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Does bank transparency matter?

Abstract

Utilizing a sample of large US banks, this study examines the benefits of bank transparency using several key performance and stability measures over the 2001-2008 period. The market's reactions to disclosure events are examined on a before-and-after comparison basis using a standard event study approach. Furthermore, the most and the least transparent banks are compared in terms of their relative performance and stability. In addition, a sample of both healthy and weak banks which are heavily involved in loan securitization and credit derivative activities are examined to identify the extent to which greater transparency stabilizes (destabilizes) and/or increases (decreases) bank performance. Finally, a logit model is used to see if bank disclosure played a role in the recent financial crisis. Surprisingly the results suggest that highly transparent banks are riskier than their less transparent peers. Specifically, greater disclosure regarding their securitization and credit derivative activities submitted on regulatory reports, as well as extensive coverage of credit derivatives in their annual report, increases the probability of an institution being classified as a "troubled" bank.

Keywords: banking transparency, banking disclosure, information disclosure, bank performance, bank stability, securitization, credit derivatives, financial crisis.
JEL Classification: G14, G21.

Introduction

Over the last decade, the financial markets have grown rapidly and the structure of the markets have become increasingly more complex and interconnected as a result of increased use of financial derivatives. The recent sub-prime crisis has intensified the debate regarding the need for greater transparency. The purpose of this study is to contribute to this debate by examining the relationship between the quantity and quality of information disclosure regarding a bank's securitization and credit derivative activities and the subsequent impact on bank performance and stability. The focus of this study is on complex securitized assets, often referred to as "toxic assets", and credit derivatives both of which played a central role in the recent financial crisis.

Specifically, using a sample of 27 large US bank holding companies, this study seeks to understand: (1) how expanded financial disclosure affects the return, stability, and risk perception of the bank by market participants; (2) how the least transparent and most transparent banks differ in terms of their performance and stability; (3) how troubled and healthy banks differ in regard to their disclosure levels; and (4) how the level of disclosure affects a bank's probability of becoming a troubled bank. The results show that greater transparency results in higher risk and greater disclosure on securitization and credit derivate activities increases the likelihood of a bank being classified as a troubled bank.

1. Literature review

Banks play an important multi-dimensional role in modern economies. As described in the early banking literature: (1) banks secure funds from surplus spending units and transmit them to deficit spending units (Klein, 1971); (2) banks reduce transaction costs (Benston and Smith, 1976); (3) banks simultaneously produce information and other services desired by investors (Campbell and Kracaw, 1980); (4) banks provide liquidity insurance (Diamond and Dybvig, 1983); (5) banks provide a special informational service with their lending activity that is not available from other lenders (James, 1987); (6) banks create liquidity by splitting the risky cash flows of the underlying assets they hold (Gorton and Pennacchi, 1990); (7) banks act as delegated monitors (Diamond, 1996); (8) banks improve transaction possibilities over what is available at the market (Rajan, 1998); (8) banks create money by issuing deposits on their claims that the public accepts as money (Bossone, 2001). Furthermore, Allen and Santomero (2001) argue that banks' ability to manage risk makes them unique.

The dramatic developments in the role of financial institutions and the types of products they offer have intensified the debate concerning the transparency of the banks and their products. Many banks have increased their exposure to securitization and credit derivative activities. Although banking is one of the most heavily regulated industries, regulation was inadequate prior to the crisis. The growing complexity of asset-backed securities with their sophisticated investment tranches made it difficult for investors and regulators to evaluate their riskiness.

Recognizing that asset securitization can be used for various purposes that can have differential effects on bank risk, Wu, Yang and Hong (2011) studied the impact of asset securitization on banks' risk. They used a time-varying beta model where a bank's beta is a function of a variety of bank-specific attributes, such as, cost of fund, loan losses, maturity gap, net foreign asset ratio, net short asset

and funding ratios, plus measures of loan securitization and associated risk retention measures. Common macro risk factors include interest rates, market return, exchange rates, liquidity, credit, and maturity spreads, and asset-backed security market risk. The authors found that credit, liquidity and secondary market risks significantly increased as a result of bank securitization activities.

Considering the potential adverse effects of asset-backed securities on bank risk, both the SEC and the bank regulatory authorities have called for enhanced financial transparency. However, inappropriate and improperly timed information disclosure may make the banking system as a whole, and specific financial institutions in particular, more sensitive to systemic shocks.

Prescott (2008) studies whether the financial supervisory authorities should disclose more information about banks. He presents several theoretical scenarios where: (1) banks send the same financial report to both regulators and market participants; (2) banks send separate reports to regulators and market participants and the regulators do not share the information; and (3) the bank has the option to share supervisory information, such as CAMELS ratings; and (4) where supervisors have the technology to detect false reports. He concludes that greater supervisory disclosure in the end makes it harder for regulators to collect the required information.

Tadesse (2005) reports results that support the need for extensive bank disclosure. He found that crises are less likely in countries with regulatory regimes that require extensive bank disclosure. Bauman and Nier (2004) investigated the relationship between a banks' long-run stock price volatility and the average level of disclosure the bank provides in its annual report. Their results suggest that expanded disclosure benefits investors. Nier and Baumann (2006) found that banks that disclose more information have a greater incentive to limit their risk of default by holding larger capital buffers. Furthermore, Hirtle (2007) showed that greater disclosure is associated with more efficient risk taking and improved risk-adjusted returns.

Determining whether more transparency regarding securitization and credit derivatives activities increases the market's ability to reliably and accurately assess a bank's financial condition is a crucial element in resolving the current financial crisis. This study contributes to the literature by examining the linkage between the transparency and bank performance and stability.

2. Efficient market theory

The efficient-market hypothesis (EMH) or efficient-market theory made popular by Eugene Fama (1965, 1970) states that financial markets are informationally efficient. There are three well known versions of the hypothesis. The weak form of the EMH asserts that prices on traded securities currently reflect all past publicly available information. Furthermore, security prices exhibit no serial correlation hence there are no predictable patterns inherent in asset prices. Thus, future price movements are determined by other information and prices follow a random walk. The semi-strong form of the theory claims that prices reflect all known publicly available information and that prices change instantly to reflect any and all new public information. In addition the strong form version states that prices instantly reflects non-public insider information. The efficient-market hypothesis implies that agents acting to maximize their utility possess rational expectations and that on average their collective judgment is correct.

The opacity of financial information in general and commercial banks in particular compounds the difficulty in applying EMH theory. The financial crises demonstrated that the quality of a bank's mortgage and commercial loan portfolio is often difficult for outsiders to assess and that the complexity of many collateralized loan and debt obligations mislead many market participants. Furthermore, both market participants and regulators placed excessive trust in the workings of the financial markets to reduce risk through product and sector diversification when in fact many of the instruments and markets were highly correlated. Furthermore, both groups assumed that the underlying financial information was complete and accurate. In many cases this trust was misplaced leading to widespread errors in assessing the nature of the risks involved. For example, when evaluating the credit default swaps sold by AIG, the security rating agencies focused primarily on default risk and failed to recognize the collateral call risk imbedded in these instruments. This led to CDS that were improperly priced which encouraged an over supply of the securities.

On the other hand, behavioral finance suggests that market imperfections exist due to a variety of cognitive biases such as overconfidence, herding behavior, and panic which often leads to overreaction, and market bubbles followed by massive market sell-offs (See the early work by Kahneman and Tversky (1982) and DeBondt and Thaler (1985) and later work by Kahneman and Thaler (2006) for more detail). Various market observers states that the EMH is at least partly responsible for the recent financial crisis suggesting that market participants and regulators underestimated of the dangers of asset bubbles in the mortgage and derivatives markets. To quote a prominent ex-Federal Reserve

Board Official, Paul Volcker "It is clear that among the causes of the recent financial crisis was an unjustified faith in rational expectations [and] market efficiencies". This study incorporates and tests elements of both efficient market theory and behavioral finance.

This paper examines the impact of the quantity and quality of financial disclosure on bank stock returns, credit default spreads (CDS), the impact of transparency on bank performance, the impact of the recent financial crisis on bank disclosure and performance, and the effect of the financial crisis on healthy and troubled banks.

Formally the following five hypotheses dealing with financial disclosure are tested.

H1: Disclosures reflecting lack of transparency, financial troubles, or meaningful amendments to financial reports have a negative impact on bank stock returns.

H2: Disclosures reflecting lack of transparency, financial troubles, or amendments to financial reports have a positive impact on bank CD and credit default spreads (CDS).

H3: The degree of transparence from "most" transparent versus "least" transparent banks has a differential impact on a bank's market and accounting risk and performance measures.

H4: The degree of financial disclosure impacts how the recent financial crisis affects a bank's market and accounting risk and performance measures.

H5: The financial health of banks impacts how the recent financial crisis affects bank's market and accounting risk and performance measures.

3. Model and data

To determine how financial markets react to increased information transparency, a standard event study methodology is employed. The Wall Street Journal index is investigated for bank transparency and bank risk related articles for a sample of large US banks. All articles relating to a given bank and are identified and the search is then narrowed by using a wide range of keywords[1]. The resulting set of articles were read to see if they relate to transparency issues or possible financial troubles the bank may be facing. The dates of the relevant articles were recorded and used as event dates in the analysis.

Events are grouped under three date categories. The first category is the date when an article concerning a transparency problem appears in Wall Street Journal (e.g., disclosing incorrect or incomplete information to the public). There are a total of 68 articles relating to transparency problems for the banks in the sample between 2001 and 2008. The second category is the date when an article concerning a bank's lack of financial soundness was published in the Wall Street Journal. There are a total of 105 articles dealing with actual or potential financial troubles for the banks in the sample. The last event category is the date when a significant amendment, usually a correction, to an annual report is announced. There are a total of 44 amendments for the banks in the sample during the period from 2001 to 2008. However, not all the amendments are materially significant. For example, some amendments are intended to correct typos or to make some minor changes in graphs or tables. After eliminating the non-significant ones, a total of nine material amendments are identified[2]. The day the amendment was announced is used as the relevant event date.

It should also be noted that not all the 68 transparency articles or the 105 "troubled bank" articles are used as event dates because some articles appeared on the same date and others were published on dates which fall into the estimation period surrounding an earlier publicity event, potentially biasing the estimation results. Therefore, the "first" events are separated as a sub-sample for further analysis, labeled the "clean" sample, while the "full" sample is used as a robustness check. In all cases, multiple events which are very close in time (e.g., one month) are excluded from the analysis. The standard market model is used to estimate the abnormal return (AR) for bank *i* on day *t* as follows:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}, \quad (1)$$

where R_{it} is the observed return on bank *i* on event day *t*; R_{mt} is the return on S&P 500 index on event day *t*; $\hat{\alpha}_i$ and $\hat{\beta}_i$ are estimated regression parameters for bank *i*.

Market model parameters are calculated over a -201 to -2 day estimation period, where day 0 is the event date. Daily abnormal returns are then combined to form cumulative abnormal returns (CARs) over several event windows.

In addition to the impact of information disclosure on bank stock prices, it should be informative to see how a bank's credit default swap spread (CDS) reacts to these same disclosure events. Five-year

[1] A sub-set of the keywords are as follows: disclosure, actual knowledge, SEC, probe, transparent, scrutiny, scandal, red flag, failure, violation, revision, trouble, problems, and write downs for cause. These keywords are the same ones used in determining the quality index and the troubled bank sample.

[2] For example, Huntington Bancshares Inc's amended its 2002 annual report and restated its net income downward from $363 million to $333 million. This was considered a material change.

CDS spreads are obtained from Bloomberg. The data was available only for six banks in the sample: Citigroup, Bank of America, JP Morgan, Wachovia, Wells Fargo, and National City Bank. However, data for National City Bank was available only through June 2008 with a good deal of missing data. Therefore, National City Bank was excluded from the analysis.

As a proxy for the market index, two credit default indices provided by Markit are used. Markit publishes several bond, equity, credit and loan indices. For the purpose of this analysis, two different credit default swap indices are utilized. The first index is a general market index (CDX) for credit default swaps and includes 125 large firms across a wide range of sectors. The second index is a financials index (CDXFIN) that includes 25 non-bank financial firms. Another common measure of a bank's risk is its certificates of deposit (CD) spread. Since the CDXFIN index includes no commercial banks (most are insurance companies), six-month certificates of deposit (CD) spreads are also used as a proxy for the market to test the robustness of the results.

Initially, the CDS spreads for the five banks are plotted over the event period to visually observe abnormal behavior of CDS spreads around events. Secondly, a standard event study is conducted, and finally a cross-sectional regression model is run for all five banks. The model is as follows:

$$CDS_i = CDX_i + Time\ Trend + Crisis + \sum E_i, \qquad (2)$$

where CDS_i is the return or change in CDS spreads on day *i*, CDX_i is the return or change in CDX spreads on day *i*, $Time\,Trend$ is the daily time trend variable starting a the beginning of the sample period.

$Crisis$ is the dummy variable which takes a value of 1 for all days after 1/1/2007, 0 otherwise, E_i is the dummy variable which takes on a value of 1 for the event period (0, -1)) and a value of 0 otherwise.

The model is run with different specifications (e.g., with or without the time trend and crisis variables). The results are robust to all specifications. Bank performance and stability measures are then compared for highly transparent banks (i.e., banks with a high disclosure index value) and their less-transparent peers. Standard tests of significance are used to compare differences in average post-disclosure performance between these two groups. To determine the most and least transparent banks, banks are ranked based on their disclosure indices. Banks, which consistently rank in the top third of the list are included in the "most transparent" banks sample. Similarly, banks, which consistently have the lowest disclosure index values and belong to the bottom third of the list are included in the "least transparent" bank sample. The performance of banks in these two samples is then compared using standard tests of significance. Furthermore, a comparison similar to the one described above for high versus low disclosure banks are made between matched samples of weak versus healthy banks to see if transparency issues have an asymmetric impact.

In addition to standard univariate tests of significance, logit regressions are run to see if a bank's level of disclosure contributes to being classified as a troubled bank. Furthermore, all the regressions designed to test the effects of both the quality and quantity of information disclosure on bank performance and stability are run using a "troubled bank" dummy variable. The sample of weak or troubled banks is based on two sources. The first is the list of failed banks published by the FDIC. Large banks from this list are included in the troubled bank sample[1]. Also, banks that received large amounts of TARP money were selected. Furthermore, one should be aware of the existence of some banks, which were not officially labeled as troubled institutions but received TARP money anyway. Therefore, a second source, the Wall Street Journal index, was used to refine the troubled bank sample. The WSJ index was searched for the following key words: charge-offs, trouble, problem, and write-downs. Large banks whose names appeared in the news as being in some form of financial trouble are included in the final sample.

Table 1. Troubled bank sample

Institution name	Total assets ($000: December 2008)*	TARP money received ($000)	TARP money/ Total asset (%)	Number of total articles (2006-2008)	Number of articles stating trouble	Number of trouble stating articles/total articles (%)
JP Morgan Chase	2.180.000.000	25.000.000	1.15	1240	4	0.32
Citigroup	1.940.000.000	45.000.000	2.32	1832	24	1.31
Bank of America	1.820.000,000	15.000.000	0.82	1132	5	0.44
Wells Fargo	1.310.000.000	25.000.000	1.91	213	5	2.35
Wachovia	670.639.000	N.A.	N.A.	451	25	5.54

[1] A total of 47 banks failed during the 2001-2008 period. Most of the banks were small and not involved in loan securitization or derivatives in any meaningful way. Therefore, these banks are excluded from the sample. Colonial Bank which failed on August 14, 2009 is included in the troubled bank sample based on the large number of articles which appeared describing the nature of the financial trouble the bank was facing.

Table 1 (cont.). Troubled bank sample

Institution name	Total assets ($000: December 2008)*	TARP money received ($000)	TARP money/ Total asset (%)	Number of total articles (2006-2008)	Number of articles stating trouble	Number of trouble stating articles/total articles (%)
PNC	291.000.000	7.579.200	2.60	70	2	2.86
U.S. Bancorp	267.000.000	6.599.000	2.47	41	4	9.76
Suntrust	189.000.000	4.850.000	2.57	68	3	4.41
National City	151.165.000	N.A.	N.A.	84	11	13.10
Regions financial	146.000.000	3.500.000	2.40	28	3	10.71
Fifth third	120.000.000	3.408.000	2.84	59	3	5.08
Keycorp	105.000.000	2.500.000	2.38	40	4	10.00
Comerica	67.912.580	2.250.000	3.31	22	1	4.55
M&T Bank	65.815.757	600.000	0.91	17	2	11.76
Zions Bancorporation	55.339.951	1.400.000	2.53	21	1	4.76
Colonial Bancgroup	25.816.306	N.A.	N.A.	6	2	33.33

Source: * Wachovia is purchased by Wells Fargo on October 3, 2008 and National City is purchased by PNC on October 24, 2008. Therefore total assets figures shown in this table for those two banks are by the end of September 2008. **Wachovia and National City remain in the sample through September 2008.

The list of the troubled bank sample is in Table 1. The column titled "Number of total articles (2006-2008)" gives the search results when only a bank's name is searched in the Wall Street Journal index from 2006 to 2008. Thus, this column reports how many times a bank was mentioned in the financial press. As it turned out, some of those articles were not primarily about the bank in question but may have referred to the bank as being a peer or competitor of another bank. Therefore, after this initial sample of articles was determined, a keyword search was conducted to identify a smaller set of relevant articles for each bank.

As mentioned above, data on CDS spreads are obtained from Bloomberg, while data for the CDS indices were provided by Markit. Data on large bank CD spreads were obtained from the St. Louis Federal Reserve Bank's economic database (FRED). Daily stock prices were obtained from the Chicago Research on Stock Prices (CRSP) database. Data concerning transparency issues was extracted from Wall Street Journal index.

4. Empirical results

4.1. Event study results. Test of hypothesis 1: *Disclosures reflecting lack of transparency, financial troubles, or meaningful amendments to financial reports have a negative impact on stock returns*.

Table 2. Cumulative abnormal stock returns (CASRs)

This table shows the results for the stock return event study. In Panel A daily abnormal returns; in Panel B event window cumulative abnormal returns are shown. The results are classified by the event dates used in the analysis. "Transparency related articles" shows the results of the analysis where the publication dates of transparency related articles on WSJ; "Trouble related articles" shows the results of the analysis where the publication dates of trouble related articles on WSJ and "Amendments" shows the results of the analysis where the announcements of amendments to annual reports are used as event dates. AR is the abnormal stock return for the portfolio of banks used in the analysis in event time; CAR is the cumulative abnormal stock return for the portfolio of banks used in the analysis during the event window period; *N* is the number of events and Number is the number of firms in the portfolio showing negative return for day *t*. ***, **, * indicate 1%, 5%, 10% significance levels, respectively.

Transparency related articles									
Clean sample (*n* = 27)					Full sample (*n* = 38)				
Day	AR	*t*-statistic	*N*	Number	Day	AR	*t*-statistic	*N*	Number
-3	-0.29%	-1.26	27	17	-3	-0.19%	-1.09	38	20
-2	0.35%	0.78	27	14	-2	0.28%	0.81	38	22
-1	0.63%	0.62	27	14	-1	0.27%	0.33	38	18
0	-0.30%	-1.63	27	15	0	-0.07%	-0.4	38	18
1	0.10%	0.47	27	15	1	0.23%	1.38	38	18
2	1.53%	1.63	27	11	2	0.92%	1.35	38	18
3	0.12%	0.5	27	13	3	0.20%	1.09	38	15
Trouble related articles									
Clean sample (*n* = 29)					Full sample (*n* = 55)				
Day	AR	*t*-statistic	*N*	Number	Day	AR	*t*-statistic	*N*	Number
-3	-1.44%	-1.1	29	17	-3	-1.09%	-1.3	55	31
-2	-1.02%	-1.38	29	20	-2	-1.17%	-1.69*	55	34

Table 2 (cont.). Cumulative abnormal stock returns (CASRs)

Transparency related articles									
Clean sample (n = 29)					Full sample (n = 55)				
-1	2.33%	0.94	29	14	-1	1.58%	1.09	55	27
0	-0.08%	-0.1	29	18	0	-0.26%	-0.34	55	36
1	0.84%	0.95	29	14	1	-0.21%	-0.34	55	30
2	-0.21%	-0.3	29	16	2	-0.49%	-0.64	55	28
3	0.30%	0.31	29	15	3	-0.71%	-0.71	55	31
Amendments									
Full sample (*n* = *9*)									
Day	AR	*t*-statistic	*N*	Number	-	-	-	-	-
-3	-0.40%	-1.56	9	7	-	-	-	-	-
-2	0.58%	2.41**	9	1	-	-	-	-	-
-1	0.00%	0.03	9	6	-	-	-	-	-
0	0.03%	0.13	9	3	-	-	-	-	-
1	0.43%	1.42	9	3	-	-	-	-	-
2	0.40%	1.52	9	3	-	-	-	-	-
3	-0.19%	-0.91	9	5	-	-	-	-	-

Panel B. Event window cumulative abnormal returns					
Transparency related articles					
Clean sample (*n* = 27)			Full sample (*n* = 38)		
Event window	CAR	*t*-statistic	Event window	CAR	*t*-statistic
[-1, 0]	0.33%	0.35	[-1, 0]	0.19%	0.24
[0, +1]	-0.20%	-1.3	[0, +1]	0.16%	1.04
[0, +2]	1.33%	1.45	[0, +2]	1.08%	1.62
[0, +3]	1.45%	1.45	[0, +3]	1.28%	1.61
Trouble related articles					
Clean sample (*n* = 29)			Full sample (*n* = 55)		
Event window	CAR	*t*-statistic	Event window	CAR	*t*-statistic
[-1, 0]	2.25%	0.68	[-1, 0]	1.32%	0.67
[0,+1]	0.75%	0.53	[0, +1]	-0.46%	-0.41
[0,+2]	0.54%	0.5	[0, +2]	-0.96%	-0.73
[0, +3]	0.84%	0.63	[0, +3]	-1.66%	-0.99
Amendments					
Full sample (*n* = 9)					
Event window	CAR	*t*-statistic			
[-1, 0]	0.04%	0.12			
[0, +1]	0.46%	1.74			
[0, +2]	0.86%	1.98*			
[0, +3]	0.67%	1.63			

Panel A of Table 2 shows the average daily stock return results. Full sample results are reported along with clean sample results as a robustness check. However, as mentioned above, the full sample results might be biased and their results should be interpreted with caution. In general, the number of firms with negative returns is slightly higher than the number of firms with positive returns for most event windows, although most of the average daily abnormal returns are statistically insignificant. The two notable exceptions are the full sample results for the trouble related articles where on day -2 the average daily returns are -1.17%, with a marginally significant *t*-value of -1.69, and for the amendment articles, where the day -2 results are positive (0.58%) and strongly significant (*t*-value of 2.41), suggesting that efforts to correct previously reported results is viewed favorably by the market.

The cumulative abnormal stock returns are presented in Panel B for four different event windows. For both the transparency and trouble related articles, the cumulative abnormal returns for the event window (0, +1) decrease, although the result is not statistically significant. The only statistically significant result once again relates to the (0, +2) event window for amended annual reports where the cumulative average return is +0.86%, with a *t*-value of 1.98. In summary, the results from Panels A and B for the amendment results suggest that the precise timing of the announcements

for corrections to the annual report may vary from -2 to +2 days but the effect is consistently positive.

Tests of hypothesis 2: *Disclosures reflecting lack of transparency, financial troubles, or amendments to financial reports have a positive impact on bank CD and credit default spreads (CDS)*.

CDS data are available for only five banks in the sample. First, CDS spreads are plotted both before and after the event dates to visually observe any significant market reactions. A few representative graphs are shown in Figure 1, which depicts CDS spreads for 38 days (-30 to +7) surrounding two different types of events: transparency and trouble events, for both J.P. Morgan Chase and Citigroup. For comparison purposes, the dotted line shows the trend of the average of the five bank's CDS spreads. In general, the graphs reveal that, similar to stock prices, CDS spreads generally fail to show a dramatic reaction to these information events. This might either mean that the events were fully anticipated by the market or the market simply did not perceive the events as being very significant.

Table 3. Cumulative abnormal CDS returns (CACRs)

This table shows the results for the CDS return event study. In Panel A daily abnormal returns; in Panel B event window cumulative abnormal returns are shown. The results are classified by the event dates used in the analysis. "Transparency related articles" shows the results of the analysis where the publication dates of transparency related articles on WSJ and "Trouble related articles" shows the results of the analysis where the publication dates of trouble related articles on WSJ used as event dates. Two different indices are used as a market proxy. CDX is the general market index, CDXFIN is the financials index. AR is the abnormal CDS return for the portfolio of banks used in the analysis in event time; CAR is the cumulative abnormal CDS return for the portfolio of banks used in the analysis during the event window period; *N* is the number of events and Number is the number of firms in the portfolio showing negative return for day *t*. ***, **, * indicate 1%, 5%, 10% significance levels, respectively.

Panel A. Daily abnormal returns									
Market proxy: CDX									
Clean sample (*n* = 7)					Full sample (*n* = 11)				
Day	AR	*t*-statistic	*N*	Number	Day	AR	*t*-statistic	*N*	Number
-3	-0.63%	-0.22	7	5	-3	1.82%	0.57	11	8
-2	1.44%	0.51	7	2	-2	-1.00%	-0.38	11	5
-1	1.75%	0.81	7	4	-1	0.86%	0.61	11	7
0	-3.27%	-1.41	7	4	0	-0.94%	-0.49	11	4
1	3.64%	1.05	7	3	1	0.69%	0.27	11	7
2	-0.21%	-0.14	7	5	2	0.41%	0.33	11	7
3	-1.66%	-0.73	7	4	3	-1.87%	-1.18	11	7
Market proxy: CDXFIN									
Clean sample (*n* = 7)					Full sample (*n* = 11)				
Day	AR	*t*-statistic	*N*	Number	Day	AR	*t*-statistic	*N*	Number
-3	-0.93%	-0.3	7	5	-3	1.57%	0.47	11	7
-2	0.21%	0.08	7	3	-2	-1.59%	-0.66	11	6
-1	1.24%	0.6	7	3	-1	0.79%	0.61	11	6
0	-3.72%	-1.79	7	6	0	-1.16%	-0.62	11	6
1	3.23%	0.97	7	2	1	0.60%	0.24	11	6
2	0.13%	0.07	7	3	2	0.59%	0.41	11	6
3	-1.12%	-0.39	7	2	3	-1.32%	-0.69	11	4
Market proxy: CDX									
Clean sample (*n* = 7)					Full sample (*n* = 19)				
Day	AR	*t*-statistic	*N*	Number	Day	AR	*t*-statistic	*N*	Number
-3	0.28%	0.6	7	2	-3	-0.83%	-1.4	19	10
-2	2.16%	0.74	7	4	-2	-1.33%	-0.6	19	11
-1	0.89%	0.63	7	3	-1	-1.48%	-0.8	19	9
0	1.13%	0.98	7	2	0	-1.85%	-0.96	19	9
1	-2.09%	-1.09	7	4	1	0.44%	0.39	19	10
2	2.38%	2.07*	7	2	2	-0.48%	-0.25	19	10
3	-4.93%	-1.04	7	4	3	-0.52%	-0.23	19	9
-3	0.18%	0.14	7	2	-3	-0.61%	-0.95	19	10
-2	2.39%	0.76	7	5	-2	-1.83%	-0.74	19	12
-1	2.34%	1.26	7	2	-1	-0.32%	-0.17	19	9
0	2.25%	1.88*	7	1	0	-0.87%	-0.43	19	6
1	-0.62%	-0.27	7	4	1	1.04%	0.93	19	9

Table 3 (cont.). Cumulative abnormal CDS returns (CACRs)

Panel A. Daily abnormal returns									
Market proxy: CDXFIN									
Clean sample (*n* = 7)					Full sample (*n* = 11)				
Day	AR	*t*-statistic	*N*	Number	Day	AR	*t*-statistic	*N*	Number
2	3.58%	2.3*	7	1	2	0.21%	0.1	19	10
3	-5.09%	-1.00	7	4	3	-0.26%	-0.11	19	10
Panel B. Event window cumulative abnormal returns									
Market proxy: CDX									
Clean sample (*n* = 7)					Full sample (*n* = 11)				
Event window		CAR	*t*-statistic		Event window		CAR	*t*-statistic	
[-1, 0]		-1.52%	-0.74		[-1, 0]		-0.08%	-0.05	
[0, +1]		0.38%	0.13		[0, +1]		-0.25%	-0.11	
[0, +2]		0.16%	0.04		[0, +2]		0.16%	0.07	
[0, +3]		-1.50%	-0.29		[0, +3]		-1.71%	-0.53	
Market proxy: CDXFIN									
Clean sample (*n* = 7)					Full sample (*n* = 11)				
Event window		CAR	*t*-statistic		Event window		CAR	*t*-statistic	
[-1, 0]		-2.48%	-1.07		[-1, 0]		-0.37%	-0.2	
[0, +1]		-0.49%	-0.15		[0, +1]		-0.56%	-0.22	
[0, +2]		-0.36%	-0.08		[0, +2]		0.03%	0.01	
[0, +3]		-1.48%	-0.22		[0, +3]		-1.29%	-0.3	
Market proxy: CDX									
Clean sample (*n* = 7)					Full sample (*n* = 19)				
Event window		CAR	*t*-statistic		Event window		CAR	*t*-statistic	
[-1, 0]		2.02%	0.95		[-1, 0]		-3.33%	-1.15	
[0, +1]		-0.96%	-0.42		[0, +1]		-1.41%	-0.61	
[0, +2]		1.42%	0.54		[0, +2]		-1.90%	-0.65	
[0, +3]		-3.51%	-0.54		[0, +3]		-2.41%	-0.57	
Market proxy: CDXFIN									
Clean sample (*n* = 7)					Full sample (*n* = 19)				
Event window		CAR	*t*-statistic		Event window		CAR	*t*-statistic	
[-1, 0]		4.59%	1.86		[-1, 0]		-1.19%	-0.38	
[0, +1]		1.63%	0.57		[0, +1]		0.17%	0.07	
[0, +2]		5.21%	1.51		[0, +2]		0.38%	0.11	
[0, +3]		0.13%	0.02		[0, +3]		0.12%	0.03	

The results for the CDS spreads are further analyzed in Table 3 once again using event study methodology, where Panel A presents the daily abnormal return results while Panel B presents the results for the cumulative abnormal returns. As mentioned earlier, two different proxies for the CDS market are used, CDX and CDXFIN. Several statistically significant results are reported in Panel A, where a positive impact (+ 2.38%) on CDS spreads is reported using the CDX market index on day +2 for the trouble related articles for the clean sample of events. When looking at the CDXFIN results for trouble announcements, a statistically significant abnormal return for the clean sample is observed on day 0 (+ 2.25%) and on day +2 (3.58%). This suggests that the market did in fact react to trouble related news by increasing their CDS spreads as anticipated.

Table 4. Regression analysis of event dates: statistically significant results

This table shows the event dates, which were significant at regressions, their sign of regression coefficients and the general tone of the article published on Wall Street Journal at the event date. The question mark is used when the interpretation of the tone of the article is not very clear. The expectation is to have a positive regression coefficient when the tone of the article is clearly negative.

Bank	Date	Sign of regression coeficient	Favorable (+)/unfavorable (-) article
Citigroup	10/18/2007	+	-
	11/5/2007	+	-
Bank of America	10/18/2007	+	-
Wells Fargo	10/17/2007	+	-
	11/28/2007	-	?
	10/16/2008	-	?

Table 4. Regression analysis of event dates: statistically significant results

Bank	Date	Sign of regression coeficient	Favorable (+)/unfavorable (-) article
JP Morgan	10/16/2007	+	-
	12/14/2007	+	-
	3/12/2008	+	-

And finally, a cross-sectional regression model is run for each bank to see the effects of various event date dummies on CDS spreads. Table 4 shows the significant event dates in the regression analysis, their regression coefficient, and the tone of the article (positive, negative, or uncertain). It is anticipated that an article with an unfavorable tone would have a positive effect on the CDS spreads. The table shows that most of the articles conveyed unfavorable information and that their effects on CDS spreads are positive as expected. There are only two instances where the effect on CDS spread is negative. Both of those articles concern Wells Fargo where the articles can be interpreted as being either positive or negative. For example, the first article (11/28/2007) states that the bank will continue to provide home equity financing directly to customers but will not originate or acquire home equity loans through indirect channels. The second article (10/16/2008) mentions that Wells Fargo's earnings increased and that loan loss reserves were reduced. Apparently the market perceived these two events as positive news and reacted by lowering Wells Fargo's CDS spreads.

As a robustness check, the event study and the regression analysis are repeated using six-month certificate of deposit (CD) spreads as the market proxy. The results are very similar to the ones reported above and hence will not be reported in detail[1]. In the event study analysis, no significant abnormal returns are observed except for the day 2 following the trouble announcements. Also, the same event dates found to be important when examining CDS, also affect CD spreads in a similar manner. Thus, in general, the results are robust to the choice of the specific market index.

4.2. Most versus least transparent bank analysis. Tests of hypothesis 3: *The degree of transparence from "most" transparent versus "least" transparent banks has a differential impact on a bank's market and accounting risk and performance measures*. Following Hirtle (2007), various measures of bank performance and stability are used as dependent variables in separate regressions.

Table 5. Variable definitions

Variable definitions	
Measures of performance	
Return on equity (ROE)	Calculated as net income divided by equity.
Return on assets (ROA)	$\frac{\overline{ROA}}{\sigma_{ROA}}$, calculated as net income divided by total assets.
Risk-adjusted return on equity (RAR_{ROE})	$\frac{\overline{ROE}}{\sigma_{ROE}}$. Rolling standard deviation of ROE is calculated using eight preceding quarters.
Risk-adjusted return on assets (RAR_{ROA})	Rolling standard deviation of ROA is calculated using eight preceding quarters.
Level of total returns	$R_1 = \frac{P_1 - P_0 + D_1}{P_0}$.
Sharpe ratio	$\frac{R_i - R_f}{\sigma_{(R_i)}}$, R_i is return on security performance, R_f is risk-free rate.
Measures of stability	
Stock price volatility	Measured by the standard deviation of a bank's total stock return.
Market beta	Calculated from Capital asset pricing model (CAPM): $R_{it} - R_{ft} = (R_{mt} - R_{ft})\,\beta_i + \varepsilon_{it}$,
The bank's probability-of-default (*z*-statistic)	Calculated as follows (Boyd and Graham, 1986, Stiroh, 2004): $Z = \frac{\overline{ROA} + \overline{E/A}}{\sigma_{ROA}}$ $\overline{E/A}$ is the mean equity to assets ratio. Rolling standard deviations of ROA is used in calculating the *Z* value. *Z*-statistic shows how many standard deviations a bank is away from insolvency. A higher *Z*-score indicates an improved risk-adjusted performance or lower probability of default.
Quantity of disclosure	

[1] For the sake of brevity, the detailed statistical results are not presented here but they are available upon request.

Table 5 (cont.). Variable definitions

Variable definitions	
Total subcategory binary index (TBI)	When constructing this index, the total number of categories that report data are counted. No data is recorded as 0, while the presence of data is recorded as 1. The maximum value for all securitization and derivative activities is 81 (69 + 12, respectively).
Securitization subcategory binary index (SBI)	SBI is a subcategory of TBI. The value for SBI index could range from 0 to 69.
Credit derivatives subcategory binary index (DBI)	DBI is a subcategory of TBI. The value for DBI index could range from 0 to 12.
Total quantitative index (TQI)	TQI adds the reported numerical values for each of the possible 81 activities for a given bank and divides this aggregate value by the bank's total assets at the time of the call report.
Annual report index (ARI)	ARI is based upon the banks annual 10-K reports. Each bank's 10-K is examined to determine the bank's level of securitization and credit derivatives disclosure activity. The focus here is on the extent of information provided regarding the objectives and strategies being followed by management and the potential risks facing the bank. Each bank's annual report is analyzed thoroughly. Numerous keywords regarding the securitization and credit derivatives are counted in the text.
Securitization annual report index (SARI)	SARI is a sub-index of ARI. Keywords counted to construct SARI are securitization, asset-backed securities, mortgage-backed securities, collateralized debt obligations, collateralized mortgage obligations and collateralized loan obligations.
Credit derivatives annual report index (DARI)	DARI is a sub-index of ARI. Keywords counted to construct DARI are credit derivatives, credit default swaps, total return swaps and credit options.
Quality of disclosure	
Quality index (QualIndex)	A sample of articles relating to loan loss revisions, earnings announcements and SEC probes are extracted from The Wall Street Journal Index (WSJI). Each article is studied to identify the bank's motives for changing its provision for loan losses, its projections of future earnings or the nature of a formal investigation by the SEC. The following are examples of keywords used in the search: disclosure, SEC, probe, transparency, scrutiny, scandal, red flag, failed, violations, revisions, and loan losses. Based on these searches, a comprehensive Quality Index (QualIndex) is constructed as follows [1– (quality related articles/ total articles about the bank)]*100. The index ranges from 0-100.
TRNS	The WSJ index is searched using the same keywords mentioned above and each article is read to see if it is related to quality related problems. Then, the total number of quality related articles appearing in the search is used as a proxy of the quality of disclosure.
# of articles	Total number of articles found when the bank's name is searched in the WSJ.
Bank size	Natural log of total assets.
Risk profile	Ratio of risk-weighted assets to total assets and the bank's risk-based capital ratio.
Balance sheet composition	Loan to deposit and loan to asset ratios.
Leverage ratio	Total liabilities to total equity ratio.
Revenue composition	Non-interest income as a share of total operating income.
Bank's efficiency ratio	The ratio of non-interest expense to total revenue.

Note: This table shows the definitions of all variables used in the study. Several measures of performance and stability are used to ensure the robustness of the results. Independent variables are constructed as indicated below.

The detailed definition of each variable and disclosure index used in this study is given in Table 5. Although it might seem that accounting measures of performance are not directly affected by changes in information disclosure, theses changes can have an indirect impact. For example, the market may perceive a more transparent bank to be more (or possibly less) risky which may lead to a higher (or possibly lower) cost of funds, which consequently impacts various accounting measures of performance and stability, such as ROA, ROE, and the bank's *Z*-value. To see if such an effect exists, accounting measures of performance and stability along with several market measures are analyzed.

To measure the quantity of information, several disclosure indexes are constructed. The indices measure the level of detail supplied by banks when reporting on their securitization and credit derivative activities. On a quarterly basis, banks are required to disclose certain information in their Y-9 regulatory Call Reports which are subsequently made public with a three month lag. However, banks have a greater degree of discretion regarding the level of disclosure to include in their annual reports. The following indices, described in detail in Table 5 (SBI, DBI, TBI, SQI, DQI and TQI) are based on call report data and measure the level of securitization and credit derivative activities banks are involved in, while two other indices (SARI and DARI) are based on the bank's annual report.

In regard to the call report indices, the level of involvement in both securitization and derivative activities is measured in two ways: a binary and continuous manner. In binary format, one simply sums the number of separate activities the bank engages in. In the quantitative format, the notional dollar amount of each of the activities is added together. For example, SBI represents the securitization binary index, DBI represents the derivative binary index and TBI indicates the binary index for the total of both securitization and derivative activities. In like manner, SQI, DQI and TQI respectively represent the level of quantitative involvement in securitization, derivatives and the total dollar notional amount of both activities. In terms of the bank's annual report, the securitization

activity annual report index (SARI) and the derivatives activity annual report index (DARI), represent the number of times keywords relating to securitization and derivatives are mentioned in the bank's annual report.

Over the sample period, there have been four major changes in the level of detail required in the bank's call report. At each breakpoint, even though the banks may be providing roughly the same level of service they were required to disclose considerably more detail concerning their securitization and credit derivative activities. Hence, the indices based on call report-data measure both the level of the financial activity and degree of disclosure surrounding that activity. In addition to the quantitative indices, the quality of disclosure is measured using three different indices: (1) a quality index (QualIndex), (2) the total number of transparency related problems mentioned in news articles (TRNS), and (3) the total number of articles appearing in the Wall Street Journal (# of articles). Both the disclosure indices and control variables are lagged one period to deal with potential endogeneity problems. The most transparent banks are compared with their least transparent peers using standard tests of significance. The list of the most and least transparent banks is given in Table 6 along with their average transparency index value.

Table 6. The most and least transparent banks samples

A. Most transparent banks sample					
BHC name	SBI	DBI	TQI	SARI	DARI
Bank of America corporation	42.06	7.13	0.84	118.68	19.42
Wachovia corporation	39.80	6.50	0.43	107.74	3.81
Citigroup inc.	39.13	7.16	0.93	129.61	27.13
JP Morgan Chase & CO.	37.19	7.94	2.26	149.29	46.81
National city corporation	18.00	3.87	0.03	130.00	0.00
Wells fargo & Company	16.26	5.94	0.64	65.58	6.97
Suntrust banks, INC.	13.39	5.81	0.46	46.03	6.58
Keycorp	11.55	4.45	0.11	89.26	11.10
PNC financial services group	7.74	4.45	0.05	79.00	18.35
B. Least transparent banks sample					
BHC name	SBI	DBI	TQI	SARI	DARI
Comerica incorporated	0.00	2.61	0.00	1.29	0.35
Northern trust corporation	0.00	2.45	0.00	13.71	5.16
BB&T Corporation	0.00	1.32	0.00	28.42	0.13
Colonial bancgroup	0.71	0.00	0.00	31.23	1.81
Associated banc-corp	0.90	0.52	0.00	5.52	0.00
Firstmerit corporation	1.61	0.00	0.01	13.10	0.00
South financial group	1.68	0.00	0.01	18.39	0.26
First citizens bancshares	1.87	0.00	0.01	6.58	0.00
International bancshares corp	2.16	0.00	0.00	0.81	0.00

Table 7. Most and least transparent banks *t*-test comparison

	Most transparent banks mean	Least transparent banks mean	*t*-test
Performance measures			
ROA(%)	0.96	1.03	0.52
ROE(%)	11.31	11.75	0.27
Risk-adjusted ROA	9.14	8.38	-0.93
Risk-adjusted ROE	9.66	8.62	-0.96
Stock return(%)	0.50	5.83	0.97
Sharpe ratio	0.18	0.20	0.13
Stability measures			
Volatility of stock return(%)	30.63	30.42	-0.08
Beta	1.11	0.99	-2.7***
Z statistic	258.31	264.30	0.26
Control variables			
Total assets ($ in millions)	590.093	32.663	-15.9***
Risk weighted assets/Total assets (%)	80.27	77.01	-2.68***
Risk based capital ratio (%)	11.82	13.01	11.02***
Loan to deposit ratio (%)	104.67	93.10	-7.14***
Loan to assets ratio (%)	58.98	63.91	4.07***

Table 7 (cont.). Most and least transparent banks *t*-test comparison

	Most transparent banks mean	Least transparent banks mean	*t*- test
Leverage ratio	11.10	10.64	-2.98***
Revenue composition (%)	33.67	25.19	-9.1***
Efficiency ratio (%)	46.31	42.20	-3.86***

Source: This table shows the *t*-test comparisons between most and least transparent banks' performance and stability measures and control variables. Time period is June 2001-December 2008. ***, **, * indicate 1%, 5%, 10% significance levels, respectively.

Table 7 shows the results of the *t*-tests between high and low disclosure banks. Almost all performance measures are greater for less transparent banks (except risk-adjusted ROA and risk-adjusted ROE), although the differences are not statistically significant. The most striking difference relates to stock returns. For highly transparent banks the average stock return is only 0.5% and compared to 5.83% for less transparent banks. However, given the large volatility in stock returns this difference is not statistically significant. Among the stability measures, only the difference between the betas of the two groups is statistically significant. The average beta for high disclosure banks is 1.11 and 0.99 for low disclosure banks. Thus, from the capital markets perspective highly transparent banks are significantly riskier than their less transparent peers. Finally, the difference between the two groups in terms of their control variables is quite apparent. Most of the differences can be explained by the much larger average size of the transparent banks, $590 billion in total assets, versus only $32.7 billion for the less transparent banks.

4.3. Pre- and post-financial crisis comparison. Test of hypothesis 4: *The degree of financial disclosure impacts how the recent financial crisis impacts a bank's market and accounting risk and performance measures*. A comparison between high and low disclosure banks is made to see how performance and stability measures change before and during the financial crisis. Table 8 shows the results of the tests. The upper portion of Panel A (Market Measures) and Panel B (Accounting Measures) tests for a statistically significant change in these measures pre- and post-crisis among the two transparency groups. The results clearly show a significant difference in all performance and stability measures before and during the crisis periods both for the most transparent and least transparent banks. Not surprisingly, during the crisis period the performance and stability of all banks deteriorated. However, the difference is much larger for the most transparent banks. For example, in the upper portion of Panel A, highly transparent banks had an average return of 11.80% before the crisis, which decreased to -32.93% during the crisis period. Similarly, in the upper portion of Panel B, the average ROE for the most transparent banks was 15.19% before the crisis but -0.16 % during the crisis.

The results in the bottom of Panels A and B compare the difference in the relevant performance measures between the two transparency groups pre- and post-crisis. The differences among all the performance and stability measures between high and low disclosure banks are not statistically significant except for beta. During the crisis period, the betas of both groups of banks increased. During the crisis period, highly transparent banks have an average beta of 1.59 (up from 0.95) and less transparent banks have an average beta of 1.34 (up from 0.88). Overall, the results show that during the crisis period banks with high disclosure levels were perceived to be riskier than banks with low disclosure levels.

4.4. Financially weak versus healthy banks. Test of hypothesis 5: *The financial health of banks impacts how the recent financial crisis affects a bank's market and accounting risk and performance measures*. To determine if there is a significant difference in the performance and stability of weak (troubled) and healthy banks, three different approaches are used. First the mean values for each group is compared and *t*-tests are employed to identify statistically significant differences. Secondly, logit regressions are run to see if the level of disclosure helps discriminate between weak and healthy banks. Finally, a regression model is used to estimate the effects of both the quantity and quality of information disclosure on bank performance and stability by including a dummy variable called "Troubled" in the regressions. The "Troubled" dummy takes on a value of 1 if the bank is listed in the troubled bank list and a value of 0, otherwise.

Table 9. Troubled and healthy banks *t*-test comparison

	Healthy banks mean	Troubled banks mean	*t*-test
Disclosure indices			
SSBI	3.11	17.05	-17.15***
DSBI	0.43	3.90	-18.59***
TSBI	3.54	20.97	-18.78***

Table 9 (cont.). Troubled and healthy banks *t*-test comparison

	Healthy banks mean	Troubled banks mean	*t*-test
TQI	0.12	0.38	-5.61***
SARI	30.20	73.99	-13.56***
DARI	0.70	9.34	-9.58***
# of Art	0.77	23.83	-10.49***
TRNS	0.01	0.13	-3.56***
QualIndex	99.41	98.91	1.04
Performance measures			
ROA (%)	1.06	1.03	0.33
ROE (%)	12.58	11.32	1.03
Risk-adjusted ROA	8.94	10.73	-2.04**
Risk-adjusted ROE	8.86	10.73	-1.91*
Stock return (%)	8.61	0.53	1.76*
Sharpe ratio	0.20	0.16	0.35
Stability measures			
Volatility of stock return (%)	31.18	30.57	0.29
Beta	1.02	1.07	-1.18
Z statistic	273.94	301.87	-1.25
Control variables			
Total assets($ in millions)	27.181	365.319	-12.29***
Risk weighted assets/Total assets (%)	76.33	84.10	-9.04***
Risk based capital ratio (%)	12.88	12.00	9.66***
Loan to deposit ratio (%)	95.55	105.46	-8.17***
Loan to assets ratio (%)	64.57	64.57	0.00
Leverage ratio	10.56	10.43	0.96
Revenue composition (%)	27.39	29.91	-2.97***
Efficiency ratio (%)	43.36	44.13	-0.91

Source: This table shows the *t*-test comparisons between troubled and healthy banks' disclosure indices, performance and stability measures and control variables. SSBI is securitization subcategory binary index, DSBI is credit derivative activities subcategory binary index, TSBI is total activities subcategory binary index, TQI is total quantitative index, SARI is securitization annual report index and DARI is credit derivative activities annual report index. # of articles is the total number of articles appeared in news, TRNS is the total number of transparency related articles appeared in news, and QualIndex is the disclosure quality index. ***, **, * indicate 1%, 5%, 10% significance levels, respectively.

Table 9 shows the results of the *t*-test comparisons. All the disclosure indices are significantly higher for the troubled banks sample. Note that due to the nature of the call report disclosure indices, higher values of disclosure index for troubled banks would also mean that these banks engage more extensively in securitization and credit derivative activities and hence disclose more information to public. Also, troubled banks have significantly more extensive financial disclosure in their annual reports and are the target of significantly more negative newspaper coverage.

Looking at the performance measures, the difference in the mean values for ROA and ROE for healthy and troubled banks is not very large and the difference is not significant. On the other hand, troubled banks have significantly higher risk-adjusted ROA and ROE values than healthy banks. However, stock returns are significantly lower for troubled banks than for healthy banks, 8.6% and 0.5%, respectively. The difference in response sensitivity may reflect the fact that the accounting measures are not as sensitive as the market measures to negative news. Note that none of the stability measures are significantly different for troubled and healthy banks. Similar to Table 8, which reported the impact of the financial crisis on the most and least transparent banks, Table 10 shows the results of the troubled and healthy banks comparison before and during the crisis period. As indicated in the upper portions of Panels A and B, performance and stability significantly decreased across both market and accounting measures for both troubled and healthy banks during the crisis period. On the other hand, the lower portion of the table indicates that differences in performance between troubled and healthy banks have widened. As indicated in Panel A, before the crisis the stock return of healthy banks (13.87%) was slightly higher than the stock return of troubled banks (11.49%), although the difference was not statistically significant. However, during the crisis period, stock return of troubled banks decreased to -31.49 %, while the returns for healthy banks only declined to -6.52 %. This difference is statistically significant. As depicted in Panel B, before the crisis the only performance measure that was significantly different for troubled

and healthy banks was risk-adjusted ROA, 13.90% versus 10.99%, respectively. However, during the crisis this difference disappears and the only performance measure that is significantly different for troubled banks and healthy banks is their ROE. During that period, the ROE of healthy banks decreased from 14.58% to 6.83%, while the ROE of troubled banks decreased from 15.12% to 0.25%.

Table 11. Logit model results

This table shows the logit regression results. SBI is securitization subcategory binary index, DBI is credit derivative activities subcategory binary index, TBI is total activities subcategory binary index, TQI is total quantitative index, SARI is securitization annual report index and DARI is credit derivative activities annual report index. Risk based capital ratio is Tier 1 + Tier 2 to total capital ratio. Leverage ratio is total debt divided by total equity and it is shown in decimals. Time period: June 2001-December 2008. Crisis period is from January 2007 to December 2008. ***, **, * indicate 1%, 5%, 10% significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Hypothesis variables						
SBI	0.318***		0.286***		0.207***	
	(0.058)		(0.045)		(0.044)	
Hypothesis variables						
DBI	-0.067		0.343***			0.008
	0.140		(0.124)			(0.122)
TBI		0.271***				
		(0.053)				
TQI	-5.345***	-4.924***	-3.470***			
	(0.902)	(1.059)	(0.596)			
SARI	-0.016*	-0.009		0.011**	-0.002	
	(0.009)	(0.008)		(0.005)	(0.006)	
DARI	0.335***	0.274***		0.306***		0.338***
	(0.065)	(0.057)		(0.057)		(0.060)
Control variables						
Bank size (log assets)	3.749***	3.371***	3.262***	3.211***	3.191***	3.126***
	(0.422)	(0.365)	(0.346)	(0.313)	(0.303)	(0.321)
Risk weighted assets/ total assets	11.311***	9.999***	9.256***	10.269***	10.898***	11.701***
	(3.110)	(2.960)	(2.624)	(2.624)	(2.549)	(2.674)
Risk based capital ratio	-0.417***	-0.405***	-0.513***	-0.373***	-0.499***	-0.349***
	(0.160)	(0.160)	(0.154)	(0.145)	(0.148)	(0.145)
Loan to deposit ratio	-1.946	-1.510	-3.994**	-2.417	-4.872**	-1.932
	(2.227)	(2.181)	(2.010)	(1.859)	(1.937)	(1.820)
Loan to asset ratio	5.269	4.982	1.938	5.816	1.149	6.267
	(4.854)	(4.62)	(4.218)	(4.164)	(3.943)	(4.127)
Leverage ratio	0.467***	0.404***	0.323***	0.244***	0.186**	0.225**
	(0.116)	(0.109)	(0.092)	(0.092)	(0.083)	(0.093)
Revenue composition	-17.867***	-17.652***	-16.559***	-15.523***	-14.141***	-14.684***
	(2.926)	(2.854)	(2.691)	(2.530)	(2.364)	(2.405)
Efficiency ratio	0.333	1.495	2.241	2.877**	1.851	2.946**
	(1.847)	(1.747)	(1.636)	(1.441)	(1.494)	(1.452)
Crisis dummy	-2.072***	-2.440***	-2.166***	-2.796***	-1.778***	-2.624***
	(0.489)	(0.481)	(0.418)	(0.426)	(0.397)	(0.422)
Number of observations	837	837	837	837	837	837
Model χ^2	859.55***	853.16***	825.274***	805.059***	795.569***	801.102***
AIC	293.48	297.86	330.08	341.97	351.46	345.93

6

To determine if the disclosure indices significantly impact a bank's probability to become a troubled bank, a logit regression was run. Table 11 shows the results of the logit models where troubled banks are assigned a value of 1 and healthy banks a value of 0. The results suggest that more information disclosed on call reports increases the probability of becoming a troubled bank. For example, the coefficient on SBI in model (1) is 0.318. Also, a more extensive discussion of credit derivative activities in a bank's annual report significantly increases the probability of being classified as a troubled bank, as the coefficient on DARI is 0.335 in model (1). However, the market appears to welcome additional information concerning securitization activities in the bank annual report as the regression coefficient is negative (-0.016) on the variable SARI. Another interesting result of the logit regressions is the negative sign of the coefficients on TQI. This index is calculated as the total dollar amount of securitization and credit derivative activities scaled by

bank size. The results show that higher TQI consisently reduces the bank's probability of being viewed as a troubled bank.

Conclusions

This study is designed to answer several important research questions: (1) How does expanded financial disclosure affect the financial performance, stability, and risk perception of the bank by market participants? (2) How do the least transparent and most transparent banks differ in terms of their performance and financial stability? (3) How do troubled and healthy banks differ in regard to their disclosure levels? and (4) How does the level of disclosure affect a bank's probability of being classified a troubled bank? The results show that much of the disclosed information was already anticipated by the market before it appeared in the Wall Street Journal since neither a bank's stock price nor its CDS/CD spreads indicated a statistically significant reaction to this information.

When high and low disclosure banks are compared, the only statistically significant difference in risk was captured in their market betas. Highly transparent banks apparently are riskier than their less transparent peers. The comparison between healthy and troubled banks indicates that troubled banks have greater levels of financial disclosure. The analysis also reveals that healthy banks have significantly higher stock returns than troubled banks. For example, during the crisis period the difference between the stock returns oftroubled and healthy banks more than doubles. While all the banks' performance and stability measures declined during the crisis period, the results show that the decline is considerably larger for troubled banks. Using a logit regression model, greater levels of securitization and credit derivative activities as reported in the bank's regulatory reports increase the probability of being a troubled bank as does the more extensive coverage of credit derivatives in the bank's annual report. On the other hand, increased discussion of securitization in the annual report reduces the probability of being a troubled bank.

The biggest challenge of this study was in separating the extent of the business activity itself and the quantity and quality of information disclosed regarding that activity. A useful further study would be one that can more clearly separate the business and disclosure effects by using a small, homogenous sample of banks that are matched by their activity level. Also, another useful direction for further research would be to use alternative measures of both the quantity and quality of information disclosure. In future studies, it might be also useful to control for bank ownership structure to observe how banks with different ownership clienteles are uniquely impact by expanded financial disclosure.

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Appendix

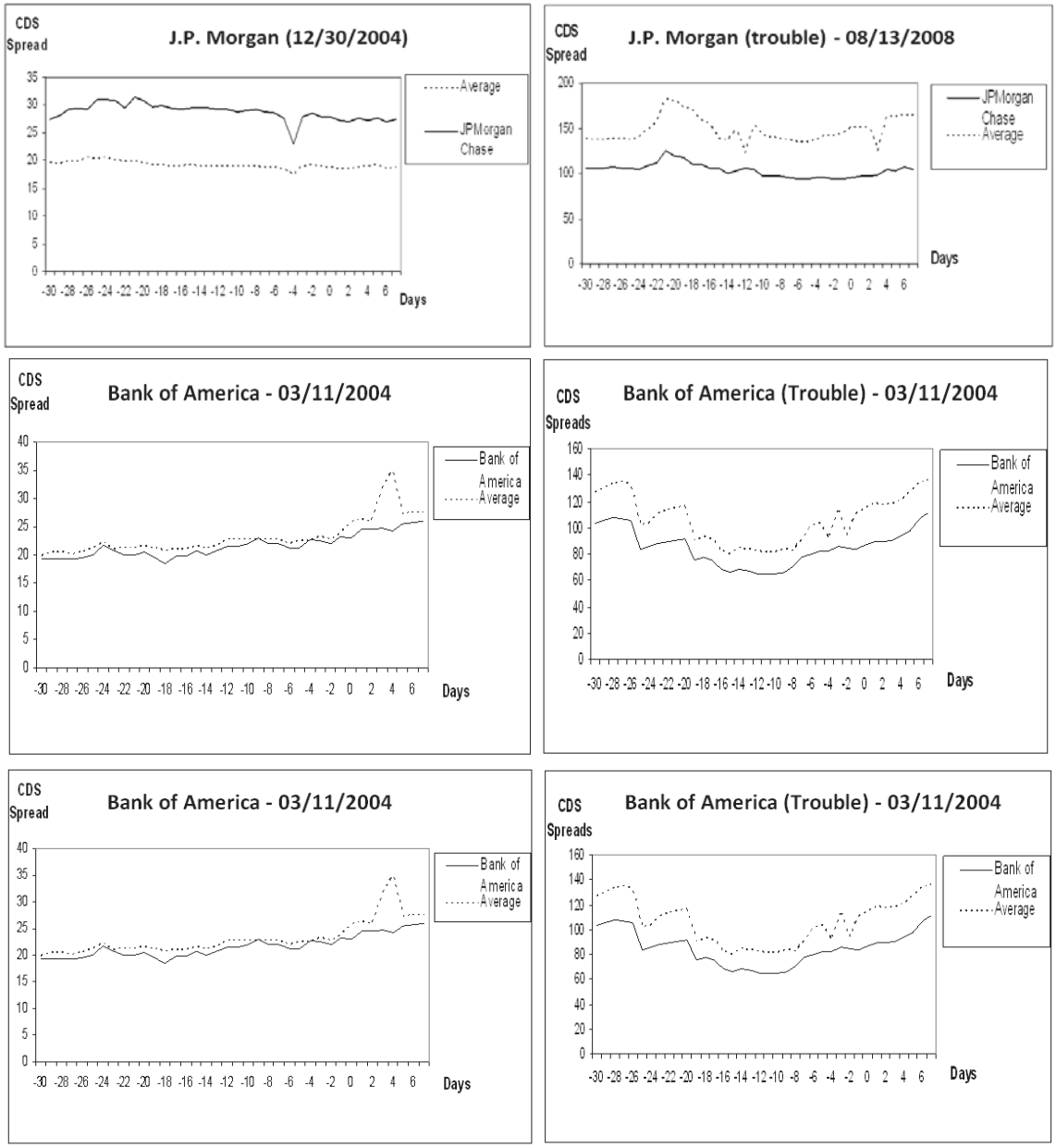

Fig. 1. CDS spreads during 2001-2008

Table 8. Most and least transparent banks *t*-test comparison before and during crisis

Panel A. Market measures												
	All BHCS				Most transparent				Least transparent			
	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis
Average beta	1.05	0.91	1.46	12.4***	1.11	0.95	1.59	-10.19***	0.99	0.88	1.34	-7.56***
Average *Z*	261.32	309.73	163.12	-6.25***	258.31	314.46	142.80	5.14***	264.30	305.01	182.89	3.69***
Average stock return	3.17	11.95	-22.42	-5.6***	0.50	11.80	-32.93	5.13***	5.83	12.11	-12.21	2.82**
Average stock volatility	30.53	21.57	56.66	13.89***	30.63	20.91	59.37	-10.70***	30.42	22.22	54.02	-8.94***
	Most transparent BHCs before crisis		Least transparent BHCs before crisis		*t*-test Most transparent/ least transparent BHCs before crisis		Most transparent BHCs during crisis		Least transparent BHCs during crisis		*t*-test most transparent/least transparent BHCs during crisis	
Average beta	0.95		0.88		1.73		1.59		1.34		3.24***	
Average Z	314.46		305.01		0.34		142.80		182.89		-1.04	
Average stock return	11.80		12.11		-0.04		-32.93		-12.21		-1.96	
Average stock volatility	20.91		22.22		-0.51		59.37		54.02		1.22	
Panel B. Accounting measures												
	All BHCS				Most transparent				Least transparent			
	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis
ROA(%)	1.00	1.23	0.32	-6.63***	0.96	1.27	0.06	6.23***	1.03	1.19	0.57	3.19***
ROE(%)	11.53	14.53	2.79	-6.58***	11.31	15.19	-0.16	6.06***	11.75	13.87	5.65	3.28***
Risk-adjusted ROA	8.76	10.85	4.51	-7.78***	9.14	11.66	3.96	6.65***	8.38	10.05	5.05	4.36***
Risk-adjusted ROE	9.14	11.15	5.05	-5.47***	9.66	11.82	5.22	4.16***	8.62	10.48	4.89	3.55***
Sharpe ratio	0.18	0.50	-0.74	-8.0***	0.17	0.54	-0.89	6.46***	0.19	0.47	-0.59	4.85***
	Most transparent BHCs before crisis		Least transparent BHCs before crisis		*t*-test most transparent/ least transparent BHCs before crisis		Most transparent BHCS during crisis		Least transparent BHCs during crisis		*t*-test most transparent/ least transparent BHCs during crisis	
ROA(%)	1.27		1.19		0.6		0.06		0.57		-2.17	
ROE(%)	15.19		13.87		0.73		-0.16		5.65		-1.89	
Risk-adjusted ROA	11.66		10.05		1.72		3.96		5.05		-0.81	
Risk-adjusted ROE	11.82		10.48		1.04		5.22		4.89		0.17	
Sharpe ratio	0.54		0.47		0.44		-0.89		-0.59		-1.11	

Source: This table shows the *t*-test comparisons between most and least transparent banks' performance and stability measures before and during crisis period. Panel A shows the significance tests for market measures and Panel B shows the significance tests for accounting measures. Time period is June 2001-December 2008. Crisis period is from January 2007 to December 2008. ***, **, * indicate 1%, 5%, 10% significance levels, respectively.

Table 10. Troubled and healthy banks *t*-test comparison before and during crisis

Panel A. Market measures												
	All BHCS				Troubled				Healthy			
	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis
Average beta	1.05	0.91	1.46	15.5***	1.06	0.91	1.52	-13.16***	1.02	0.90	1.37	-8.47***
Average *Z*	290.45	352.58	165.03	-8.45***	301.86	375.01	153.25	7.68***	273.93	319.96	181.89	3.99***
Average stock return	3.83	12.46	-21.22	-6.66***	0.53	11.49	-31.49	6.55***	8.61	13.87	-6.52	2.59*
Average stock volatility	30.82	21.55	57.71	18.12***	30.57	20.77	59.19	-14.78***	31.18	22.68	55.60	-10.56***
	Troubled BHCs before crisis		Healthy BHCs before crisis		*t*-test troubled/ healthy BHCs before crisis		Troubled BHCs during crisis		Healthy BHCs during crisis		*t*-test troubled/healthy BHCS during crisis	
Average beta	0.91		0.90		0.22		1.52		1.37		2.36†	
Average Z	375.01		319.96		2.12		153.25		181.89		-0.77	
Average stock return	11.49		13.87		-0.45		-31.49		-6.52		-2.82**	
Average stock volatility	20.77		22.68		-0.92		59.19		55.60		1.02	
Panel B. Accounting measures												
	All BHCS				Troubled				Healthy			
	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis	Full	Before crisis	During crisis	*t*-test before/ during crisis
ROA(%)	1.04	1.29	0.32	0.33	1.03	1.34	0.14	8.53***	1.06	1.23	0.59	3.80***
ROE(%)	11.84	14.90	2.96	1.03	11.32	15.12	0.25	8.74***	12.58	14.58	6.83	3.80***
Risk-adjusted ROA	10.00	12.72	4.51	-2.04**	10.73	13.90	4.28	8.66***	8.94	10.99	4.84	4.62***
Risk-adjusted ROE	9.97	12.47	4.91	-1.91*	10.73	13.47	5.17	6.518***	8.86	11.03	4.54	4.24***
Sharpe ratio	0.18	0.51	-0.79	0.35	0.16	0.53	-0.91	8.72***	0.20	0.48	-0.61	5.52***
	Troubled BHCs before crisis		Healthy BHCs before crisis		*t*-test troubled/ healthy BHCs before crisis		Troubled BHCs during crisis		Healthy BHCs during crisis		*t*-test troubled/healthy BHCs during crisis	
ROA(%)	1.34		1.23		0.96		0.14		0.59		-2.38‡	
ROE(%)	15.12		14.58		0.39		0.25		6.83		-2.87**	
Risk-adjusted ROA	13.90		10.99		2.91**		4.28		4.84		-0.39	
Risk-adjusted ROE	13.47		11.03		2.13		5.17		4.54		0.38	
Sharpe ratio	0.53		0.48		0.33		-0.91		-0.61		-1.36	

Source: This table shows the *t*-test comparisons between troubled and healthy banks' performance and stability measures before and during crisis period. Panel A shows the significance tests for market measures and Panel B shows the significance tests for accounting measures. Time period is June 2001-December 2008. Crisis period is from January 2007 to December 2008. ***, **, * indicate 1%, 5%, 10% significance levels, respectively.