Disclosure, Runs and Bank Capital Raising[*]

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January 31, 2018

JEL Classification: G21, G28, G32
Keywords: Bank runs, disclosure, equity issuance

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[*]We are grateful for helpful comments from Aparna Gupta, Kathleen Hanley, Robert Hauswald, Dasol Kim, Kelly Liu, Robert Marquez, Gregor Matvos, Andrew Winton and participants at a seminar at the SEC, the 2017 University of South Carolina Conference on Fixed Income and Financial Institutions, the 2017 FIRN Banking Conference, and the 2017 FDIC Annual Bank Conference. We also appreciate assistance from Raluca Roman and Jan Jindra, who generously shared data on government assistance programs.
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ABSTRACT

Banks often must raise equity financing in a crisis despite having weak prospects and potential investors who heavily discount the value of their risky assets. By increasing disclosure at such times, banks may benefit from a more precise estimation of firm risk and thus a lower cost of capital. But they may also reveal that bank capital is dangerously low, which could hamper equity issuance or trigger a bank run by uninsured depositors. We investigate the costs and benefits of greater disclosure facing large commercial banks during the subprime crisis. Our findings suggest that disclosure slightly improves capital raising, but it also leads to withdrawals of uninsured deposits. Thus, the overall impact on bank health is slightly negative.

When U.S. banking regulators adopted stress tests in 2009, they both increased the amount of information about the health of the largest banks and assured investors that the weakest of these banks would be recapitalized. Morgan, Peristiani and Savino (2014) conclude that the tests "helped quell the financial panic by producing vital information about banks." The stress tests fit with the view in Flannery and Thakor (2006) and Nier and Baumann (2006) that information disclosure is necessary for effective market discipline in banking. It also supports Pritsker (2010), who argues that greater information reduces uncertainty, and thus the required risk premium on bank credit spreads. Similarly, Korajczyk, Lucas and McDonald (1991) argue that equity offerings will involve a smaller lemons problem when firms issue at times when information is greatest.

In contrast to the U.S. experience in 2009, Bischof and Daske (2013) describe the European Union (EU) stress tests of 2010 and 2011 as unsuccessful in combatting the negative effects of the sovereign debt crisis. Schuermann (2016) suggests that the benefits of increased information from the EU tests were more than offset by fears that the EU banks were insufficiently capitalized. The European experience is consistent with several theory papers that analyze the drawbacks of stress tests (e.g., Goldstein and Sapra, 2014; Botia, 2016). In particular, mandatory disclosure has the potential to cause bank runs or reduce risk-sharing. Goldstein and Leitner (2015) argue that disclosure could cause the Hirshleifer (1971) effect, where negative information is revealed before banks have a chance to raise new equity capital. Chen and Hasan (2006) conclude that greater transparency of the banking system may increase the chance of a bank run, even in the face of substantial deposit insurance. Thus, it is not clear whether the benefits of disclosure in creating market discipline and raising capital outweigh the risks of runs and diminished risk-sharing.

Given the importance of reducing systemic risk and ensuring a well-capitalized banking system in a downturn, regulators recently have been keen to apply stress-testing to banks. But the differing experiences in the U.S. and Europe suggest that it may not be optimal to force banks to disclose information in a crisis, especially if the information is so negative that it has the potential to destabilize markets. The Federal Reserve maintains the secrecy of discount window borrowers during a crisis, which Gorton and Ordonez (2017) argue is the optimal policy to avoid bank runs. Given regulators' desire to control the amount and scope of information they release about bank health, banks themselves may find it optimal to provide more information to investors and uninsured depositors as a way to ensure their own survival in a crisis.

Our paper examines the trade-offs related to greater information disclosure by banks in a crisis. On the one hand, when investors are given more information, uncertainty is reduced, which may reduce the cost of external funding (Botosan, 1997; Pritsker, 2010). This may be especially important during a crisis when banks must raise new equity capital to avoid insolvency. On the other hand, most of the information released in a crisis is bad news and could exacerbate concerns about future viability. In some cases during the subprime crisis, the information disclosed was so negative that it is caused bank runs (Rose, 2015). If increased disclosure highlights the lack of capital in the banking system, then greater disclosure might hamper efforts to recapitalize and instead result in difficulties with debt financing.

Using a sample of large U.S. banks during the subprime crisis, we investigate the impact of increased bank disclosure on the probability of a bank run, the likelihood of successfully issuing new equity, and the net effect on bank health. We measure disclosure by two methods. First, we consider the information in conference calls. Second, we analyze filings with the Securities and Exchange Commission (SEC) that mention losses on real estate. To examine the impact of disclosure on bank runs, we regress the change in uninsured deposits each quarter against the extent of bank disclosure. To determine the impact of disclosure on the probability of issuing equity during the crisis, we estimate a cross-section logit during the three-year period. We also estimate the probability of equity issuance with a two-stage procedure that considers the impact of disclosure on uncertainty. That is, we first estimate the effects of disclosure on uncertainty, measured by the standard deviation of equity returns or by the dispersion of analysts' earnings forecasts, and then use the predicted values of uncertainty in a logit regression to determine the role of disclosure on equity issuance. Given that the effect on equity issuance is expected to be positive and the impact on uninsured deposits negative, our final set of tests considers the overall effect of disclosure on bank health. We measure bank health by the z-score (Laeven and Levine, 2009), the expected default frequency (EDF) of Bharath and Shumway (2008) and by Tobin's Q.

Our results indicate that increased disclosure about losses on mortgage-backed securities and other real estate investments leads to a higher probability of withdrawals from uninsured deposit accounts. At the same time, it has a slight positive impact on equity issuance, whether we measure the impact with a simple logistic regression or the two-stage procedure. While the impact on equity issuance is only weakly positive, it is not negative, indicating that the Hirshleifer effect is not an important factor. However, to the extent that equity issuance is positively affected by disclosure, there is scant evidence that the mechanism involves reduced uncertainty. Some of our measures of disclosure are associated with lower uncertainty, but we do not find that a lower dispersion of analysts' forecasts helps to raise new equity. Overall, disclosure about problem loans hurts banks by causing bank runs, which more than offset the benefits afforded in capital raising. However, these opposite effects have only a slim effect on the overall health of the bank, as measured by lower z-scores and Tobin's Q. We do not find any evidence of worsened bank health when measured by EDF.

In the next section we discuss the literature and develop our hypotheses. Section II summarizes our data, Section III presents empirical results, Section IV reports sensitivity analyses, and Section V concludes.

I. Literature and Analytical Framework

Our focus is on the tradeoff facing large commercial banks in a downturn: Are they better off providing full information, even when the news is largely negative, in order to increase the precision of investor estimates of firm value and assure investors who might provide new equity capital? Or should they avoid disclosure in order to reduce the chances of a bank run by uninsured depositors and investors in short-term credit markets? To analyze these questions we consider two strands of the literature: bank runs and capital raising.

To measure disclosure we rely on two types of data: conference calls with analysts and SEC filings. Matsumoto, Pronk and Roelofsen (2011) show that conference calls provide information over and above the earnings press release, which they attribute to the participation of analysts in the discussion section of the call. Thus, we focus on the question and answer part of the conference call. Bird and Karolyi (2016) count the number of SEC filings to determine the preferences of institutional investors. We use a similar approach in counting the number of 8-K and other filings with the SEC that mention the real estate problems of the subprime crisis.

a. Bank runs

Much of the early literature on bank runs, such as Diamond and Dybvig (1983), highlights the potential for inefficient runs when coordination problems prevent banks from supplying liquidity. In contrast, researchers such as Chari and Jagannathan, (1988), Chen (1999), Huang and Ratnovski (2011), and Nikitin and Smith (2008) focus on bank runs that arise from concerns about insolvency. When public information does not separate good banks from bad ones, solvent banks may face inefficient runs, but Bouvard, Chaigneau, and De Motta (2015) show that increasing bank-specific information helps sound banks avoid runs (albeit at the expense of weak ones). Parlatore (2015) finds in a model with noisy private signals about bank health that increasing the precision of the signals (increased disclosure) makes runs on all banks more likely. Healthy banks suffer from runs because they are unable to credibly reveal their value, which is also important in Faria-e-Castro, Martinez and Philippon (2015).

Increased disclosure may lead to the so-called "Hirshleifer effect" (Hirshleifer, 1971), whereby revealing bad news leads to a reduction in risk-sharing opportunities (Goldstein and Sapra, 2013; Goldstein and Leitner, 2013; Shapiro and Skeie, 2012; and Spargoli, 2016). Dang, Gorton, Holmstrom and Ordonez (2017) show that keeping bank asset values secret helps maintain investor confidence. Alvarez and Barlevy (2014) suggest that welfare may be improved by forcing banks to remain silent. Likewise, Spargoli (2016) notes that disclosing negative information about a bad bank leads to a run unless the bank recapitalizes.

Because bank runs in the U.S. all but disappeared after the creation of the Federal Deposit Insurance Corporation (FDIC) and because data from before the FDIC are sparse, there is little empirical evidence on whether increasing disclosure increases the probability of a run. Calomiris and Mason (1997) provide evidence that pre-FDIC bank runs occurred when depositors doubted a bank's solvency. This suggests that in a period with nearly uniformly negative information, such as the subprime crisis, increased disclosure would increase the likelihood of a run for many banks. Post-1933 empirical analysis, summarized by Berger and Turk-Ariss (2015), focuses on risk premiums on certificates of deposit and shows only a weak relation to bank health. Using data from a single bank in India, Iyer, Puri and Ryan (2016) show that uninsured depositors run after news of a negative audit outcome. The subprime crisis is unusual in offering direct evidence of runs in the U.S., such as in Gorton and Metrick (2012), Martin, Skeie and von Thadden (2014), Covitz, Liang and Suarez (2013), and Schroth, Suarez, and Taylor (2014), who study runs in debt capital markets. Rose (2015) argues that "commercial bank runs have re-emerged," noting the cases of Wachovia, Washington Mutual, IndyMac, National City Bank and Sovereign Bank in the recent financial crisis. Egan, Hortacsu and Matvos (2017) provide a model and empirical analysis of the time period that indicates uninsured depositors are very concerned with the probability of default.

Given that banks' disclosure during most quarters of the subprime crisis involved news of losses on real estate-related investments, we expect that increased disclosure would on average have increased the likelihood of a bank run. Specifically, H1 considers the impact of disclosure on uninsured deposits:

H1 Bank Runs:
The risk of uninsured depositor withdrawals increase when more information about a bank's health is revealed in a crisis.

Many uninsured deposits belong to institutional investors who rely, in part, on equity analysts' interpretation of the information disclosed by banks. Greater disclosure should allow analysts to have a clearer picture of the path of future earnings so that the dispersion of analysts' forecasts is smaller (Lang and Lundhelm, 1996). Having more analysts should also aid the precision of the information (He and Tian, 2013; Zur, 2015). If the analysts' estimates are more precise, the bank's stock market returns should be less volatile, all else constant. For example, Bushman and Williams (2015) show that banks with more opaque loan loss provisioning policies are more likely to suffer higher downside risk, especially so in bust periods.

Measuring the information environment with analysts' forecasts and the standard deviation of stock returns, we propose alternative versions of **H1**:

H1a Analysts and Bank Runs:
Uninsured depositors are more likely to withdraw funds when analysts agree that the bank is weak, which is measured by lower analyst forecast dispersion in a crisis.

H1b Stock Market Volatility and Bank Runs:
Uninsured depositors are more likely to withdraw funds when investors agree that the bank is weak, which is measured by low stock return volatility in a crisis.

In addition to withdrawals by uninsured depositors, disclosure of information may lead to a run in the debt capital markets (e.g., repos or asset-backed commercial paper). Together, these declines in funding may force the bank into an even weaker position and may lead to fire sales (e.g., Adrian and Shin, 2010). We measure the probability of failure with z-scores (Laeven and Levine, 2009) and expected default frequencies (EDFs), as in Bharath and Shumway (2008). We also estimate the impact of disclosure on Tobin's Q. To the extent there are rated firms in the sample, we also consider the likelihood of a bond downgrade.

H2 Disclosure and Increasing Risk of Failure:
Greater disclosure in a crisis leads to increased funding problems and higher interest rates on borrowed funds, which in turn hurts overall bank health (i.e., lower Z scores, lower Tobin's Q and higher EDFs).

H1, H1a, H1b and H2 are based on the idea that more disclosure leads to a clearer understanding by investors that if they provide funds to the bank they do so with limited or zero upside (the Hirshleifer effect). These hypotheses rely on the logic that a perfectly clear picture of the bank's health is a picture of loss. In this situation, providing funds to the bank is tantamount to providing relief to existing creditors (Myers, 1977) or stock investors (Myers and Majluf, 1984).

b. Equity issuance

While losses for large U.S. banks in the subprime crisis were great and some banks were likely insolvent, many banks remained solvent throughout the crisis and some had sufficient growth potential to avoid the debt overhang problem. For solvent banks, greater disclosure may have helped convince investors to provide additional capital. In a crisis, banks are often under pressure to meet regulatory minimum capital ratios and may be forced to tap the equity markets for additional funds. If disclosure helps convince new investors that future returns are sufficiently high, then greater disclosure may be beneficial to these banks despite the risks related to runs.

Although many U.S. banks started the crisis with relatively high capital (Flannery and Rangan, 2008; Berger, DeYoung, Flannery, Lee and Oztekin, 2008), losses in the subprime crisis severely eroded capital and the need for equity infusions was widespread among banks. Morgan, Peristiani and Savino (2014) report that the 2009 stress test found Bank of America in need of $33.9 billion (b.) additional capital while Wells Fargo and Citigroup were deemed to be short by $13.7 b. and $5.5 b., respectively. Boyson, Helwege and Jindra (2014) show that more than half of their sample of large commercial banks issued equity during the subprime crisis

Given the widespread need for raising new capital during a crisis, increased disclosure might have an impact on the likelihood that a bank successfully issues such equity and on its cost. If asymmetric information between banks and investors leads to a lemons problem with equity issuance (Myers and Majluf, 1984), greater disclosure by healthier banks, if credible, could mitigate these problems. Cornett and Tehranian (1994) and Cornett, Mehran, and Tehranian (1998) provide evidence that information problems have a significant effect on banks' capital-raising in a downturn. Thus, we propose the following hypothesis related to equity issuance:

H3 Disclosure and Equity Issuance:
By providing more information about the true value of its stock, a bank increases its likelihood of successfully raising additional equity capital in a crisis.

Alternatively, banks may find that greater information makes equity issuance more difficult and H3 may be rejected. As stated earlier in discussing the Hirshleifer effect, greater disclosure may reveal to potential investors that there are no opportunities for sharing risk, either as creditors or equity investors. Related to this, the information may reveal a severe debt overhang that would prevent investors from providing new equity to the bank (Myers, 1977).

If greater disclosure helps banks raise new equity, the channel through which disclosure aids issuance may be related to uncertainty and related risk premia. Several studies suggest that greater disclosure reduces estimation risk related to the parameters of a stock's payoff distribution, which may affect the cost of capital (e.g., Botosan, 1997; Klein and Bawa, 1976; Barry and Brown, 1985; Coles and Loewenstein, 1988; Handa and Linn, 1993; Coles et al., 1995; and Clarkson et al., 1996). Easley and O'Hara (2004) argue that information affects the required return on stocks when uninformed investors are at a disadvantage, while Diamond and Verrecchia (1991) theorize that disclosure improves the firm's cost of capital by increasing the liquidity of its stock. Empirically, Zur (2015) finds that increased disclosure leads to an improved assessment of banks' risk while Bischof and Daske (2013) conclude that the European stress tests improved liquidity through greater disclosure. Baumann and Nier (2004) find that greater disclosure leads to lower bank stock volatility. We investigate whether disclosure affects uncertainty and, if so, whether lower uncertainty and greater liquidity increases equity issuance.

H4 Disclosure and Uncertainty:
By providing more information about its true value, a bank benefits from investors' improved understanding of its value. Therefore, greater disclosure leads to lower dispersion of analysts' forecasts, lower volatility of the bank's equity returns and greater agreement among bond rating agencies.

H4a Disclosure, Equity Volatility and Equity Issuance:
By providing more information about its true value, a bank benefits from investors' improved understanding of its value (lower uncertainty), which in turn increases the probability of successfully raising new equity.

H4b Disclosure, Equity Liquidity and Equity Issuance:
By providing more information about its true value, a bank's stock liquidity increases, which increases the probability of successfully raising new equity.

Towards the end of our sample period, the Federal Reserve instituted the first stress tests. Empirical studies of the effects of this form of disclosure are mixed.[1] While the stress tests may provide less uncertainty about the health of a particular bank, they also provide information about the regulators' policies (Flannery, Hirtle, and Kovner, 2017; Bird, Karolyi, Ruchti and Sudbury, 2015). Because the stress tests during the crisis period are quite limited and only apply to a small number of banks, the emphasis in this study is on disclosure by banks rather than by regulators. However, to the extent that the stress-tested banks provide additional information during the sample period, our measures of disclosure will be affected by them.[2] Considering the potential effects of disclosure on bank runs and equity issuance, the overall impact on bank health is unclear. We show sensitivity analysis related to the 14 stress tests banks in Section IV.

c. Bank Health

In discussing H2, we highlighted the potential for greater disclosure to hamper the bank's funding strategies, which in turn could lead to failure. In contrast, our discussion of H3, H4, H4a and H4b focused on the positive potential of increased disclosure to affect the bank's health. While a bank run could cause failure, it is an empirical question as to whether outflows are large enough to cause a substantial decline in bank net worth. Likewise, it is an empirical question as to whether the improved information setting created by greater disclosure is very helpful in raising new equity capital. Therefore, we reconsider H2:

[1] See Petrella and Resti (2013), Morgan, Peristiani, and Savino (2014), Candelon and Sy (2015), Bird, Karoyli, Ruchti and Sudbury (2-15), Fernandes, Igan and Pinheiro (2015) and Flannery, Hirtle and Kovner (2016).
[2] For example, Bank of America filed an 8-K on May 8, 2009 to report item 8.01 (Other Events), which referred to the results of the Federal Reserve's stress test.

H2 Disclosure and Risk of Failure:
Greater disclosure in a crisis leads to increased funding problems and higher interest rates on borrowed funds, which in turn hurts overall bank health (i.e., lower Z scores, lower Tobin's Q and higher EDFs). Alternatively, greater disclosure improves a bank's ability to raise new equity capital and leads to stronger bank balance sheets.

II. Data

Our analysis examines large, publicly traded U.S. bank holding companies during the subprime crisis. We restrict the sample to larger banks because of their greater potential to raise capital in public equity markets, whereas small or private banks may not have access to new public equity during the period. We identify sample banks using SNL Financial (SNL), which we match to CRSP using data on RSSD and PERMCO provided by the Federal Reserve Bank of New York. SNL includes data on branch locations and deposits by state, as well as balance sheet and income items. The sample is restricted to banks that have at least $1 b. in assets at year-end 2006 and that are headquartered in one of the 50 states in the U.S.

We first measure disclosure by counting the number of words in the question and answer section of the conference call transcript. Some banks do not hold conference calls or only have pre-recorded calls that have no Q&A session. If there is no Q&A session the word count variable is set to zero and the bank is treated as if it did not hold the call at all. Conference call transcripts are obtained from Factiva, Lexis Nexis, SNL and NASDAQ. These sources obtain their transcripts from Fair Disclosure (FD) Wire, CQ FD Disclosure, Voxant, Seeking Alpha and/or Thomson.

We also create disclosure measures based on the number of SEC filings that mention losses. We obtain these counts from a search in Capital IQ. While it seems likely that 8-K filings, which report material new information, would be the most important forms of disclosure, other filings could have a similar effect. Hence, we also use three other counts of SEC filings that mention real estate losses: (1) the number of proxy statements; (2) the number of prospectus filings; and (3) the number of 10-K and 10-Q filings. Although type (3) filings typically occur once per quarter, firms may file amendments, so the averages can be higher. In addition to these detailed counts, we sum up the four types of filings related to real estate losses and consider this as a separate measure of disclosure.

Some firms file extra proxy statements because of a change in management. In addition to the count of type (1) filings, we also create an indicator variable for banks that have CEO turnover during the study period.

We further test the effects of disclosure using three additional metrics: (1) the dispersion of analysts' forecasts; (2) the number of equity analysts; and (3) bond ratings. We collect data on bond ratings (Standard and Poor's, Moody's and Fitch) from Bloomberg and create an indicator variable for banks with split ratings and another for banks with bond rating changes. Many banks in our sample do not have bond ratings, so we do not focus our analysis on these tests.

While we do not require a bond rating for a bank to be included in the sample, we only include banks that have analyst coverage in I/B/E/S for at least one quarter during 2007-2009. To calculate analyst dispersion a bank must have at least two analysts' forecasts. Banks that do not have sufficient analyst coverage to calculate dispersion are excluded from this analysis but are included in the sample used in other analyses. The full sample includes 2,106 bank-quarter observations on 191 banks. The sample with forecast dispersion includes 1,267 bank-quarter observations.

A further check on the ability to raise equity is the liquidity of the bank's stock. Not only do we require that banks have stock prices reported in CRSP for at least 60 days in the last quarter of 2006, but we also exclude any bank whose stock has five or more zero trading days per month on average. CRSP data is also used to calculate the volatility of equity returns, which is based on 3 months of daily data.

Several of the banks failed during the sample period or were merged with other banks (possibly to avoid failure). We include data on these banks for as long as SNL reports it. We also identify bank failures by matching the list of sample banks to the FDIC's failed bank list. Because few of the 191 banks in the sample fail, we do not do separate tests on surviving banks.

During the subprime crisis many banks became distressed due to losses on real-estate related investments (Cole and White, 2012). Thus, it is important to control for banks' exposures to the downturn in real estate prices. We create two variables that capture real estate exposure that is known to investors even without supplemental disclosures. First, we measure the exposure to the housing bust by calculating a weighted average housing return for each bank-month. Housing returns are derived from the Fannie Mae house price index for each state. The weighted average is calculated by using the fraction of deposits the bank has in each state by using branch deposit data from SNL. The second variable calculates the standard deviation of housing price returns, again weighting by the bank's deposits in the state.

Banks that operate branches in multiple states are likely to have more diversified asset portfolios and therefore less likely to suffer extreme losses from a real estate bust in one particular location. We include a variable for the number of states in which the bank operates. This variable may also capture investors' familiarity with the bank (Merton, 1987). Therefore, banks with more nationally recognized operations may be able to raise equity more easily.

We also consider the use of government programs in the most recent crisis by analyzing data from the Federal Reserve's response to a Freedom of Information Act (FOIA) request on 3/31/2011. The FOIA data are described in detail in Boyson, Helwege and Jindra (2016).

We match the sample to the Securities Data Corporation (SDC) database to determine whether a bank issued equity. We create an indicator variable for banks that issued equity, regardless of whether it was issued privately or publicly.

Summary statistics for the full sample are presented in Table 1. By construction, the sample includes large banks, so the minimum asset size is slightly more than $1 b. The average (median) assets is $54 b. ($4.07 b.) and the largest bank has more than $1.8 trillion in assets. Despite their size, most banks only operate in a few states and none are truly national banks during the period. Not shown, approximately 60% of the banks hold conference calls on average. The average and median word counts of the Q&A section is about 4,000, but some conference calls have as many as 13,000 words in one Q&A session. SEC filings via 8-K forms average 2.74 per quarter and have a maximum value of 7.17 per quarter. Other SEC filings occur far less often. For example, proxy statements average 0.48 per quarter. These may be related to CEO turnover, which averages 0.21 per quarter but is typically zero. Prospectuses, which are mainly related to debt offerings, can reach 61.67, but the typical bank in the sample files few prospectuses. Banks with zero filings are those that have become small enough or weak enough to avoid having to file but which still have reported data in SNL (if only for one last quarter). Measures of bank health vary sharply over the sample period, but the variation is masked somewhat by averaging by time and then across banks. Nonetheless, loan loss provisions, return on equity, leverage ratios, Tier 1 risk ratios, stock returns and real estate returns exhibit substantial volatility in Table 1. We require banks in the sample to have at least one analyst, leading to a sample with 4.83 analysts on average. We also require that the banks in the sample have fairly liquid stock, so the number of non-trading days is quite low (average of 0.42 per quarter). Given the sample of large banks, it is not surprising that the average amount borrowed from government programs during the period averages $24.77 m. (not reported) or that there are a number of heavy users of these programs in the sample (15% are heavy users). Acquisitions are fairly common, averaging .5 per quarter.

III. Results

A. Bank Runs

The summary statistics in Table 1 indicate that many banks in the sample were in or approaching distress during the sample period. Thus, to the extent they provided more information to investors, banks were at risk of creating strong incentives for uninsured depositors to withdraw their funds. We test for the impact of disclosure on bank runs in Table 2, where the dependent variable is a decline in uninsured deposits of one percent or more in a quarter. The estimation is done with 12 quarters of panel data over the 2007-2009 sample period.

Since we expect disclosure to affect investors' confidence in the bank, we include the standard deviation of equity returns and the skewness of returns as measures of uncertainty. Disclosure is one part of the information environment, which can be substituted for with analyst coverage. We include the number of analysts and the dispersion of analysts' forecasts as additional measures of information. Because uncertainty of stock returns is highly correlated with the dispersion of earnings forecasts, we do not include both variables in the regressions at the same time. The odd-numbered models in Table 2 measure uncertainty with the standard deviation of stock returns while the even-numbered models instead include analysts' forecast dispersion.

Three of the four models in Table 2 indicate that increased disclosure through SEC filings increases the probability of a bank run, which supports H1. However, the conference call variable is never significant and only the SEC filing count variables indicate that disclosure matters for bank runs. The two types of disclosure that appear to have the largest impact are the 8-K filings and the proxy disclosures, which suggest that when banks release more information (about what are generally bad outcomes), uninsured depositors become worried and are more likely to exit. In contrast, the prospectus-related disclosure variable has a significant negative coefficient in model (2). The net effect of total disclosures is significantly positive in model (3).

Each of the specifications in Table 2 has a significant negative coefficient on the assets variable, which is consistent with institutional depositors having faith that the government will continue to pursue too-big-to-fail (TBTF) policies. This raises the question of whether our results on disclosure hold for the largest banks in the sample. In unreported estimations, we exclude the 14 banks that were part of the May 2009 stress tests. None of the variables that are significant in Table 2 change sign and nearly all remain significant when the TBTF banks are removed from the sample. The assets variable remains significant and negative with a similar coefficient in all four models. We discuss the impact of the stress test banks in greater detail in Section IV.

The models in Table 2 control for the health of the bank via a variety of metrics. We consider the real estate exposure variable to be one of the most important of these control variables. Recall that this variable, which is a weighted average of the housing price returns in the various states in which the bank operates, has a negative value on average. That is, it is positively correlated with how much the bank has lost on real estate loans, where the losses are reported as negative values (negative returns). Thus, the significant negative coefficients in all four models indicates that greater losses on real estate were a significant source of withdrawals by concerned institutional investors.

Similarly, the lower the market value of equity (measured by book to market) the more likely the bank is to experience withdrawals. Greater capital and higher returns to equity are sometimes significant and supportive of the conclusion that weaker banks have more withdrawals.

These results are consistent with the evidence in Calomiris and Mason (1997) that fears of bank insolvency lead to runs.

The standard deviation of stock returns is insignificant in both models that include it, contrary to H1b. Similarly, the analysts forecast measures are insignificant. Perhaps this reflects a consensus that the government would help out banks but it could also reflect an unwillingness on the part of analysts to admit the extent of losses at these banks.

B. Uncertainty

In addition to a reduction in confidence that might lead to bank runs, disclosure may be important for the precision of investors' estimates of shareholder value. We hypothesize in H4A that disclosure, if it matters for raising capital, affects the probability of issuing equity by reducing uncertainty. This suggests a channel through which disclosure matters for equity issuance: disclosure reduces uncertainty, which lowers the required return on equity (or at least makes potential investors more confident that they understand the risks associated with the investment), which in turn makes it more likely that banks will successfully place new shares. We investigate a portion of this channel in Table 3 by considering the impact of disclosure on uncertainty. Panel A of Table 3 shows the impact of greater disclosure on the bank's stock return volatility, while Panel B examines the relationship between disclosure and the dispersion of analysts' earnings estimates. Panels C and D of the table look at the prevalence of split ratings and rating changes, respectively.

In models (1) – (2) of Table 3, Panel A we include counts of all four detailed categories of SEC filings as separate variables while in models (3) and (4) we include the aggregate count. All of the models indicate that the amount of disclosure by banks affects the standard deviation of a bank's stock returns. The word count variable indicates that a more informative question and answer session in the earnings conference call leads to a less volatile stock price. In contrast, the

SEC filing counts are mainly insignificant. The exceptions are the 8-K disclosure count and the overall count. However, these two variables suggest that the relationship between disclosure and volatility is positive. That is, the 8-K and total SEC variables indicate that the more information the bank provides to the investing public the more doubtful they are about the firm. This could owe to the fact that the information being provided during our sample period is extremely negative. Since uncertainty is measured by the standard deviation of stock returns and there are many days with extremely negative returns for many banks, especially in late 2008 and early 2009, these results may reflect the fact that greater disclosure reveals more bad news. Consistent with this explanation, we find in (untabulated) results that the quartile with the highest standard deviation of stock returns has a median stock return of -0.08% per quarter while the quartile of observations with the lowest standard deviation of stock returns has a median stock return that is not as negative (-0.024% per quarter).

Consistent with this interpretation of the SEC disclosure variables, we find that nonperforming loans are positively associated with uncertainty and that higher betas increase the volatility of the equity. Likewise, the lower the return on equity, the higher the standard deviation. Keeping in mind that the mean ROE in the sample is negative, the negative coefficient on ROE implies an above average standard deviation for the lowest ROE firms. Similarly, the safer firms in the sample, as measured by assets and capital (tier 1 risk ratio), have lower stock price volatility. Firms that needed to borrow from government liquidity programs had more volatile returns.

In Panel B of Table 3 we measure uncertainty with the dispersion of analysts' forecasts. The specifications in Panel B are identical to those in Panel A. The conference call word count is significantly negative in all of the models explaining analysts' forecast dispersion. This suggests that greater disclosure helps potential new investors understand the risks of the bank's equity. In contrast, the number of SEC filings is only significant four out of ten times. For models (1) and (2), where disclosure is measured with the four detailed variables, the coefficients are significantly positive when the measure of disclosure is based on prospectus filings. The effect of total disclosures, seen in models (3) and (4), is also positive.

Another feature of the results in Panel B of Table 3 is the frequency with which variables lose significance or change sign compared to Panel A. Nonperforming loans provisions continue to induce uncertainty and capital remains a significant dampening factor on forecast dispersion, but assets and beta flip signs. As expected, a larger number of analysts reduces the variance of the forecast estimate. Overall, the results in Panel B of Table 3 suggest that SEC disclosure does not aid equity issuance through less uncertainty about the value of the firm but discussions with analysts do.

Next we consider bond ratings. We view split ratings and rating changes as measures of uncertainty and investigate whether they are affected by disclosure. Split ratings occur when one of the three rating agencies disagrees with the other two, which likely occurs when the value of the firm is more uncertain. Rating changes are an indicator of uncertainty because upgrades and downgrades occur when the agency views the situation differently than before.

Rating changes and split ratings are infrequent in the sample due to the fact that some firms are not rated at all and that one goal of rating agencies is relative stability. This paucity of data makes reliable inferences more difficult to obtain and thus we view these results as less informative than those in Panels A and B of Table 3. Because there are so few split ratings and rating changes for the dependent variables in these two tables, we do not estimate the models with panel data with quarterly time series as in previous tables. Instead, we create indicator variables for firms that ever have a split rating (or rating change) over the sample period and we only do a cross-sectional analysis. To control for the potential problem of endogeneity, we also create an indicator for whether the rating split or change occurred in 2009 and we use explanatory variables that are calculated over the 2007-2008 period.

Panel C of Table 3 presents results of a logit regression where the dependent variable is one for banks with split ratings, and zero otherwise. In models (1)-(4), this indicator variable is calculated using data throughout the 2007-2009 period and is set to one if there is a split rating at any point during the period. In models (5)-(8), the dependent variable is one if the bank has a split rating in 2009 and 0 if its rating is not split or it is unrated in 2009. The independent variables in the regressions in (5)-(8) are averages over the previous two years. Of the 191 banks in the sample, there are 47 banks with a positive split ratings indicator in the full period and 39 with a split rating in 2009.

In most of the specifications, the conference call word count is positive, suggesting that more information leads to less agreement about the creditworthiness of the bank. However, the variable is only significant in three of the eight models. One of the models with proxy filings is consistent with this interpretation. In contrast, the SEC filings related to prospectuses and the overall count, when significant, suggest that more information leads to greater agreement among rating agencies. The 8-K and 10-K disclosures are never significant in these models.

In estimating these regressions, we include a number of measures of bank health, stock liquidity and uncertainty measures (standard deviation of stock returns and analysts' forecast dispersion). As expected, greater disagreement among equity analysts is associated with greater disagreement among bond analysts, although the dispersion variable is only significant in models (6) and (8). Beta is negative and often significantly so in the eight models, which suggests that riskier firms are more easily evaluated. Perhaps this is because they are evaluated as having major losses. Larger banks are more likely to have a split rating but the coefficient is only significant in models (5)-(7). The number of states is a similar variable and has the same sign but it is only significant in some of the first four models. We find evidence suggesting that banks that were heavy users of LOLR programs are less likely to have split ratings, perhaps reflecting the fact that very large banks were considered to be recipients of TBTF policies during this period. That is, their weak positions did not lead to uncertainty about their status.

Panel D of Table 3 reports estimates of the impact of disclosure on the 56 rating changes that took place over the sample period. Most of the changes (42 of 56) were negative events (downgrades or on watch for possible downgrade) and most of the events (42) occurred in 2009. As in Panel C of Table 3, columns (5)-(8) include regressions where the dependent variable is one if the event took place in 2009 and the independent variables are averaged over 2007-2008. The conference call word count is never significant in these logits, but the number of 8-Ks is associated with fewer rating changes in two models and so is the prospectus variable. Overall, greater disclosure appears to be related to a slightly lower incidence of rating downgrade.

Since most of the rating changes are negative, it is not surprising that the real estate exposure variable (which usually has a negative value) has a significant negative coefficient. That is, the greater the losses on real estate, the more likely the bank suffered a downgrade during the period. Few variables are consistently significant, but larger firms are more likely to have a rating change.

In sum, our analysis of the impact of disclosure on uncertainty shows that disclosure through the conference call question and answer session tends to help to clarify the bank's situation. When we measure uncertainty by the standard deviation of stock returns or the dispersion of analysts' earnings forecasts, the word count variable is significant and has a sign consistent with greater clarity. However, the variable is either insignificant or has the opposite when we consider the split ratings and rating changes. When disclosure is measured by a count of SEC filings the results are mixed: some variables, when they are significant, indicate that more filings reduces uncertainty whereas others imply the opposite.

C. Equity Issuance

Next, we investigate H3 and the probability of equity issuance during the recent financial crisis. Given the previous section's results, it is possible that uncertainty will be reduced by greater disclosure and that in turn will lower the bank's cost of capital. Less expensive equity at a time when new capital is sorely needed should lead to more frequent issuance in the crisis.

Some banks did not issue equity during the sample period and those that did so were not frequent issuers, as is common for most firms (Myers and Majluf, 1984). During 2007-2009, 76 banks completed either public or private offerings. Table 4 shows that these 76 banks undertook 106 offerings that most occurred during the later period of the subprime crisis. Only two offerings were completed in 2007 and equity offerings were not much more common in some quarters in 2008. Table 4 shows that two-thirds of the offerings were in the last three quarters of 2009. Because equity issuance is infrequent during the sample period, estimating the probability of issuance using a quarterly time series presents econometric hurdles. Therefore, as with our estimates in Panels C and D of Table 3, we do not estimate the probability of an equity offering with quarterly time series observations and instead average the data for one bank over time to create a cross-section dataset.

Table 5 reports estimates of two sets of logit regressions where the dependent variable is one for banks that issued equity at least once during the relevant period and zero otherwise. For the first four columns of Table 5, the dependent variable is measured for the period 2007-2009 and the independent variables are averaged over the three year period. On the right side of Table 5, columns (5) through (8) report coefficient estimates from logits where the dependent variable is one for banks that issued equity in calendar year 2009. The independent variables in these logit regressions are measured as the average over the years 2007 and 2008.

In half of the specifications in Table 5, we include four detailed measures of SEC filings (the number of 8-Ks filed; the number of 10-K and 10-Q filings; the number of proxy statements; and the number of registration statements), while in the other models (models (3), (4), (7) and (8)), we replace these four measures with a count of all four types of SEC filings.

The evidence in Table 5 indicates that greater disclosure has little impact on the probability of completing an equity offering. Most of the disclosure variables are insignificant. Only the proxy variable is consistently significant. With its positive sign in all four models in which it is included, this result is consistent with H3 that greater disclosure improves the likelihood of raising new capital. The proxy statements' impact suggests that changes in governance are associated with recapitalization during this stressful period. The total SEC filings variable is significant in model (4) and in that specification also indicates a positive impact.

The models in columns (5) through (8) use measures of disclosure that are from the years before the potential equity issuance in calendar year 2009. This approach allows us to ensure that the causality, if it exists, runs from disclosure and not in reverse. We find that endogeneity is not a major factor in the equity issuance estimations. Nearly all of the variables have coefficients and significance that are similar to their counterparts in the first four specifications. The disclosure variables are again mainly insignificant after controlling for endogeneity. The main difference between these models and the specifications in columns (1) - (4) is that the magnitude of the coefficient on the proxy disclosure variable declines, although the variable remains significant.

The standard deviation of equity returns is significantly positive in model (1) but not in the other models. If model (1) is the more reliable model, the standard deviation of returns coefficient suggests that more uncertainty leads to a greater equity issuance, contradicting hypothesis H4A.

Given that the sample period is one during which many banks were close to insolvency, the effects of disclosure on equity issuance are likely to be comingled with the effects of undercapitalization. If insolvency is a major concern, investors are unlikely to provide new equity capital if it will only serve to bail out creditors (Myers, 1977). Contrariwise, banks that are closer to insolvency are in greater need of new capital, especially when they are in danger of failing to meet regulatory ratios. Dinger and Vallascas (2016) find that seasoned equity offerings are more common among poorly capitalized banks, suggesting that financial solvency variables will be important in the regressions in Table 5.[3] We measure bank health with book to market, loan loss provisions, return on assets, the two real estate exposure variables and the ratio of liquid assets to total assets. In addition, we include size (measured by assets) and the number of states in which the bank has branches. Because mergers require regulatory approval, an indicator for acquiring banks is likely to be one for stronger banks, and zero otherwise.

In the eight specifications included in Table 5, the only measures of bank health that are consistently significant are assets, book to market and the acquirer indicator. These results indicate that high market to book banks and those that are involved in M&A activities as acquirers are more likely to issue equity. Since acquirers are generally healthier banks these two results support each other. However, the negative coefficient on assets suggests the opposite, given that larger banks are generally healthier. In this time period, the largest banks may be relying on TBTF policies and

[3] While Dinger and Vallascas (2012) find that poorly capitalized bank issue more equity than other banks, their findings indicate that the banks wait until after a systemic shock is over to raise new capital. This suggests that weak banks may not raise capital any more often than other banks in our sample period.

thus reluctant to issue new equity. The Tier 1 risk ratio is only significant in the 2009 regressions, where it suggests that highly capitalized banks are less likely to raise additional capital. Other measures of bank health, such as the real estate exposure variables, loan loss provisions, liquidity, beta, the number of states in which the bank operates and return on equity are insignificant.

Proxy statements could be higher as a result of CEO turnover, and therefore not merely a measure of information supplied, so we include a separate indicator variable for turnover as well. CEO turnover is negative but insignificant.

Consistent with H4B, liquidity of the firm's stock affects its ability to issue equity, so we also consider the role of monthly trading volume. For the sake of brevity, we do not report estimates of logits that include the number of non-trading days or the bid-ask spread, which are never significant variables. The log of the monthly trading volume is significant in all eight models in Table 5, with a positive coefficient in each, indicating that greater stock liquidity increase the likelihood of equity issuance.

Finally, we include an indicator variable related to the Federal Reserve's lender of last resort (LOLR) programs. While Boyson, Helwege and Jindra (2016) show that the LOLR involved scant borrowing even in the depths of the crisis, when used they tend to substitute for private bank capital. Thus, we expect the coefficient on the heavy user variable to be negative, but it is insignificant in all eight specifications.

In sum, the results in Table 5 indicate that disclosure may have a slight positive impact on the probability of issuing equity, albeit mainly through proxy statement filings and increased analyst following. We do not find any evidence that greater disclosure works through the Hirshleifer effect to reduce risk-sharing. Liquidity is also important for recapitalization, suggesting another avenue through which greater disclosure may help. Uncertainty as measured by the standard deviation of stock returns and dispersion of analysts' forecasts is not usually significant in the logits.

Next, we directly test H4a with a two-stage estimation process. Specifically, first we estimate the effects of disclosure on uncertainty and then used predicted uncertainty measures in the equity issuance logit. We implement this two-stage approach with two of the four measures of uncertainty analyzed in Table 3: equity volatility and the dispersion of analysts' forecasts. We ignore split ratings and rating changes in this analysis because of their limited data. In the second stage, we estimate the impact of disclosure on the probability of issuing equity with the same dependent variable as in Table 5, but where we address the impact of disclosure on the uncertainty by using a predicted value for uncertainty. In this procedure, we use the predictions for the volatility of equity returns and the dispersion of analysts' forecasts that come out of the models shown in Panels A and B of Table 3.

In Panel A of Table 6 we report logit models of equity issuance where the standard deviation of equity returns included in the logit is a predicted variable. Likewise, we include a two-stage logit where the dispersion of analysts' forecasts variable is replaced with the predicted values from the regressions shown in Panel B of Table 6. Table 6 includes fewer control variables than in Table 5 because many of the variables also affect the standard deviation of stock returns. In models (2) and (4) of each panel, the real estate variables are not included in the second stage because they are included in the first stage estimation. Note that the first stage estimation uses a panel dataset of quarterly time series observations whereas the second stage is a cross-section. Due to the frequent changes over time in the growth of short-term funding, the variable is only included in Table 6 and is not considered in Table 5. Other than short-term funding growth, the variables in this procedure are the same as those in Table 5 and are either included in the first stage or the second stage, but not both. Each panel of Table 6 includes four specifications of the probability of equity issuance in the crisis. Models (1) and (2) include all four SEC disclosure variables in the first stage while models (3) and (4) include the total disclosure variable in the prediction stage.

As in Table 5, Panel A of Table 6 shows that higher volatility is associated with a higher probability of issuing equity, although now the variable is significant in all four models. Furthermore, the predicted standard deviation of stock returns has a larger coefficient than in Table 5. Given our earlier result that the standard deviation is negatively correlated with returns, the coefficients in Panel A indicate that weaker banks are more likely to raise equity in the crisis. The difference between the one-stage approach in Table 5 and the two-stage approach in Panel A of Table 6 is that the latter shows evidence that greater disclosure adds to investors' understanding that the bank is weak and this makes it more likely that it will raise new funds.

The two-stage procedure using analysts' forecast dispersion provides similar results to the one stage version in Table 5 in that the dispersion of forecasts variable is insignificant. Other variables retain their sign and significance, which suggests that the two-stage approach does not affect the results much. The evidence in Panel B also indicates that there is no reduction in uncertainty from greater disclosure, which contradicts H4a. To the extent that Table 5 shows evidence that greater disclosure improves the opportunities to issue equity, it does not appear that the effect is through less uncertainty facing analysts.

Another way of interpreting the results in Tables 5 and 6 is that disclosure is important for equity issuance because it allows equity investors to gain confidence that there is upside potential. Disclosure appears to clarify the extent of the losses in the crisis, which would allow the price to drop to the appropriate level. This in turn may allow investors to gain confidence that they are not overpaying for the equity. However, the losses themselves still present a problem to investors. In particular, the significant negative coefficient on the book to market variable in Tables 5 and 6 suggests that there are limits to the value of reporting losses. If they are too large and the value of the stock is very low, equity issuance is stifled by the Myers (1977) debt overhang problem.

Overall, the results of these tests provide weak support for H4, which posits that access to equity capital will increase with disclosure. Our results on analysts' forecast dispersion indicate that uncertainty is reduced by greater disclosure through conference calls, but other evidence on disclosure and uncertainty is weak. We do not find any indication that equity issuance is hampered by greater disclosure, which stands in contrast to the concern in Goldstein and Leitner (2014) that greater disclosure will inhibit risk-sharing through the Hirshleifer effect.

C. Risk of Failure

Our analysis indicates that greater disclosure leads to an increased risk of bank runs and slightly aids in raising new equity capital. What is the net effect on the bank? It could be that the runs drive the bank towards failure but it could also be that the new equity saves it from failure. Is the overall effect one of pushing a bank towards financial instability? We investigate H2 with two measures of failure risk: (1) z-score, as calculated by Laeven and Levine (2009) for banks and (2) the EDF, as in Bharath and Shumway, 2008). Z-score is calculated using the past 16 quarters of data. EDF is measured at the end of the quarter. We also consider the impact on Tobin's Q.

Table 7 presents estimates of the determinants of z-scores, including measures of the impact of disclosure. Banks with longer conference calls are no more nor less likely to suffer low z-scores than other banks. Model (1) shows that two of the individual disclosure count variables are significantly negative, indicating that greater disclosure makes the bank less likely to withstand a crisis. However, none of the other disclosure variables are significant in Table 7 and these two variables are not significant in model (2). By this measure of bank health, the net effects of disclosure are quite modest in their negative effects.

Other variables have a much greater impact on bank health. Larger banks have higher z-scores, all else constant. Larger banks were more often in financial trouble in the subprime crisis. The weaknesses in these banks affect z-scores through variables that measure asset quality, such as loan loss provisions and the real estate exposure variable. Similarly, book-to-market has a significant negative coefficient. Consistent with the findings in Boyson, Helwege and Jindra (2016), banks that were heavy users of emergency liquidity programs are less healthy. Unexpectedly, however, greater liquidity in a bank's stock is associated with lower z-scores, as is a greater fraction of liquid assets on the balance sheet.

We next measure the impact of disclosure on the bank's EDF. Here, we omit the standard deviation of stock returns as an explanatory variable because it is part of the definition of EDF. Table 8 also shows that the net impact of disclosure on failure is not strong. Indeed, in Table 8 only one disclosure variable is significant (prospectus in model (1)). Since EDF and z-score are inversely related, the negative coefficient on the prospectus variable is inconsistent with the findings on the variable in Table 7. Most of the measures of bank health that are significant in Table 7 are significant with the opposite sign, as expected, in Table 8.

In sum, the probability of distress is closely related to measures of bank fundamentals. It is not closely associated with increased disclosure. Given the results on bank runs in Table 2, one might have expected a greater impact on failure but we remind the reader that the definition of a bank run in this analysis is a withdrawal in one quarter of 1% or more of uninsured deposits. Since many of the banks have plenty of insured deposits, the overall impact is likely to be small. Furthermore, offsetting the negative effects of withdrawals is the slightly positive impact on equity issuance associated with disclosure. While most of the disclosures reveal bad news, which hurts the stock returns of the bank, it appears that greater disclosure also provides some confidence to investors that there is some upside going forward.

Next, we consider the impact on the overall bank value by estimating the effect of disclosure on Tobin's Q. Table 9 shows that the conference call word count variable is significantly negative in all four specifications. Similarly, 8-K filings and prospectuses have significant negative coefficients, which lead to significant negative coefficients on the total SEC filings variable. Thus, the regressions show that disclosure hurts the valuation of the bank's stock in a crisis. Tobin's Q is also negatively impacted by size, beta, geographic presence, the standard deviation of real estate returns, and the dispersion of forecasts. In contrast, Q is higher when book equity is higher and when the return on equity is greater. Liquidity of the bank's stock is also significantly positive in the Tobin's Q regressions. Surprisingly, the real estate exposure variable is not significant.

IV. Sensitivity Analyses

We discuss the results of several robustness tests in this section. First, we consider alternative approaches to measuring the effects on equity issuance. Second, we examine the impact on our results of using time series data rather than cross-sectional observations. Third, we investigate the impact on our results of using alternate definitions of a bank run to estimate the logits in Table 2. Fourth, we consider whether the very largest banks are impacted differently from the rest of the sample. Fifth, we discuss the results when disclosure though the conference call is measured with an indicator variable. The last subsection examines several other areas in which the results may be affected by our implementation choices.

A. Equity Issuance

Because of the low number of quarters in which banks issue equity, we estimate the probability of equity issuance over the entire sample period. This means that the explanatory variables are averaged over the three-year period as well. We could instead measure the bank fundamentals as of year-end 2006, but this would not allow us to incorporate any disclosure variables. When we include measures of health from year-end 2006, we find qualitatively similar results for the measures of bank health. As mentioned earlier, we also estimate the likelihood of equity issuance in 2009 as a way to avoid the endogeneity problem that stems from variables measured over 2007-2009. The results in Table 5 and in panels C and D of Table 3 indicate that the main cross-section results are not much affected by endogeneity. We note that using 2009 data for the dependent variable reduces the number of events and could lessen the power of the tests, but in some cases the 2009 results show a larger number of disclosure variables that are significant.

In discussing Table 6, we interpret our evidence as unsupportive of the uncertainty disclosure channel in that higher disclosure does not lead to lower volatility. In this discussion, we point out that negative stock returns are associated with higher standard deviations and this may be why we find evidence against the uncertainty channel. In unreported tests, we use the 95% VaR instead of the standard deviation of equity returns and find a similar relationship. That is, higher equity volatility in this time period tends to represent greater downside risk.

B. Time Series vs. Cross Section Analysis

Due to the small number of equity offerings, we are unable to reliably estimate the impact of disclosure on the quarterly probability of an equity issue. However, we are able to undertake time-series estimations of the impact of disclosure on the standard deviation of stock returns, the dispersion of analysts' forecasts, the probability of a bank run and measures of bank health. We view the incremental information in the time series as valuable enough to estimate these variables differently from equity issuance and rating changes. To a certain extent, the information in the equity issuance over time appears in the determinants of bank health in Tables 7 and 8.

C. Defining Bank Runs

The dependent variable in Table 2 is based on whether the bank has outflows of uninsured deposits of 1% or more. The cutoff of 1% may seem arbitrary or too small of an outflow to matter, so we also consider alternative definitions of the dependent variable. The main consideration for choosing a 1% cutoff is that it increases the number of bank-quarters where the dependent variable is one. Given the discussion on time series and cross-sections, we prefer to estimate a logit where the explanatory variables are not fixed for three years. By choosing a cutoff of 1% or more in absolute value increases the likelihood that the dependent variables will have a value of one. In the time series, only about 10% of the observations take on a value of 1 in Table 2. Nonetheless, in untabulated logits we estimate the impact of disclosure on the probability of a withdrawal of 2% or more in a quarter. The results are weaker, although the proxy variable remains significant throughout, as does the real estate exposure variable.

D. TBTF banks

In our discussion of Table 2 we note that the very largest banks in the sample may have a different relationship between disclosure and bank runs because of the expectation of a bailout by the government. While the 14 banks that underwent stress tests were not identified until the end of our sample period, it is possible that investors and depositors were able to identify these banks as too big to fail as early as January 2007. In untabulated results, we find that the 14 TBTF banks have little impact on the results. In the bank run estimations, only a few variables lose significance when the 14 banks are excluded and these are variables with p-values close to 10% in Table 2. In the estimations of uncertainty, the word count variable's coefficient is similar in both samples. In these estimations a few SEC variables lose significance in some models but gain in others. As for bank health, the z-score coefficients are slightly more likely to be significant when the 14 banks are excluded while the EDF and Tobin's Q sometimes show weaker results. Overall, we find only small and inconsistent differences when the stress banks are excluded from the analysis.

E. Word count of the Q&A session part of the conference call

For each bank quarter with a conference call, we count the number of words in the Q&A section of the transcript. Since some banks do not hold conference calls, the variable can have a value of zero. In untabulated results, we replace the word count with an indicator for whether the bank held an earnings conference call in the previous quarter. The two variables are positively correlated and lead to similar conclusions, but the word count variable is more often significant than the simple indicator.

F. Other issues

Previous research by Butler, Grullon and Weston (2005) and Lipson and Mortal (2009) examines the relationship between liquidity and equity issuance. Since liquidity is also related to information (e.g., Easley and O'Hara, 2004), the results in Table 5 may occur as a result of disclosure's impact on liquidity, which in turn might affect equity issuance. We address this issue in untabulated results by estimating regressions that explain three measures of liquidity: (1) bid-ask spreads; (2) trading volume; and (3) the number of zero volume trading days. We find that trading volume is the only variable in Table 5 that is significant.

We investigate fundamental bank health in part with an indicator variable for heavy users of LOLR programs, which is based on the work of Boyson, Helwege and Jindra (2016). An alternative measure is the amount that banks received from TARP or other special capital programs (Berger and Roman, 2015). We include this measure in all of our estimations and find that it always provides similar evidence to the LOLR indicator variable. The one exception is in Table 7, where we estimate the impact of disclosure on the bank's z-score. In that case, the amount borrowed is not a significant factor in the regression whereas the LOLR heavy user indicator is.

V. Conclusion

In this paper we consider the costs and benefits of greater disclosure in a banking crisis. If banks provide more information about the state of affairs, they run the risk of revealing information that is so negative as to cause a bank run. In contrast, a shortage of information at a critical time may repel investors who might otherwise have provided new equity capital to the bank.

We test for the effects of disclosure on equity issuance and bank runs by estimating models that include six measures of disclosure. First, we measure the length of the question and answer session in the quarterly earnings conference call by counting the number of words in the Q&A part of the conference call transcript. Second, we use four measures related to SEC filings that mention losses on mortgage-backed securities and other major problems that dominated the subprime crisis. Using these proxies for the information environment, we estimate the likelihood of equity issuance during the financial crisis and find that disclosure has a small positive effect.

Accounting research theorizes that the positive impact of disclosure on equity funding comes through the channel of reduced uncertainty. We find some evidence that disclosure reduces uncertainty, but only consistently so when we use the word count metric. While the conference call variable has a substantial impact on analysts' forecast dispersion, the dispersion has no impact on equity issuance. When we measure uncertainty by the standard deviation of stock returns, we find that higher uncertainty is associated with greater equity issuance. Stock returns are more variable for banks in the subprime crisis that suffered large losses (the variance is affected more by negative returns than by positive returns). Because higher disclosure is, by definition, disclosure about real estate problems in this study, it is more often associated with negative returns and thus increased stock return volatility. Nonetheless, the estimated impact on equity issuance is not negative, which is a concern of theories such as Goldstein and Leitner (2014) that highlight the potential for excessive disclosure to destroy risk-sharing opportunities.

We find that providing more information during a financial crisis increases the odds that a bank will suffer an outflow of uninsured deposits. Overall, the U.S. banks in our sample did not typically see withdrawals of much more than 2%. Indeed, our main measure of a run is based on a decline of 1% or more in a quarter. Nonetheless, any form of a run is undesirable and we find that runs are more likely when there are more 8-Ks and proxies that include information about losses. We also find that withdrawals are linked to poor health, as measured by the real estate exposure variable, loan loss provisions and the book to market ratio.

In light of the slightly positive impact of disclosure on equity issuance and the negative impact on uninsured deposits, we examine the impact of disclosure on overall bank health. We find that the effect on the bank's z-score is negative, but there is no evidence that it increases the EDF value. Another measure of bank health, Tobin's Q, provides evidence that disclosure about bank losses is detrimental in a crisis. Overall, we conclude that detrimental effects of greater disclosure in a crisis are fairly small and the Hirshleifer effect is not an empirically large factor among U.S. banks.

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Table 1. Summary Statistics

Statistics are calculated for the 191 banks in the sample using all of the quarterly time series data available for each bank and then averaging across banks. Conference call is an indicator set to one for banks that held an earnings conference call in the previous quarter. Word count is the number of words (in thousands) in the Q&A section of the quarterly conference call. SEC disclosure data are average quarterly counts. Beta, standard deviation of stock returns and skewness are calculated using 3 months of daily stock return data. Loan loss provisions and liquid assets are scaled by total assets. CEO turnover is one for banks with CEO turnover during the sample period; zero otherwise. Acquirer is one for banks that acquired another bank during the quarter; zero otherwise. Real estate exposure is a weighted average of the returns on the state-specific Fannie Mae real estate index where the weights are the fraction of bank deposits in the various states. Forecast dispersion is the standard deviation of analysts' forecasts for bank quarters when at least two analyst forecasts exist. Number of analysts is the average number of analysts per quarter. Heavy LOLR user is one for banks defined as heavy users of lender of last resort (LOLR) programs; zero otherwise.

	Mean	**Median**	**Std. Dev.**	**Minimum**	**Maximum**
Word count (thousands)	4.26	4.08	2.12	0.00	13.28
Number of 8K disclosures	2.74	2.42	1.33	0.08	7.17
Number of prospectus disclosures	1.98	0.50	7.85	0.00	61.67
Number of proxy disclosures	0.48	0.42	0.32	0.00	1.90
Number of 10K/10Q disclosures	1.02	1.00	0.18	0.00	1.50
All SEC disclosures	6.22	4.50	8.67	0.08	71.00
Assets ($ billions)	54.00	4.07	242.05	1.06	1,827.70
Book to market ratio	1.33	1.05	0.89	0.26	4.85
Beta	1.29	1.37	0.42	0.12	1.98
Loan loss provisions	1.13	0.92	0.91	-0.01	4.28
Tier1 risk ratio	10.97	10.77	2.31	5.10	23.42
Return on equity	-4.03	4.17	23.57	-128.90	23.46
Liquid assets	11.17	8.81	8.70	3.53	50.04
Number of states of operation	3.84	2.00	4.71	1.00	26.00
Acquirer	0.51	1.00	0.50	0.00	1.00
CEO turnover	0.21	0.00	0.41	0.00	1.00
Standard deviation of real estate returns	0.70	0.68	0.17	0.43	1.03
Real estate exposure	-1.39	-1.14	1.02	-4.70	0.21
Skewness of stock returns	0.38	0.33	0.34	-0.28	2.06
Standard deviation of stock returns (%)	4.00	3.82	1.24	1.71	9.65
Forecast dispersion	0.17	0.04	0.57	0.00	4.95
Number of analysts	4.83	3.00	4.24	1.11	18.17
Monthly trading volume ($ millions)	80.51	3.36	414.41	0.01	4,561.60
Heavy LOLR user	0.15	0.00	0.35	0.00	1.00

Table 2. The Probability of a Bank Run

The dependent variable in the logistic regressions is one for banks that experienced a decline in the ratio of uninsured deposits to assets of 1% or more over the previous quarter and zero otherwise. The regressions include time fixed effects and clustered errors. We control for clustering in standard errors at the firm level. Word count is the number of words (in thousands) in the Q&A section of the quarterly conference call. SEC disclosure data are average quarterly counts. Assets is the logarithm of quarterly assets. Beta, standard deviation of stock returns and skewness are calculated using 3 months of daily stock return data. Loan loss provisions and liquid assets are scaled by total assets. CEO turnover is one for banks with CEO turnover during the period and zero otherwise. Acquirer is one for banks that acquired another bank during the period; zero otherwise. Real estate exposure is a weighted average of the returns on the state-specific Fannie Mae real estate index where the weights are the fraction of bank deposits in the various states. Forecast dispersion is the standard deviation of analysts' forecasts for bank quarters when at least two analyst forecasts exist. Number of analysts is the average number of analysts per quarter. Volume is the logarithm of monthly stock trading volume. Heavy LOLR user is one for banks defined as heavy users of lender of last resort (LOLR) programs; zero otherwise.

	(1)	**(2)**	**(3)**	**(4)**
Intercept	4.02*	4.10	3.81	4.15
Word count	-0.03	0.01	-0.04	0.01
8K disclosures	0.11**	0.13*	-	-
Prospectus disclosure	-0.01	-0.15*	-	-
Proxy disclosure	0.23***	0.27***	-	-
10K/ 10Q disclosure	0.03	0.26	-	-
All disclosures	-	-	0.02*	0.00
Assets	-0.60**	-0.80**	-0.56**	-0.75**
Book to market ratio	0.16***	0.19**	0.17***	0.16**
Beta	-0.60***	-0.46*	-0.57***	-0.44*
Loan loss provisions	0.12	0.07	0.13*	0.11
Tier1 risk ratio	-0.09*	-0.06	-0.09*	-0.06
Return on equity	-0.00	-0.01*	-0.005*	-0.01*
Liquid assets	-0.00	0.00	-0.01	-0.00
Number of states	-0.00	-0.05	-0.02	-0.07
Acquirer	-0.34	-0.27	-0.33	-0.24
Real estate exposure	-0.14**	-0.15**	-0.13**	-0.15**
Std. dev. real estate returns	-1.64***	-1.80***	-1.56***	-1.68**
Std. dev. stock returns	0.06	-	0.06	-
Skewness of stock returns	-0.15*	-0.20	-0.16*	-0.22
Dispersion forecasts	-	0.05	-	0.05
Number of analysts	-0.04	-0.01	-0.04	-0.01
Monthly volume	0.39***	0.54***	0.39***	0.54***
Heavy LOLR user	-0.22	0.33	-0.30	0.29
R-Square	10.6%	12.8%	10.0%	11.6%
No. of Obs.	2106	1267	2106	1267

Table 3. The Effects of Disclosure on Uncertainty

In Panel A, the dependent variable in the panel regressions is the standard deviation of equity returns calculated over the past 3 months. In Panel B, the dependent variable in the panel regressions is the dispersion of analysts' forecasts. The sample in Panel B is smaller than in Panel A because some banks in the sample have fewer than two analysts in a given quarter. The dependent variable in the cross-section regressions in Panel C is a split rating where the split is between any of Moody's, Fitch or Standard and Poor's. In Panel D, the dependent variable in the cross-section regressions is a rating change or an addition to or removal from CreditWatch. All regressions in Panels A and B include unreported time fixed effects. Word count is the number of words (in thousands) in the Q&A section of the quarterly conference call. SEC disclosure data are average quarterly counts. Assets is the logarithm of quarterly assets. Beta, standard deviation of stock returns and skewness are calculated using 3 months of daily stock return data. Short-term funding growth is the percentage change over the quarter in federal funds purchases, repurchases, commercial paper, FHLB advances and other borrowings. Loan loss provisions and liquid assets are scaled by total assets. CEO turnover is one for banks with CEO turnover during the period and zero otherwise. Acquirer is one for banks that acquired another bank during the period; zero otherwise. Real estate exposure is a weighted average of the returns on the state-specific Fannie Mae real estate index where the weights are the fraction of bank deposits in the various states. Forecast dispersion is the standard deviation of analysts' forecasts for bank quarters when at least two analyst forecasts exist. Number of analysts is the average number of analysts per quarter. Volume is the logarithm of monthly stock trading volume. Heavy LOLR user is one for banks defined as heavy users of lender of last resort (LOLR) programs; zero otherwise. The standard errors in Panel A and B are heteroskedastic-consistent.

Panel A. Standard Deviation of Equity Returns

	(1)	(2)	(3)	(4)
Intercept	2.40***	2.28***	2.59***	2.45***
Word count	-0.02**	-0.02**	-0.02*	-0.02**
8K disclosures	0.03*	0.04*	-	-
Prospectus disclosures	0.01	0.01	-	-
Proxy disclosures	0.07*	0.06	-	-
10K/10Q disclosure	0.08	0.07	-	-
All SEC disclosures	-	-	0.01**	0.01**
Assets	-0.13***	-0.13***	-0.14***	-0.13***
Beta	1.25***	1.25***	1.26***	1.26***
Tier1 risk ratio	-0.07***	-0.07***	-0.07***	-0.07***
Short term funding growth	0.09**	0.08*	0.09**	0.08*
Deposits/ Assets	-0.20	-0.18	-0.20	-0.17
Return on equity	-0.01***	-0.01***	-0.01***	-0.01***
Nonperforming Loans	0.46***	0.45***	0.46***	0.45***
Real estate exposure	-	-0.06***	-	-0.06***
Std. dev. real estate returns	-	-0.06	-	-0.05
Number of analysts	0.02**	0.02*	0.02**	0.02**
Heavy LOLR user	0.94***	0.95***	0.93***	0.94***
R-Square	82.7%	82.8%	82.6%	82.7%
No. of Obs.	2106	2106	2106	2106

Table 3 (continued)

Panel B. Dispersion of Analysts' Forecasts

	(1)	(2)	(3)	(4)
Intercept	-0.32	-1.16	-0.83	-1.64
Word count	-0.11***	-0.10***	-0.11***	-0.10***
8K disclosures	-0.05	-0.06*	-	-
Prospectus disclosures	0.03***	0.03***	-	-
Proxy disclosures	-0.04	-0.04	-	-
10K/10Q disclosure	-0.18	-0.17	-	-
All SEC disclosures	-	-	0.02***	0.02***
Assets	0.20**	0.22***	0.21**	0.22***
Beta	-0.46**	-0.48**	-0.49**	-0.51**
Tier1 risk ratio	-0.09**	-0.10**	-0.09**	-0.09**
Short term funding growth	0.21	0.20	0.21	0.20
Deposits/ Assets	0.33	0.48	0.35	0.49
Return on equity	-0.00	-0.00	-0.00	-0.00
Nonperforming Loans	0.27***	0.25***	0.28***	0.26***
Real estate exposure	-	0.03	-	0.03
Std. dev. real estate returns	-	0.92**	-	0.87**
Number of analysts	-0.19***	-0.20***	-0.20***	-0.20***
Heavy LOLR user	-0.04	-0.02	-0.00	0.02
R-Square	24.5%	24.7%	24.2%	24.4%
No. of Obs.	1267	1267	1267	1267

Table 3 (continued)
Panel C. Split Ratings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-28.40***	-208.80*	-147.60**	-116.60**	-51.62***	-63.79***	-41.46***	-39.66**
Word count	0.01	1.53*	1.78	1.54*	0.24	0.29	0.36	0.42*
8K disclosures	-0.07	-2.77	-	-	-0.03	0.29	-	-
Prospectus disclosures	-0.14***	-1.66**	-	-	-0.25**	-0.37***	-	-
Proxy disclosures	1.27	14.99*	-	-	-3.86	-4.19	-	-
10K/ 10Q disclosures	0.24	-4.00	-	-	4.57	6.51	-	-
All SEC disclosures	-	-	-0.18	-0.25	-	-	-0.2**	-0.22**
Assets	1.40*	4.40	5.40	3.88	2.27*	2.58*	2.17*	1.76
Book to market	-0.07	-1.07	2.31	0.39	-1.08	-2.25	-2.23*	-2.73**
Beta	-2.04**	-25.03**	-11.09*	-12.15**	-3.66	-3.50	-4.01*	-3.07*
Loan loss provisions	0.01	-6.86	-4.96	-5.68	1.05	1.05	1.14	1.48
Tier1 risk ratio	-0.16	-1.78	-1.40	-1.24	-0.34	-0.23	-0.39	-0.43
Return on equity	0.02	0.08	0.06	0.08	0.07	0.10	0.07	0.08
Liquid assets	-0.03	0.06	-0.01	-0.07	-0.04	-0.11	-0.04	-0.06
Number of states	0.15	3.15*	1.69*	1.53**	0.12	0.22	0.13	0.17
Acquirer	-0.80	-6.34*	-5.19*	-5.06**	-0.73	-0.96	-0.48	-0.37
CEO turnover	0.14	6.40*	4.50	3.47	-0.49	-0.15	-0.23	0.02
Real estate exposure	-0.07	-2.61	-0.72	0.40	-1.01	-0.47	-0.85	-1.44
Std. dev. real estate returns	-0.30	-8.03	4.18	7.52	-0.16	-0.08	-0.23	-0.28
Std. dev. stock returns	0.08	-	-3.03	-	0.52	-	0.89	-
Skewness of stock returns	0.04	-3.40	-1.34	-0.78	-0.49	-0.47	-1.00	-1.15
Dispersion of forecasts	-	3.00	-	2.98	-	3.79**	-	3.03**
Number of analysts	-0.10	-0.84	-0.96	-0.51	-0.36*	-0.33	-0.37**	-0.35*
Volume	0.62	11.90*	5.78**	4.78**	1.18	1.48	0.89	1.29
Heavy LOLR user	-1.13	-10.94*	-7.98*	-6.40*	-0.90	-1.39	-0.27	0.22
R-Square	49.8%	63.4%	61.9%	62.0%	50.5%	52.6%	49.4%	50.7%
No. of Obs.	191	191	191	191	181	181	181	181

Table 3 (continued)
Panel D. Rating Changes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-70.55***	-69.79***	-64.69***	-68.76***	-43.69***	-44.34***	-37.09***	-39.01***
Word count	0.22	0.23	0.10	0.13	-0.05	-0.05	-0.01	-0.01
8K disclosures	-1.23**	-1.22**	-	-	-0.52	-0.52	-	-
Prospectus disclosures	0.22	0.22	-	-	-0.15**	-0.14**	-	-
Proxy disclosures	2.64	2.61	-	-	0.10	0.10	-	-
10K/ 10Q disclosures	-3.97	-4.06	-	-	4.31	4.13	-	-
All SEC disclosures	-	-	-0.12	-0.12	-	-	-0.13**	-0.12**
Assets	3.29**	3.27**	3.48**	3.84***	2.12**	2.17**	2.12**	2.23**
Book to market	0.82	0.62	1.08	0.64	-0.34	-0.42	-0.48	-0.28
Beta	-0.11	-0.15	0.62	-0.25	1.19	0.95	1.30	1.52
Loan loss provisions	-0.24	-0.51	-0.13	-0.64	0.60	0.58	0.71	0.75
Tier1 risk ratio	-0.22	-0.24	-0.24	-0.20	-0.30	-0.28	-0.29	-0.30
Return on equity	-0.00	-0.00	-0.02	-0.01	-0.01	-0.01	0.01	0.01
Liquid assets	-0.05	-0.05	-0.05	-0.08	-0.09**	-0.1**	-0.09**	-0.09**
Number of states	-0.39*	-0.39*	-0.42**	-0.43**	-0.08	-0.08	-0.08	-0.10
Acquirer	-1.81*	-1.75	-1.94**	-2.01**	-0.49	-0.51	-0.57	-0.62
CEO turnover	-1.18	-1.16	-1.07	-1.04	1.20	1.20	0.94	0.90
Real estate exposure	-2.02**	-1.93**	-1.62**	-1.41**	-7.92	-7.88	-7.02	-7.39
Std. dev. real estate returns	-8.92*	-8.25*	-8.65**	-7.49*	-1.3**	-1.29**	-1.2**	-1.27**
Std. dev. stock returns	-0.17	-	-0.83	-	-0.14	-	0.02	-
Skewness of stock returns	-2.08	-2.19	-0.26	-0.42	-0.84	-0.88	-0.80	-0.81
Dispersion of forecasts	-	0.86	-	0.71	-	-0.06	-	-0.56
Number of analysts	-0.27	-0.26	-0.14	-0.12	-0.12	-0.12	-0.13	-0.15
Volume	2.09**	2.04**	1.27*	1.05	0.77	0.77	0.52	0.52
Heavy LOLR user	0.75	0.85	-0.30	-0.38	0.54	0.50	0.49	0.44
R-Square	59.7%	59.8%	58.0%	57.8%	47.3%	47.3%	46.2%	46.4%
No. of Obs.	191	191	191	191	181	181	181	181

Table 4. Equity Issuance over Time

Statistics are calculated for the 191 banks in the sample using all of the quarterly time series data available for each bank. Equity issuance is determined from Securities Data Corporation (SDC) data on public and private offerings. Proceeds are in $ millions.

Quarter	**Year**	**Number of offerings**	**Total proceeds**	**Average proceeds**
1	2007	0	0	0
2	2007	1	54	54
3	2007	0	0	0
4	2007	1	201.3	201.3
1	2008	2	12,535.0	6,267.5
2	2008	9	26,549.9	2,950.0
3	2008	10	11,279.9	1,128.0
4	2008	8	21,421.8	2,677.7
1	2009	3	434.7	144.9
2	2009	28	40,757.4	1,455.6
3	2009	27	4,720.3	174.8
4	2009	17	49,144.1	2,890.8
	Total	106	167,098.4	1,794.5

Table 5. Logistic Regression Estimation of Equity Issuance

The dependent variable is one for banks that issued equity at least once during the estimation period and zero otherwise. For columns (1)-(4), the estimation period is 2007-2009 while for columns (5)-(8) the dependent variable is one for equity issuance in 2009. The independent variables are measured as averages in 2007-2009 in columns (1)-(4) while columns (5)-(8) use the average value over 2007 and 2008. Word count is the number of words (in thousands) in the Q&A section of the quarterly conference call. SEC disclosure data are average quarterly counts. Assets is the logarithm of quarterly assets. Beta, standard deviation of stock returns and skewness are calculated using 3 months of daily stock return data. Loan loss provisions and liquid assets are scaled by total assets. CEO turnover is one for banks with CEO turnover during the period and zero otherwise. Acquirer is one for banks that acquired another bank during the period; zero otherwise. Real estate exposure is a weighted average of the returns on the state-specific Fannie Mae real estate index where the weights are the fraction of bank deposits in the various states. Forecast dispersion is the standard deviation of analysts' forecasts for bank quarters when at least two analyst forecasts exist. Number of analysts is the average number of analysts per quarter. Volume is the logarithm of monthly stock trading volume. Heavy LOLR user is one for banks defined as heavy users of lender of last resort (LOLR) programs; zero otherwise.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Intercept	9.00	9.89	8.58	10.41	3.03	3.60	6.45	6.86
Word count	0.08	0.09	0.07	0.08	-0.03	-0.02	-0.05	-0.03
8K disclosures	-0.00	0.11	-	-	-0.07	-0.08	-	-
Prospectus disclosures	0.06	0.04	-	-	-0.15	-0.15	-	-
Proxy disclosures	2.67***	2.44***	-	-	1.51**	1.44*	-	-
10K/ 10Q disclosures	0.53	0.97	-	-	1.23	1.32	-	-
All SEC disclosures	-	-	0.15	0.17*	-	-	-0.06	-0.06
Assets	-1.78**	-1.69**	-1.44**	-1.46**	-1.13*	-1.13*	-1.16*	-1.14*
Book to market ratio	-1.20***	-1.05***	-0.87**	-0.75**	-2.09**	-1.98**	-2.02**	-1.97**
Beta	0.30	1.04	0.37	0.99	1.00	1.24	0.84	1.06
Loan loss provisions	0.14	0.25	0.06	0.20	-0.08	0.10	-0.09	0.11
Tier1 risk ratio	-0.13	-0.15	-0.10	-0.12	-0.27*	-0.28*	-0.25	-0.26*
Return on equity	0.03	0.01	0.02	0.01	0.00	0.00	0.00	-0.01
Liquid assets	0.01	0.01	0.00	0.01	0.01	0.02	0.00	0.01
Number of states	0.11	0.10	0.06	0.05	0.01	0.01	0.01	0.01
Acquirer	1.55***	1.39***	1.26***	1.18***	1.29***	1.31***	1.20***	1.21***
CEO turnover	-0.63	-0.56	-0.22	-0.22	-0.15	-0.15	-0.13	-0.12
Real estate exposure	-0.05	-0.20	-0.06	-0.15	0.12	0.38	-0.23	-0.05
Std. dev. real estate returns	1.15	0.70	1.02	0.70	-0.21	-0.19	-0.21	-0.20
Std. dev. Stock returns	0.64*	-	0.48	-	0.16	-	0.13	-
Skewness of stock returns	-1.37*	-1.25	-0.80	-0.75	-0.15	-0.14	0.00	0.00
Dispersion of forecasts	-	0.44	-	0.26	-	-1.37	-	-1.78
Number of analysts	0.21	0.18	0.19	0.18	0.10	0.11	0.13	0.13
Volume	0.87**	0.79**	0.65*	0.61*	0.86**	0.82**	0.81**	0.77**
Heavy LOLR user	0.25	0.39	0.22	0.33	0.71	0.73	0.69	0.71
R-Square	34.5%	33.4%	30.1%	29.3%	22.1%	22.1%	19.4%	19.6%
No. Obs.	191	191	191	191	181	181	181	181

Table 6. Two-Stage Estimation of the Probability of Equity Issuance

The dependent variable in the logistic regressions is one for banks that issued public or private equity at least once during the 2007-2009 period and zero otherwise. The estimations in Panels A and B are from the second of two stages. In Panel A the first stage estimate creates a predicted standard deviation of stock returns and in Panel B the first stage creates a prediction of the dispersion of analysts' forecasts. In models (1) and (2) of each panel the predicted variable is based on the four detailed disclosure variables, whereas in models (3) and (4) only the total disclosure variable is used. In models (1) and (3) of each panel the real estate exposure and standard deviation of real estate returns variables are omitted from the first stage, whereas in models (2) and (4) the two variables are included in the first stage prediction.

Panel A. Two-stage estimation with predicted standard deviation of stock returns

	(1)	(2)	(3)	(4)
Intercept	-8.50***	-8.24***	-8.42***	-8.16***
Book-to-market	-0.69**	-0.64**	-0.68**	-0.63**
Loan Loss Provision	-0.23	-0.12	-0.21	-0.10
Liquid Assets	-0.01	-0.01	-0.01	-0.01
Number of states	0.03	0.03	0.03	0.03
Acquirer	1.04***	0.95***	1.05***	0.96***
CEO turnover	-0.10	-0.09	-0.10	-0.09
Real estate exposure	-0.33	-	-0.33	-
Std. dev. real estate returns	0.20	-	0.22	-
Std. dev. stock returns (predicted)	0.58**	0.59**	0.55**	0.56**
Skewness	-0.53	-0.42	-0.54	-0.42
Trading volume	0.39***	0.40***	0.39***	0.40***
R-Square	25.0%	23.7%	24.8%	23.5%
No. of Obs.	191	191	191	191

Table 6 (continued)

Panel B. Two-stage estimation with predicted dispersion of analysts' forecasts

	(1)	(2)	(3)	(4)
Intercept	-5.81**	-5.39**	-6.27**	-5.80**
Book-to-market	-0.59**	-0.54*	-0.59**	-0.54*
Loan Loss Provision	0.29	0.40	0.26	0.38
Liquid Assets	-0.01	-0.01	-0.01	-0.01
Number of states	0.03	0.02	0.03	0.02
Acquirer	1.10***	1.00***	1.09***	1.00***
CEO turnover	-0.15	-0.16	-0.16	-0.16
Real estate exposure	-0.25	-	-0.27	-
Std. dev. real estate returns	0.44	-	0.38	-
Dispersion of forecasts (predicted)	-0.12	-0.15	-0.05	-0.09
Skewness	-0.69	-0.60	-0.69	-0.59
Trading volume	0.32*	0.33**	0.35**	0.35**
R-Square	23.1%	21.8%	23.1%	21.7%
No. of Obs.	191	191	191	191

Table 7. The Determinants of Bank Financial Health Measured by Z-Score

The dependent variable in the panel regressions is the z-score. The regressions include time fixed effects. Word count is the number of words (in thousands) in the Q&A section of the quarterly conference call. SEC disclosure data are average quarterly counts. Assets is the logarithm of quarterly assets. Beta, standard deviation of stock returns and skewness are calculated using 3 months of daily stock return data. Loan loss provisions and liquid assets are scaled by total assets. CEO turnover is one for banks with CEO turnover during the period and zero otherwise. Acquirer is one for banks that acquired another bank during the period; zero otherwise. Real estate exposure is a weighted average of the returns on the state-specific Fannie Mae real estate index where the weights are the fraction of bank deposits in the various states. Forecast dispersion is the standard deviation of analysts' forecasts for bank quarters when at least two analyst forecasts exist. Number of analysts is the average number of analysts per quarter. Volume is the logarithm of monthly stock trading volume. Heavy LOLR user is one for banks defined as heavy users of lender of last resort (LOLR) programs; zero otherwise. The standard errors are heteroskedastic-consistent.

	(1)	**(2)**	**(3)**	**(4)**
Intercept	-1.36	-24.33	0.04	-26.61
Word count	0.10	0.14	0.12	0.17
8K disclosures	-1.17**	-0.71	-	-
Prospectus disclosures	0.10	0.09	-	-
Proxy disclosures	-1.47*	-1.40	-	-
10K/10Q disclosures	-0.82	-4.41	-	-
All disclosures	-	-	-0.05	-0.03
Assets	5.29***	6.63***	4.89***	6.21***
Book to market	-1.43***	-3.10***	-1.48***	-3.10***
Beta	9.16***	0.41	9.05***	0.21
Loan loss provisions	-3.19***	-4.44***	-3.27***	-4.59***
Tier1 risk ratio	0.20	1.09*	0.24	1.09**
Liquid assets	-0.47***	-0.51***	-0.42***	-0.47***
Number of states	-0.14	-0.19	-0.04	-0.08
Acquirer	-0.73	2.48	-0.85	2.38
Real estate exposure	1.59***	1.58**	1.54***	1.62**
Std. dev. real estate returns	-10.03***	-11.27**	-10.42***	-11.52**
Std. dev. stock returns	-3.88***	-	-3.95***	-
Skewness stock returns	3.45***	2.08	3.48***	2.03
Dispersion of forecasts	-	-0.55	-	-0.50
Number of analysts	-0.04	-0.49	-0.09	-0.54
Monthly volume	-3.62***	-3.32**	-3.66***	-3.22**
Heavy LOLR user	-7.12**	-9.91***	-6.86**	-9.26***
R-Square	30.7%	30.1%	30.4%	29.8%
No. of Obs.	2106	1267	2106	1267

Table 8

The Determinants of Bank Financial Health Measured by EDF

The dependent variable in the panel regressions is the expected default frequency (EDF) of Bharath and Shumway (2008). The regressions include time fixed effects. Word count is the number of words (in thousands) in the Q&A section of the quarterly conference call. SEC disclosure data are average quarterly counts. Assets is the logarithm of quarterly assets. Beta, standard deviation of stock returns and skewness are calculated using 3 months of daily stock return data. Loan loss provisions and liquid assets are scaled by total assets. CEO turnover is one for banks with CEO turnover during the period and zero otherwise. Acquirer is one for banks that acquired another bank during the period; zero otherwise. Real estate exposure is a weighted average of the returns on the state-specific Fannie Mae real estate index where the weights are the fraction of bank deposits in the various states. Forecast dispersion is the standard deviation of analysts' forecasts for bank quarters when at least two analyst forecasts exist. Number of analysts is the average number of analysts per quarter. Volume is the logarithm of monthly stock trading volume. Heavy LOLR user is one for banks defined as heavy users of lender of last resort (LOLR) programs; zero otherwise. The standard errors are heteroskedastic-consistent.

	(1)	**(2)**	**(3)**	**(4)**
Intercept	37.74***	25.32*	37.19***	23.93*
Word count	-0.10	0.03	-0.11	0.02
8K disclosures	0.29	0.22	-	-
Prospectus disclosure	-0.13*	-0.11	-	-
Proxy disclosure	0.49	0.74	-	-
10K/10Q disclosure	-0.09	-1.83	-	-
All SEC disclosures	-	-	-0.08	-0.07
Assets	-3.96***	-3.88***	-3.84***	-3.82***
Book to market ratio	6.53***	7.12***	6.57***	7.19***
Beta	1.66*	0.85	1.72*	0.85
Loan loss provisions	2.29***	2.17***	2.32***	2.21***
Tier1 risk ratio	-1.21***	-0.77**	-1.23***	-0.79**
Liquid assets	0.03	-0.13	0.02	-0.13
Number of states	0.23	0.17	0.19	0.14
Acquirer	-2.90**	-2.84*	-2.87**	-2.85*
Real estate exposure	-0.92**	-0.64	-0.90**	-0.61
Std. dev. real estate returns	5.75**	10.56***	5.89**	10.86***
Skewness of stock returns	-1.26**	-0.60	-1.26**	-0.60
Dispersion forecasts	-	0.47	-	0.46
Number of analysts	-0.02	-0.01	-0.00	0.00
Monthly volume	1.94***	2.39***	1.96***	2.40***
Heavy LOLR user	6.20**	6.41**	6.14**	6.35**
R-Square	42.7%	45.6%	42.6%	45.4%
No. of Obs.	2106	1267	2106	1267

Table 9

The Determinants of Bank Financial Health Measured by Tobin's Q

The dependent variable in the panel regressions is Tobin's Q. The regressions include time fixed effects. Word count is the number of words (in thousands) in the Q&A section of the quarterly conference call. SEC disclosure data are average quarterly counts. Assets is the logarithm of quarterly assets. Beta, standard deviation of stock returns and skewness are calculated using 3 months of daily stock return data. Loan loss provisions and liquid assets are scaled by total assets. CEO turnover is one for banks with CEO turnover during the period and zero otherwise. Acquirer is one for banks that acquired another bank during the period; zero otherwise. Real estate exposure is a weighted average of the returns on the state-specific Fannie Mae real estate index where the weights are the fraction of bank deposits in the various states. Forecast dispersion is the standard deviation of analysts' forecasts for bank quarters when at least two analyst forecasts exist. Number of analysts is the average number of analysts per quarter. Volume is the logarithm of monthly stock trading volume. Heavy LOLR user is one for banks defined as heavy users of lender of last resort (LOLR) programs; zero otherwise. The standard errors are heteroskedastic-consistent.

	(1)	**(2)**	**(3)**	**(4)**
Intercept	2.13***	2.45***	2.10***	2.44***
Word count	-0.02***	-0.02***	-0.02***	-0.02***
8K disclosures	-0.02***	-0.02***	-	-
Prospectus disclosure	-0.01***	-0.01***	-	-
Proxy disclosure	-0.01	-0.01	-	-
10K/10Q disclosure	-0.06**	-0.04	-	-
All SEC disclosures	-	-	-0.01***	-0.01***
Assets	-0.11***	-0.11***	-0.11***	-0.11***
Beta	0.08***	-0.04*	0.08***	-0.04*
Loan loss provisions	-0.04***	-0.06***	-0.04***	-0.06***
Tier1 risk ratio	-0.01*	-0.02**	-0.01*	-0.01**
Return on equity	0.00*	0.00***	0.001*	0.003***
Liquid assets	0.01***	0.01***	0.01***	0.01***
Number of states	0.00	0.00	0.00	0.00
Acquirer	-0.11***	-0.14***	-0.11***	-0.15***
Real estate exposure	0.01	0.01	0.01	0.01
Std. dev. real estate returns	0.05	-0.04	0.05	-0.04
Std. dev. stock returns.	-0.08***	-	-0.08***	-
Skewness of stock returns	0.05***	0.02	0.05***	0.02
Dispersion forecasts	-	-0.01***	-	-0.01***
Number of analysts	-0.00	0.00	-0.00	-0.00
Monthly volume	0.10***	0.08***	0.10***	0.08***
Heavy LOLR user	-0.03	-0.05	-0.03	-0.05
R-Square	48.2%	48.5%	48%	48.3%
No. of Obs.	2106	1267	2106	1267