggest that, in response to liquid CDS trading's pressure, managers may level the playing field between informed and uninformed investors not only by enhancing earnings forecast activity but also via other disclosure channels.

Our study contributes to the literature along several dimensions. There is an intense debate in the literature 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, and Bolton and Oehmke, 2011) and the decline in lenders' demand for accounting conservatism from the borrowing firm (Gong et al., 2013). We extend this literature by investigating how the CDS market affects CDS reference entities' public disclosure choices. We demonstrate that, by imposing pressure on managers to enhance their voluntary disclosure practices, 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 (2013), who examines changes in borrowers' disclosure 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 documenting that 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 in eliciting the voluntary disclosure of bad news, despite managers' career- and wealth-related incentives for delaying its revelation.

Finally, we extend the growing research on the consequences of financial institutions' exploitation of their access to firm's private information through lending relationships. Ivashina and Sun (2011), Massoud et al. (2011) and Kang and Mullineaux (2011) show that institutional non-bank lenders trade in the equity market on the borrower's confidential information around information intensive events and use private information to facilitate merger and acquisition deals. Bushman et al. (2010) find that 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 probe further into the potential positive externalities of financial institutions' exploitation of information received in their capacity as private lenders. We suggest that the revelation of private information in CDS prices, induced by informed lenders' trading, can lead to positive capital market effects by enhancing firms' voluntary disclosures.

The remainder of the paper is organized as follows. Section 2 presents the prior research that motivates our analyses and 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 most 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.[6] 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 distinguishing characteristic of the CDS market is that its dominant players are major banks and financial institutions with access to material non-public information on CDS obligors

[6] 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 5-year maturity are the most actively traded.

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).[7] In addition to trading in the CDS market to satisfy their hedging and speculative needs, large financial institutions also serve as dealers in this market, often supplying CDS spread quotes for firms to which they have loan exposure. While the guidance of 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., Economist, 2003, Financial Times, 2005, and Standard and Poor's, 2007).

In addition, in recent years, hedge funds have substantially intensified their trading activities in the CDS market, further fuelling insider trading concerns. Hedge funds often get access to private information through participation in syndicated loans (e.g., Bushman et al., 2011, Ivashina and Sun, 2011, and Massoud et al., 2011) and tight connections with large financial institutions (e.g., WSJ, 2006, The New York Times, 2007, Financial Times, 2009). In its first CDS insider trading case, the SEC recently charged a hedge fund manager with insider trading in CDSs on the basis of private information learned from a major investment bank (Financial Times, 2009, and Yadav, 2014).[8]

[7] 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 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.

[8] The SEC alleges that Jon-Paul Rorech from Deutsche Bank Securities Inc. tipped Renato Negrin, a portfolio manager at Millennium Partners L.P., about the 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.

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 its bond or equity pricing (Whitehead, 2012).[9] In a number of acquisition-related 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).[10] More generally, Acharya and Johnson (2007) show that the CDS market leads the equity market in price discovery, especially when a CDS reference entity has a high number of ongoing banking relationships, consistent with these financial institutions' informed trading.[11] Prior to adverse information events, CDSs also tend to lead equity option markets in price discovery (Berndt and Ostrovnaya, 2007), even though private information is typically quickly revealed via equity option trading (e.g., Diamond and Verrecchia, 1987, Skinner, 1990, Chakravarty et al., 2004, and Cao et al., 2005).[12]

Lenders trading on a borrower's private information and the consequent prompt reflection of such information in CDS spreads should make the withholding of information transparent to

[9] Bushman et al. (2011), Ivashina and Sun (2011) and Massoud et al. (2011) document that informed lenders also trade on private information in the equity market. However, this insider trading is limited to non-bank institutional investors, such as hedge funds, mutual funds and CLOs, with no evidence of commercial and investment banks engaging in such behavior. Also, the CDS market is considerably less regulated and scrutinized by the SEC relative to the equity market, facilitating insider trading in CDSs (e.g., ISDA, 2003, Bloomberg, 2006, The Wall Street Journal, 2006 and 2007, and Yadav, 2014).

[10] 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).

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

[12] Interestingly, 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 than are CDSs to trade on unsubstantiated rumors.

investors. Thus, to mitigate the litigation and reputation risk associated with non-disclosure, we expect managers to enhance their voluntary disclosure practices. 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 they convey information to lenders, thus providing public disclosures simultaneously with information revelation through CDS spreads. However, managers may also choose to respond to insider trading by lenders, thus disclosing subsequently to conveying information to lenders and the private information revelation through CDS spread movements. Because our main focus is to examine whether liquid CDS trading elicits enhanced voluntary disclosures and due to fact that the exact timing of information provision from managers to lenders is unobservable, our hypotheses relate to the overall disclosure intensity, without differentiating between these two potential disclosure strategies.

2.2 The importance of CDS market liquidity and empirical predictions

A fundamental premise of our paper is that, due to lenders' informed trading, CDS spreads reveal firm 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, a growing body of research shows that liquidity enhances price discovery in the stock market. Subrahmanyam and Titman (2001) and Khanna and Sonti (2004) model insiders' behavior and show that liquidity stimulates trading by informed investors, thus making stock prices more informative to shareholders. 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 Sadka 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. These institutions, which serve as dealers in this market, often supply CDS spread quotes for firms to which they have loan exposure. Qiu and Yu (2012) show that the number of dealers providing CDS spread quotes is determined to a large extent by the number of the CDS reference entity's 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 firms that tend to be the most liquid 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.

Based on the strong relation between liquidity and price discovery documented by prior research and the provision of liquidity by informed lenders in the CDS market, spreads of liquid CDS contracts are likely to promptly and accurately reveal private information communicated by firms to their lenders. Thus, due to the consequent increase in litigation and reputation concerns arising from non-disclosure, we hypothesize that high CDS liquidity will pressure managers to enhance voluntary disclosure. On the other hand, we do not expect thinly traded CDS contracts, which are unlikely to reflect private information on a timely basis, to induce changes in managers' disclosure practices.

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' personal wealth tied to a firm's 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 and often leads price discovery in the equity market (Acharya and Johnson, 2007, and Qiu and Yu, 2012), managers' withholding of bad news should become immediately transparent to investors. The litigation and reputation concerns associated with non-disclosure are also higher 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 the prompt disclosure of bad news. In other words, we expect liquid CDSs to play a disciplining role by encouraging managers to reveal adverse private information, hence 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. 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 forecast- and press-release-related disclosures, we expect the effect of liquid CDS trading to be particularly pronounced for 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 market makers 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 Thomson Reuters Loan Pricing Corporation. The bond trading data and outstanding principal amounts are obtained from the TRACE (Trade Reporting and Compliance Engine) database and the Mergent Fixed Income Securities Database, respectively. 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. We

[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. Furthermore, our empirical analyses control for analyst following and institutional ownership, the two variables found to be associated with the comprehensiveness of First Call's coverage.

also require COMPUSTAT data on firm characteristics, which restricts our sample to 5,034 firms, representing 25,130 firm-year observations. We then match this sample to the Markit database (we previously hand-matched Markit to COMPUSTAT based on firm name). We find that 775 firms in our sample have traded CDS contracts over our sample period, representing 4,517 firm-year observations.

3.2 Descriptive statistics

Table 2 provides the descriptive statistics for our primary variables of interest. Our primary CDS liquidity measure, *Liquid CDS*, 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 5-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 for each firm in our sample (*Depth*). The quotes are reported, on average, by 6 dealers, with a standard deviation of 4.4 and an interquartile range of 5.9, suggesting a substantial variation in market depth. To account for the intertemporal evolution of CDS market liquidity 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 Appendix B). The mean value of *Liquid CDS* indicates that 9% of the firm-year observations in our sample have liquid CDS contracts.

We define the *Forecast* variable to be equal to one if the firm issues at least one annual or

[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, 5-year contracts are significantly more commonly traded than other tenors. In addition, Markit reports the number of distinct dealers providing quotes for 5-year contracts only.

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 are characterized by management forecast activity (Kwak et al., 2012, report similar descriptive data for their 1997-2009 sample period). *Number of Forecasts* is estimated as the number of annual and quarterly forecasts in a given year and its mean is equal to 2.05 for our sample.

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 (median) ratio of earnings before extraordinary items to total assets (*ROA*) is -0.003 (0.031). There is considerable variation in riskiness across sample firms, as reflected by the standard deviation of *Return Volatility*. Firms in our sample have substantial institutional ownership and analyst following. 9.2% of the sample firm-year observations experience equity issuance (*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 start our analyses by testing the relation between the issuance of management earnings forecasts and the existence of high-depth (liquid) CDS traded 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:

$$Forecast = \beta_0 + \beta_1 Liquid\ CDS + \beta_2 Firm\ Controls + \varepsilon, \quad (1)$$

[15] Following previous studies (e.g, Ajinkya et al. 2005, and Houston et al., 2010), we exclude from the analyses earnings forecasts issued between fiscal-period end and earnings announcement dates, i.e. pre-announcements, because these forecasts are considered a part of earnings announcement strategy, and not a voluntary disclosure activity. Our inferences remain the same when we include these pre-announcements in the measurement of forecast issuance and frequency (untabulated).

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*, reflects whether a firm has liquid CDS contracts. We follow prior research (e.g., Baginski et al., 2002, Ajinkya, 2005, Bergman and Roychowdhury, 2008, Rogers and Van Buskirk, 2009, and Kwak et al., 2012) and control for firm size, market-to-book ratio, profitability, stock market volatility, institutional ownership, analyst following, equity issuance and membership in a high litigation industry. Following prior research, with the exception of profitability, stock market volatility and equity issuance variables that are estimated in 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.

We present our findings in Table 3, Panel A. Consistent with our predictions, a significant and positive coefficient on *Liquid CDS* in column 1 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.

To test the robustness of our findings, in column 2 we examine the number of management forecasts in a given year instead of the probability of a forecast being issued. We re-estimate model 1 above with the number of management forecasts issued – *Number of Forecasts* – as the dependent variable. Consistent with a strong association between *Liquid CDS* and the probability of a management forecast, we find that this variable is significantly associated with the number of management forecasts. The economic magnitude of this effect is sizable: the coefficient of 0.395 on *Liquid CDS* in column 2 corresponds to an incidence rate ratio of 1.49, suggesting that

the management forecasts of firms with liquid CDS trading are 1.49 times more frequent relative to management forecasts issued by other sample firms.

The coefficients on control variables are generally consistent with prior studies. 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 issuance.

In Panel B of Table 3, we replicate our tests with an alternative liquidity measure based on the count of a firm's CDS contracts with distinct maturities (terms) traded on a given day.[16] We acknowledge that this measure is a noisy proxy for market depth, as it is likely to be strongly affected by a firm's debt maturity structure and by differences in investors' hedging demand for different debt terms. We hence view this analysis as a robustness check with respect to the tests presented in Panel A. We estimate the annual average of the number of distinct terms for each firm in our sample; sample firms have, on average, 7.6 terms traded on a daily basis. To account for inter-temporal variation in CDS market liquidity over our sample period, we define this alternative *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 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

[16] Saretto and Tookes (2013) use the daily number of CDS quotes as their primary liquidity measure. This measure is similar in spirit to our term-count-based measure, as it represents a combination of distinct term counts provided by different dealers.

likelihood of a management forecast by 13.7% and the incidence rate ratio for 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 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 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 four additional tests, discussed in the next section: 1) propensity score matching, 2) an instrumental variable approach, 3) a comparison of highly liquid to non-liquid CDS firms, and 4) a liquidity change analysis.[17]

4.2 Propensity score matching and instrumental variable approaches

4.2.1 What factors determine the presence of a liquid CDS market?

In this section, we mitigate endogeneity concerns by employing two empirical approaches that directly address the determinants of high CDS liquidity: a propensity score methodology (PSM) and an 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). An

[17] In addition to using the propensity score matching and instrumental variable approaches, Saretto and Tookes (2013) address CDS trading endogeneity using two CDS variables: an indicator variable equal to one if there is a CDS market for the firm's debt at any time during their sample period and an indicator variable equal to one if there is a traded CDS during year t. This approach is not applicable in our setting for the following two reasons. First, while Saretto and Tookes (2013) examine the initiation of CDS trading, we test the effect of liquid CDS trading. Second, the vast majority of CDS firms in our sample (70%) have traded CDS contracts in all nine years of our sample period, implying very little difference between the existence of CDS trading at any time during our sample period and CDS trading in a given year.

instrumental variable approach further tackles the endogeneity concerns arising from the potential association of unobservable firm characteristics with both high CDS liquidity and the management's 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:

$$\begin{aligned} Liquid\ CDS = {} & \beta_0 + \beta_1 Asset\ Maturity + \beta_2 Leverage + \beta_3 Market - to - Book + \beta_4 ROA \\ & + \beta_5 Tangibility + \beta_6 Firm\ Size + \beta_7 Earnings\ Volatility \\ & + \beta_8 Number\ of\ Lenders \\ & + \beta_9 Bond\ Investors' Hedgind\ \&\ Speculative\ Demand\ +\ \varepsilon, \end{aligned} \quad (2)$$

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 with CDS market liquidity in particular (e.g., Ashcraft and Santos, 2009, Qiu and Yu, 2012, Boehmer et al., 2013, Gong et al., 2013, and Saretto and Tookes, 2013). We also incorporate into the model two additional variables (instruments) that are likely to be strongly associated with CDS market liquidity, but which are not expected to be directly related to the management's voluntary disclosure choices.

First, we control for the number of lenders involved in a firm's outstanding loan contracts within a given year. 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). Qiu and Yu (2012) hypothesize and find a strong positive relation between the number of distinct dealers providing CDS quotes and the number of a firm's lenders, consistent with the positive association between the amount of informed CDS trading and the number of quote providers. We therefore predict a positive relation between CDS market

liquidity and *Number of 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 issue earnings forecasts. Private lenders often get managements' 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 empirical 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 variation in the number of lenders involved in outstanding loans contracts will affect borrowers' disclosure practices, especially in routine circumstances.

We utilize the DealScan database to obtain the number of lenders involved in a firm's syndicated loans. For each firm in our sample, we identify the syndicated 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 to mitigate measurement error and to better capture the variation in the intensity of lenders' count. We base our lenders' count measure on all lenders involved in the syndicate, as opposed to lead arrangers only, because many syndicate participants are either large financial institutions that often act as market makers in the CDS market or non-bank institutional investors that actively engage in speculative CDS trading. However, we replicate all relevant tests using only a count of loans' lead arrangers and find generally similar results.

The second instrumental variable we employ reflects 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 (2012) 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 bond trading volume of a firm's two-digit SIC industry peers to proxy for CDS trading demand. If investors demand 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 market liquidity. We therefore predict a negative relation between CDS market liquidity and bond trading volume, 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 be directly related to 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 are no obvious reasons to expect a strong association between a firm's voluntary disclosure and an industry peers' bond trading volume.

For each firm in our sample, we retrieve from the TRACE database bond trading volume for all firms in the respective two-digit SIC industry. For each one of these bonds, we then collect the face value of the bond on the issue date from the Mergent database. To account for the size effect, 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 to better reflect the variation in bond market liquidity.

We present the results of the liquid CDS Probit model in Panel A of Table 4. We find that larger firms and firms with a longer asset maturity and higher market-to-book ratios have higher CDS market liquidity. We do not find profitability, leverage and earnings volatility to be strongly

related to CDS liquidity. Of particular interest are the coefficients on the two instrumental variables. Consistent with our predictions, 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. The coefficient on the *Bond Investors' Hedging & Speculative Demand* variable is negative and significant, consistent with lower demand for a liquid CDS market when bond trading is more liquid. While, to the best of our knowledge, Stock-Yogo statistics for instrument validity do not exist for Probit models, we evaluate the incremental explanatory power of our instruments with a Wald Chi^2 test. The Chi^2 test statistic is highly significant (103.94 with a p-value of <0.001), suggesting strong instruments. The partial pseudo-R^2 of 4.9% suggests that our instruments have a reasonable explanatory power. In addition, the liquid CDS Probit model's relatively high pseudo-R^2 of 46.7% suggests a well-specified first stage model.

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., "propensity score") of *Liquid CDS*, as estimated by equation (2). We use the commonly used "nearest neighbor matching" approach with the further restriction that the absolute difference in the propensity scores of matched observations is 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 regression analysis. We also test the matched samples for covariate balancing. As evidenced from Panel B, 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.

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.

In a further attempt to address endogeneity concerns, we employ an instrumental variables approach. Panel D of Table 4 presents the results of the second stage of the two-stage estimation, where the first stage is the liquid CDS Probit model presented in Panel A. The results are robust to this alternative econometric approach. We continue to find that managers of firms with highly liquid CDSs are more likely to voluntarily disclose earnings news via management forecasts and to disclose a higher number of these forecasts. In untabulated robustness tests, we find that the IV estimation is not sensitive to using the quintile and quartile rank measures of our instrumental variables (the same applies to the PSM approach).

While the PSM- and IV-based analyses suggest that systematic difference 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. Hence, we supplement these tests with two additional sets of analyses that focus on the comparison of firms with low and high CDS trading liquidity.

4.3 Restricted sample analysis

4.3.1 Earnings forecast activity of liquid versus non-liquid CDS firms

Potential endogeneity concerns associated with the differential characteristics of high CDS liquidity firms are likely to be the strongest when comparing these firms to those without any traded CDS contracts. Thus, we restrict the analysis to CDS firms (firm-year observations after the initiation of CDS trading) and directly compare firms with liquid CDS contracts to CDS firms with low liquidity (Saretto and Tookes, 2013, follow a similar approach).

We re-estimate model 1 for the CDS firm sample and present this analysis in Panel A of Table 5. The coefficients on the *Liquid CDS* variable continue to be significant in both columns, with a slightly lower economic significance relative to the results presented in Table 3, Panel A, further mitigating endogeneity concerns. Relative to firms with low liquidity CDS contracts, having highly liquid contracts increases the likelihood of a management forecast by 10.0%. The incidence rate ratio for the management forecasts of firms with liquid CDS trading relative to that of firms with low CDS liquidity is 1.36.

4.3.2 Liquidity change analysis

An additional approach to address endogeneity concerns utilizing the sample of CDS firms is to examine voluntary disclosure around the change in CDS liquidity. More specifically, we isolate the event of a change in a firm's CDS liquidity from low to high in a given year and perform a comparative analysis of managers' voluntary disclosure in the pre-change 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*).[18] We estimate the following model:

[18] We observe that the change to higher liquidity remains relatively stable. The vast majority of firms that experience a change from low to high liquidity CDS trading do not revert back to low liquidity in subsequent years.

$$Forecast\ (Number\ of\ Forecasts)$$
$$= \beta_0 + \beta_1 CDS\ Liquidity\ Change + \beta_2 Firm\ Controls + \varepsilon, (3)$$

where *Forecast* and *Number of Forecasts* are defined as in previous analyses. Our main variable of interest, *CDS Liquidity Change*, takes the value of 1 in the post-change period and zero in the pre-change period. We include the same control variables as in our primary tests.

As evidenced in Panel B of Table 5, the management forecast activity is significantly more intensive following the increase in CDS contract liquidity. Economically, the likelihood of a management forecast is higher by 5.3% following an increase in CDS liquidity. The incidence rate ratio for management forecasts following liquidity change relative to that of the previous period is 1.54. Hence, liquidity change tests further mitigate the concern that endogeneity drives our main results.

4.4 High CDS liquidity and bad news management forecasts

Having shown that liquid CDSs are associated with the manager's decision to issue earnings forecasts, we next explore whether they particularly impact 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 examine 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:

$$Bad\ News\ Forecast\ Frequency\ Measure$$
$$= \beta_0 + \beta_1 Liquid\ CDS + \beta_2 Firm\ Controls + \varepsilon, (4)$$

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 contracts. We include the same set of firm-level controls as in our other tests.

We find strong support for our prediction with respect to the frequency of negative news forecasts (Table 6, Panel A). The coefficient on *Liquid CDS* is positive and significant when estimating both the absolute and relative frequency of bad news management forecasts in columns 1 and 2, respectively. Economically, the incidence rate ratio of bad news forecasts for firms with liquid CDSs relative to that of firms with thinly traded CDSs is 1.19. The proportion of bad news management 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 regarding the disciplining effect of liquid CDSs on managers' voluntary disclosure of bad earnings news.

We seek to provide further support for this inference by testing whether the effect of CDS liquidity on the frequency of bad news earnings forecasts strengthens with more negative credit news (Table 6, Panel B). 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 the arrival of

negative credit news to investors. 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 Return* (*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 common credit rating categories: AAA to AA-, A+ to BBB+, BBB to BB and BB- to D).[19]

The results reveal that the effect of liquid CDSs on the frequency of bad news earnings forecasts is substantially stronger when firms experience high CDS spread changes in both the absolute and relative frequency of bad news earnings forecast estimations (the 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 providing further support for the disciplining role of the liquid CDS market.

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

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

liquid CDSs have a higher frequency of unbundled bad news earnings forecasts.

We employ model 4 above with the number of unbundled bad news management forecasts – *Unbundled Bad News Forecast Frequency* and *Unbundled Relative Bad News Forecast Frequency* – as the dependent variables. The results reported in Table 6, Panel C 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 firms with non-liquid CDSs is 1.19 and the proportion of unbundled bad news earnings forecasts is higher by 5.5% for high CDS liquidity firms. In Table 6, Panel D, we augment model 4 for unbundled forecasts with the *Liquid CDS High Spread Change* and *Liquid CDS Low Spread Change* variables. Consistent with expectations, the effect of CDS liquidity on both the absolute and relative frequency of unbundled bad news earnings forecasts is stronger when CDS returns are high, but these results are only marginally significant (the F-test indicates that the coefficients on *Liquid CDS High Spread Change Return* are significantly higher relative to the coefficients on *Liquid CDS Low Spread Change* at the 10% level, one-sided).

In untabulated tests, we examine two additional aspects of managers' earnings forecast choices, forecast precision and specificity. It is possible that due to CDS market pressure, managers are not only more likely to issue earnings forecasts, but also enhance the informativeness of earnings forecasts via improving forecast precision and specificity. However, we do not find a significant relation between these forecast characteristics and liquid CDSs.

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

While earnings forecasts are 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 voluntary 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.[20] CSS scores range

[20] 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 specializes in identifying 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 specializes 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

from 0 to 100, with 50 indicating the cutoff between positive and negative news. To create a sharper differentiation between negative and positive press releases, in untabulated robustness tests, 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).

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 start 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 above with the number of press releases – *Number of Press Releases* – as the dependent variable. We present the results of this estimation in Table 7, column 1. We find a positive and significant coefficient 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 firms with low liquidity CDSs is 1.30.

We next examine whether active CDS trading disciplines managers to voluntary disclose negative press releases (columns 2 and 3). Untabulated descriptive statistics reveal that managers 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

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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.

having only 2.95 negative press releases per year. We employ model 4 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 on *Liquid CDS* is positive and significant. 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 high CDS liquidity firms. 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.

Finally, in Panel B of Table 7, we explore whether active CDS trading increases press release disclosure to a larger extent when high CDS spread changes convey to investors the arrival of bad news. We augment bad news press release frequency model with the *Liquid CDS High Spread Change* and *Liquid CDS Low Spread Change* variables, as defined previously. Consistent with our expectation, we find that the effect of liquid CDSs on the frequency of negative press releases is significantly higher when CDS spread changes are high; this effect holds for both the absolute and relative frequency of negative press releases (the F-test indicates that the coefficients on *Liquid CDS High Spread Change* are significantly higher relative to those on *Liquid CDS Low Spread Change* in columns 1 and 2).

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 financial institutions, the largest 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 argue that the threat of private information revelation in CDS spreads will increase managers' exposure to the litigation and reputation risks associated with the non-disclosure of material price-sensitive information. In response to this heightened risk exposure, we predict that managers will enhance their voluntary disclosures to level the playing field between informed and uninformed investors. 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 management forecasts, in particular. In addition to eliciting management forecasts, we also find that liquid

CDSs prompt enhanced disclosures via managerial 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 a significant 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 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 the capital markets. It helps to alleviate managers' reluctance to issue management forecasts, in particular 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 the capital markets by displacing an effective incentive for managers' voluntary disclosures.

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APPENDIX A
Variable Definitions

Variable		Definition
Analyst Following	=	Analyst coverage at the end of the fiscal year, calculated as the 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 earnings 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 a RavenPack's Composite Sentiment Score (CSS) of below 49.
Bond Investors' Hedging and Trading Demand	=	The decile rank measure of the average annual bond trading volume for a firm's two-digit SIC industry peers.
Equity Issuance	=	An indicator variable equal to one if the firm issued 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, and zero otherwise.
High Litigation Industry	=	An indicator variable equal to one for high litigation industries, zero otherwise. The following SIC codes are considered high litigation: 2844-2836, 3570-3577, 7370-7374, 3600-3674, 5200-5961, and 8731-8734.
Institutional Ownership	=	Institutional ownership (%) at the end of a given fiscal year, measured as the fraction of total shares outstanding held by institutional investors.
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 a firm's CDS contracts with distinct maturities (terms) traded on a given day, averaged over the year.
Liquid CDS Change	=	An indicator variable that takes the value of one in the post-CDS liquidity change period (the year of a firm's CDS liquidity changed and the following two years) and zero in the pre-change period (three years prior to the year of a firm's CDS liquidity change).

APPENDIX A (continued)

Variable		Definition
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 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 fiscal year.
Market to Book	=	Ratio of market value to book value of equity at the end of fiscal year.
Number of Forecasts	=	Number of management earnings forecasts issued during the year.
Number of Lenders	=	The decile rank measure of the number of unique lenders involved in a firm's outstanding syndicated loans.
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.
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 issued during the year. Unbundled forecasts are defined as those management forecasts that are not bundled with earnings announcements (i.e., forecasts issued outside of the two days window around an earnings announcement).
Unbundled Relative Bad News Forecast Frequency	=	The relative number 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.
Volatility of Earnings	=	Standard deviation of annual changes in earnings divided by total assets over the previous 5 year period.

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	5,117	25,130
(3) Sample 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 Appendix A.

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-stats are in brackets and are clustered by firm.

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

	1	2
Dep Var =	*Forecast*	*Number of Forecasts*
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]
N	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

	1	2
Dep Var =	*Forecast*	*Number of Forecasts*
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]
N	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. Panel B reports differences for explanatory variables between the liquid CDS sample and matched-firm sample to provide evidence of covariate balancing in PSM estimation. Panel C presents PSM model estimation, while Panel D presents the second-stage results using the IV technique. In both the Panels C and D, 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-stats are in brackets and are clustered by firm.

Panel A: CDS Liquidity Probit Model

Dep Var =	*Liquid CDS*
Asset Maturity	0.010*
	[1.74]
Leverage	0.329
	[1.44]
MTB	0.026***
	[2.81]
ROA	0.033
	[0.09]
Tangibility	-0.409
	[-1.55]
Log Total Assets	0.643***
	[21.14]
Volatility of Earnings	-0.740
	[-1.54]
Bond Investors' Hedging and Speculative Demand	-0.042***
	[-3.47]
Number of Lenders	0.180***
	[9.67]
Wald Chi^2 test	103.94
(p-value)	[0.00]
N	19,340
Pseudo R^2	0.467

(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]
Bond Investors' Hedging and Trading Demand	6.19	6.20	0.00
			[0.01]
Number of Lenders	8.36	8.23	0.14
			[-1.42]
N	1,005	1,005	

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

Panel C: Propensity Score Matching

	1	2
Dep Var =	*Forecast*	*Number of Forecasts*
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]
N	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

Dep Var =	1 *Forecast*	2 *Number of Forecasts*
Liquid CDS	**2.303*** **	**2.614*** **
	[6.52]	**[5.12]**
Log (Total Assets)	-0.227***	-0.239***
	[-8.50]	[-5.61]
Market to Book	-0.030***	-0.030***
	[-8.27]	[-4.40]
ROA	1.149***	1.759***
	[14.37]	[11.48]
Institutional Ownership	0.006***	0.007***
	[14.95]	[11.36]
Analyst Following	0.289***	0.463***
	[11.36]	[9.47]
Return Volatility	-0.097***	-0.112***
	[-11.47]	[-8.06]
Equity Issuance	-0.150***	-0.111*
	[-4.16]	[-1.91]
High Litigation Industry	0.153***	0.153***
	[8.50]	[3.10]
N	19,340	19,340

TABLE 5
Restricted Sample and Liquidity Change Analyses

This table presents two sets of analyses based on the sample that excludes non-CDS firms (firm-year observations without traded CDS contracts). In Panel A, the sample is restricted to firm-year observations with traded CDS contracts. Thus, these tests compare firms with liquid CDSs to firms with thinly traded CDSs. Panel B presents the analysis of the change in CDS liquidity from low to high (the *Liquid CDS Change* variable). The sample period in Panel B 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. 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-stats are in brackets and are clustered by firm.

Panel A: The Restricted Sample Analyses

	1	2
Dep Var =	*Forecast*	*Number of Forecasts*
Liquid CDS	**0.254*** **	**0.312*** **
	[3.35]	**[4.84]**
Log (Total Assets)	-0.115***	-0.095***
	[-3.03]	[-2.87]
Market to Book	-0.000	0.003
	[-0.04]	[0.29]
ROA	0.662*	1.634***
	[1.69]	[3.97]
Institutional Ownership	0.002*	0.002
	[1.71]	[1.50]
Analyst Following	0.233***	0.220***
	[3.07]	[3.70]
Return Volatility	-0.150***	-0.137***
	[-8.15]	[-7.25]
Equity Issuance	-0.395***	-0.471***
	[-4.55]	[-4.49]
High Litigation Industry	0.137	0.141*
	[1.30]	[1.79]
N	4,517	4,517
Pseudo R^2	0.062	0.070

(continued)

TABLE 5 (continued)
Restricted Sample and Liquidity Change Analyses

Panel B: Liquidity Change Analyses

	1	2
Dep Var =	*Forecast*	*Number of Forecasts*
Liquid CDS Change	**0.140****	**0.433*****
	[2.42]	**[8.15]**
Log (Total Assets)	-0.077*	-0.055
	[-1.69]	[-1.39]
Market to Book	0.046***	0.034***
	[2.94]	[4.23]
ROA	-0.523	0.522
	[-0.87]	[1.13]
Institutional Ownership	0.004**	0.002
	[2.32]	[1.50]
Analyst Following	0.216**	0.105
	[1.97]	[1.26]
Return Volatility	-0.022	-0.074**
	[-0.63]	[-2.37]
Equity Issuance	-0.292**	-0.198*
	[-2.52]	[-1.68]
High Litigation Industry	0.147	0.222**
	[1.15]	[2.43]
N	2,292	2,292
Pseudo R^2	0.034	0.054

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 (firm-year observations with at least one management forecast). Panel A presents the analyses of the frequency of bad news earnings forecasts, while Panel B presents the analyses of the frequency of bad news earnings forecasts, conditional on the credit news (measured by the magnitude of abnormal annual CDS spread changes). Panels C and D present similar analyses for the frequency of unbundled bad news earnings forecasts (forecast that are not issued in conjunction with earnings announcements). In all panels, specification 1 presents Poisson regressions of the frequency of bad news management forecasts, while specification 2 presents a Tobit regression of relative frequency of bad news earnings forecasts (the ratio of bad news to the total number of management forecasts). Robust z-stats are in brackets and are clustered by firm.

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

	1	2
Dep Var =	*Bad News Forecast Frequency*	*Relative Bad News Forecast Frequency*
Liquid CDS	**0.177*** **	**0.051** **
	[3.31]	**[2.35]**
Log (Total Assets)	-0.017	-0.029***
	[-1.32]	[-4.93]
Market to Book	-0.010**	-0.009***
	[-2.16]	[-4.37]
ROA	0.151	-0.343***
	[1.42]	[-5.78]
Institutional Ownership	0.004***	0.001***
	[7.69]	[4.84]
Analyst Following	0.024	-0.044***
	[0.78]	[-3.14]
Return Volatility	-0.006	0.004
	[-0.58]	[0.69]
Equity Issuance	0.005	0.030
	[0.13]	[1.39]
High Litigation Industry	-0.017	-0.060***
	[-0.47]	[-4.12]
N	10,692	10,692
Pseudo R^2	0.009	0.018

(continued)

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

Panel B: The Impact of Liquid CDSs, Conditional on Credit News

	1	2
Dep Var =	*Bad News Forecast Frequency*	*Relative Bad News Forecast Frequency*
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)	-0.016	-0.029***
	[-1.29]	[-4.92]
Market to Book	-0.010**	-0.009***
	[-2.14]	[-4.36]
ROA	0.154	-0.342***
	[1.45]	[-5.78]
Institutional Ownership	0.004***	0.001***
	[7.71]	[4.84]
Analyst Following	0.024	-0.044***
	[0.79]	[-3.14]
Return Volatility	-0.006	0.003
	[-0.63]	[0.66]
Equity Issuance	0.004	0.030
	[0.11]	[1.38]
High Litigation Industry	-0.016	-0.060***
	[-0.46]	[-4.12]
F-test: *Liquid CDS High Spread Change* vs. *Liquid CDS Low Spread Change [p-value]*	0.157 [0.006]	0.051 [0.034]
N	10,692	10,692
Pseudo R^2	0.009	0.018

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

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

Dep Var =	1 *Unbundled Bad News Forecast Frequency*	2 *Unbundled Relative Bad News Forecast Frequency*
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]
N	10,692	10,692
Pseudo R^2	0.009	0.004

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

Panel D: Unbundled Forecasts: The Impact of Liquid CDSs, Conditional on Credit News

Dep Var =	1 *Unbundled Bad News Forecast Frequency*	2 *Unbundled Relative Bad News Forecast Frequency*
Liquid CDS Low Spread Change	**0.135***	**0.042**
	[1.86]	**[1.64]**
Liquid CDS High Spread Change	**0.251*****	**0.079*****
	[3.38]	**[2.79]**
Log (Total Assets)	0.033**	-0.004
	[2.14]	[-0.75]
Market to Book	0.007	0.000
	[1.24]	[0.00]
ROA	0.404**	-0.135**
	[2.47]	[-2.14]
Institutional Ownership	0.003***	0.000**
	[4.43]	[2.02]
Analyst Following	-0.043	-0.058***
	[-1.07]	[-3.90]
Return Volatility	-0.039***	-0.010*
	[-2.84]	[-1.91]
Equity Issuance	-0.210***	-0.063**
	[-3.44]	[-2.58]
High Litigation Industry	0.034	-0.012
	[0.78]	[-0.78]
F-test: *Liquid CDS High Spread Change* vs. *Liquid CDS Low Spread Change [p-value]*	0.116 [0.109]	0.038 [0.164]
N	10,692	10,692
Pseudo R^2	0.010	0.004

TABLE 7
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. Panel A presents the analyses of the number of press releases and the frequency of negative press releases. Panel B presents the analyses of the frequency of negative press releases, conditional on credit news. In Panel A, specification 1 presents Poisson regression of the total number of press releases, specification 2 presents Poisson regressions of the frequency of negative press releases and specification 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). Panel B presents the analysis for the frequency and relative frequency of bad news press releases, conditional on the credit news (measured by the magnitude of abnormal annual CDS spread changes). In this panel, specification 1 presents Poisson regressions of the frequency of negative press releases and specification 2 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-stats are in brackets and are clustered by firm.

Panel A: Liquid CDSs and the Frequency of Press Releases

Dep Var =	1 *Number of Press Releases*	2 *Bad News Press Release Frequency*	3 *Relative Bad News Press Release Frequency*
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]
N	23,555	23,555	23,555
Pseudo R^2	0.344	0.182	0.178

TABLE 7 (continued)
Active CDS Trading and Voluntary Disclosure via Press Releases

Panel B: The Impact of Liquid CDSs on the Frequency of Negative Press Releases, Conditional on Credit News

Dep Var =	1 *Bad News Press Release Frequency*	2 *Relative Bad News Press Release Frequency*
Liquid CDS Low Spread Change	**0.257*** **	**0.005**
	[5.39]	**[1.30]**
Liquid CDS High Spread Change	**0.397*** **	**0.021*** **
	[8.13]	**[3.98]**
Log (Total Assets)	0.296***	0.018***
	[28.95]	[20.07]
Market to Book	0.007	-0.001
	[1.36]	[-1.60]
ROA	-0.510***	-0.045***
	[-6.50]	[-7.05]
Institutional Ownership	0.001**	0.000
	[2.37]	[0.81]
Analyst Following	0.102***	-0.007***
	[3.35]	[-2.70]
Return Volatility	0.088***	0.009***
	[14.44]	[12.77]
Equity Issuance	0.145***	0.006*
	[4.51]	[1.91]
High Ligitation Industry	0.204***	0.006**
	[5.06]	[2.08]
F-test: *Liquid CDS High Spread Change* vs. *Liquid CDS Low Spread Change [p-value]*	0.139 [0.000]	0.016 [0.000]
N	23,555	23,555
Pseudo R^2	0.183	0.179