Audits and Bank Failure: Which Causes Which?

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Abstract: We examine the decision of a bank to hire an external auditor and the decision of a bank regulator to close a bank. We find that audited banks fail at three times the rate of unaudited banks, but using a bivariate probit model to control for endogeneity of the audit decision, we also find that this disparity disappears once we control for differences in ex ante and ex post measures of risk. However, we find no evidence that external audit *reduces* the probability of failure, leading us to conclude that the incidence of external audit has no impact on the likelihood of bank failure. Our findings with respect to the determinants of audit and failure are generally consistent with the extant literature on these two topics.

Keywords: audit, bank, bank audit, bank regulation, bank failure, commercial bank, external audit.

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1. Introduction

Bank failures during the recent financial crisis raised questions concerning external auditing practices in the banking industry. Why, in early 2009, when the financial system teetered on the edge of meltdown, did auditor reports issued on financial institutions receiving government bailouts, including Bank of America and Citigroup, fail to contain any "red flags" when compared to the very same audit reports in 2006, at the peak of the business cycle (U.S. Senate, 2011)? Did audit inadequacies play a role in the inability of regulators to mitigate bank risk in a timely manner (Board of Governors of the Federal Reserve, 2011)? How, as a result, should audit practices "evolve" in the future (Bank of International Settlements (BIS), 2011)?

In opposition to these questions are widespread beliefs that auditors enhance market confidence, improve the quality of information relied on by banking supervisors, mitigate internal control weaknesses, identify problems unknown to supervisors and help correct them (U.S. General Accounting Office (GAO), 1989; Basel Committee of Bank Supervision (BCBS), 2008; Commercial Bank Examination Manual, 2011). Such beliefs have been confirmed, to varying degree, in studies by Dahl *et al*. (1998) and Gunther and Moore (2003) indicating that auditors affect discretionary accounting decisions in banking.

The only empirical evidence on the relationship between auditing and bank failure, to our knowledge, is Jin *et al*. (2011). These authors examine banks that are subsidiaries of holding companies for which the holding company itself--but not necessarily each bank within it--was audited to varying degree of intensity. They find that banks in holding companies audited by reputable auditors have lower probability of failure. This is consistent with their hypothesis that "high quality auditing is an important external monitoring mechanism…that likely reduces the

probability of a bank getting into trouble and subsequently failing." It also consistent with the statement of McKenna (2012) that failed banks are audited, mostly, by "the next 50-100 firms under the Big 4."

In this study, we revisit the question of auditor effects on bank failure. More specifically, we extend Jin *et al*. (2011) along an important dimension by examining failure in the context of *if* an audit was conducted at a *bank* rather *how* an audit was conducted at its *parent holding company*. This offers an interesting complement insofar as increases in auditing intensity at low, or non-existent, levels of auditor involvement may have different impacts on failure than increases in auditing intensity at high levels of auditor involvement. From this perspective, the analysis of auditor characteristics is only a second-best alternative imposed because variation in audit presence is generally unavailable (Minnis, 2011).

Empirical tests employ a bivariate probit model that jointly estimates the likelihood of a bank choosing to be audited and the likelihood of a bank subsequently being closed by regulators. We model the probability of a bank failing during the two-year period 2009 to 2011 as a function of explanatory variables reflecting bank risk measured at year-end 2008 (or earlier). Our approach is similar to that employed by Jin *et al*. (2011) and more closely follows Minnis (2011). It offers insight into why banks choose audit as well as the effects of audit on bank performance.

We use a sample of 6,246 commercial banks, of which 4,254 were audited and 1,992 were unaudited. The banks have assets less than $500 million, which is the level at which audits are uniformly mandated by regulation; only these smaller banks have latitude in choosing whether or not to have their financial statements audited.

With respect to audit choice, our results indicate that banks perceived to be less transparent—i.e., banks with assets that are characterized to a greater degree by "soft" as

opposed to "hard" information (see, among others, Minnis (2011))—are more likely to be audited. This contrasts with Jin *et al*. (2011), who find that reputable auditors avoid banks with greater "perceived" risk.[1] From their perspective, in which the choice resides with auditors rather than banks, less transparent banks have lower levels, rather than higher levels, of auditor involvement. Our perspective, on other hand, considers an audit choice that resides with banks, rather than auditors. It is consistent with a hypothesis whereby they have incentives to provide "greater assurances to investors and creditors," (Schwartz and Menon, 1985) perhaps in order to obtain "certification" benefits (see Haw *et al.*, 2008, and references therein) or in response to enhanced "incentives to commit to monitoring." (See Minnis, 2011)

We also identify a potential complementary relationship between transparency and failure; in this regard, preliminary comparisons of banks in our data show that failed banks in the financial crisis were more than three times *more* likely to be audited than unaudited. It may reflect an impact on auditing choice exerted by firms with weaker internal accounting capabilities as hypothesized by Minnis (2011). He found that auditors "harden" reported financial information within firms in a way that is useful to providers of credit to them. In his approach, the providers of credit (banks) are monitors, with the interest rate on borrowings serving as a signal of ex ante risk; in our approach, regulators are the monitors, with their declaration of failure serving to identify ex post risk.

Shifting next to the effect of audit on performance, we show that incidence of audit, after controlling for factors influencing its choice, is unassociated with failure. This contrasts with the findings of Jin *et al.* (2011) that Big-4 auditors are better able to "constrain the tendency…to engage in aggressive reporting or fraud" insofar as intensity of audit decreases the probability of

[1] Similarly, Schwartz and Menon (1985) state that bankrupt clients "may leave the auditor more vulnerable to allegations of failure to detect reporting deficiencies."

failure for bank holding companies. By focusing on the more basic question of whether bank behavior is influenced by auditors (as opposed to the question of whether bank behavior is influenced more by better auditors), we extend the debate concerning the extent to which auditors can identify, and mitigate, incipient financial problems (DeBoskey and Jian, 2012; Basel Committee of Banking Supervision (BCBS), 2008; GAO, 1989; BCBS, 2008; Commercial Bank Examination Manual, 2011; Dahl *et al*., 1998; and Gunther and Moore, 2003).

Our results are relevant to recent proposals for "strengthening the contribution of external audits to the quality of risk disclosures (BIS, 2011)" that have been made by, among others, the U.S. Treasury Advisory Committee on the Auditing Profession (2008) and the Public Accounting Oversight Board Investor Advisory Group (2011). They follow underlying premises outlined by the BCBS (2002) and statutory changes that have both decreased (Bahim, 2006) and increased (Howell and LeLand, 2011) regulatory stringency on external audits.

The rest of the paper is organized as follows. We present our Methodology and Data in Sections 2 and 3, respectively. Our results are reported in Section 4, followed by summary and conclusions in Section 6.

2. Methodology

In the U.S., bank financial statements are examined by regulatory agencies including the Federal Deposit Insurance Corp. (FDIC). One set of financial statements, required for all banks, on a bank-specific basis, is a quarterly Report of Condition and Income. These reports are filed with the Federal Financial Institutions Examination Council (FFIEC). They may, or may not, be independently audited by certified public accountants under conditions set forth in Part 363, 12 U.S.C. 1831.

External audits are required for banks with assets of more than $500 million. Although smaller banks are not required to have external audit work, they are "encouraged" by the FDIC to "adopt an external auditing program that includes an annual audit of its financial statements by an independent public accountant."

An audit constitutes "the most comprehensive level of auditing work performed for the bank by independent external auditors." The following levels are reported: (1) independent audit of the bank conducted in accordance with generally accepted auditing standards by a certified public accounting firm which submits a report on the bank; (2) independent audit of the bank's parent holding company conducted in accordance with generally accepted auditing standards by a certified public accounting firm which submits a report on the consolidated holding company (but not on the bank separately); (3) attestation on bank management's assertion on the effectiveness of the bank's internal control over financial reporting by a certified public accounting firm; (4) director's examination of the bank conducted in accordance with generally accepted auditing standards by a certified public accounting firm; (5) director's examination of the bank performed by other external auditors; (6) review of the bank's financial statements by external auditors; (7) compilation of the bank's financial statements by external auditors; (8) other audit procedures; and (9) no external audit work.

From the foregoing, we define banks in categories (1) and (2) to be externally audited and banks in all other categories as not externally audited. We designate this variable as *AUDIT_1_2*.

To analyze the influence of audit on failure, we utilize a bivariate probit methodology, which enables us to jointly model the decision by a bank regarding whether or not to be audited and the decision by regulators whether or not to close a bank. Beyond efficiency of estimation,

this methodology also enables us to control for endogeneity of bank failure with the audit choice (Wooldridge, 2002, pp. 477-478).[2]

Adopting the notation of Wooldridge (2002, pp. 477 – 478), our first equation is the regulator's closure decision:

$$FAILURE = 1\ [\mathbf{z}_1 \boldsymbol{\delta}_1 + \alpha_1 AUDIT\_1\_2 + u_1 > 0] \quad (1)$$

where *FAILURE* is equal to one if regulators closed bank *i* during year (t_1+1) , where $t_1 + 1$ = 2009, 2010 and 2011; and is equal to zero if bank *i* survived through year (t_1+1); $\boldsymbol{\delta}_1$ is a set of bank characteristics reported by bank *i* as of December in year t_1 that are expected to explain the regulator's closure decision; $\mathbf{z}_1$ is a vector of parameter estimates for bank characteristics $\boldsymbol{\delta}_1$; *AUDIT_1_2* is a dummy variable that takes on a value of one if the bank underwent an external audit at any time during 2005 – 2008; α_1 is the estimated effect of audit choice on bank failure; μ_1 is an error term; $i = 1, 2, \ldots, N$, where N is the number of banks; and year t_1 = 2008, 2009, 2010.

Our second equation is the bank's audit-choice decision for year t_2: as reported in the March Call Report of year ($t_2 + 1$):

$$AUDIT\_1\_2 = 1\ [\mathbf{z}\ \boldsymbol{\delta}_2 + v_2 > 0] \quad (2)$$

where $\boldsymbol{\delta}_2$ is a vector of bank characteristics reported by bank *i* as of December in year ($t_2 - 1$) and expected to explain the bank's audit-choice decision; $\mathbf{z}$ is a vector of parameter estimates for bank characteristics $\boldsymbol{\delta}_2$; *AUDIT_1_2* is defined as above; v_2 is an error term; and t_2 = 2004.[3]

[2] In our case, endogeneity is induced by the FDIC's imposition of audit requirements on banks through enforcement actions (see FDIC website), regulation of large banks with poor performance ratings (see Part 363) and regulation of de novo banks (Membership Application Process, Federal Reserve Bank of Boston).

[3] For example, the audit decision for 2004 is reported on the March 2005 Call Report and is matched with explanatory variables from the December 2003 Call Report.

In the bivariate probit model, the error terms u_1 and v_2 are distributed bivariate normal with mean zero and unit variance and have an estimated correlation coefficient, ρ. In the case where $\rho = 0$, *AUDIT_1_2* is exogenous in eq. (2), and can be estimated by single-equation models such as simple probit or logit; otherwise, if $\rho \neq 0$, then u_1 and v_2 are correlated, and *AUDIT_1_2* is endogenous, so that single-equation models will produce inconsistent estimates of $\boldsymbol{\delta_1}$ and α_1 (Wooldridge 2002).

Explanatory variables in eq. (1) and eq. (2) are those drawn from their balance sheets and their profit-and-loss statements that we believe are likely to influence the likelihood of a bank's failing and the likelihood of audit, respectively. Our audit equation (2) is:

$$\begin{aligned} AUDIT\_1\_2_{\,i,t} = {} & a_0 + a_1\,\mathrm{LNSIZE}_{\,i,t-1} + a_2\,\mathrm{LNAGE}_{\,i,t-1} \\ & + a_3\,\mathrm{SCORP}_{\,i,t-1} + a_4\,\mathrm{PUBLIC}_{\,i,t-1} \\ & + a_5\,\mathrm{FFE\_EXP}_{\,i,t-1} + a_6\,\mathrm{TTE}_{\,i,t-1} + a_7\,\mathrm{TLGROWTH}_{\,i,t-1} \\ & + a_8\,\mathrm{GOODWILL}_{\,i,t-1} + a_9\,\mathrm{INSIDER}_{\,i,t-1} + e_{\,i,t} \end{aligned} \qquad (3)$$

We measure our explanatory variables as of the year-end prior to the year for which the audit variable is valid (see footnote 3 for an example). Following Minnis (2011), our variables are selected on the basis of a bank's incentive to mitigate asymmetries in the information used by the bank and its regulators. The asymmetries extend, in part, from differentiated internal accounting capabilities.

LNSIZE is the natural logarithm of bank assets. Minnis (2011) states that larger firms face greater agency conflict arising within them insofar as senior managers "must rely on information from subordinates and, therefore, may desire higher levels of attestation to ensure that the financial statements upon which she is basing decisions are accurate." We hypothesize a negative coefficient on this variable. Larger banks are more likely to be audited.

LNAGE is the natural logarithm of bank age. The coefficient on this variable will be negative if younger banks rely to a greater extent on "soft" or unseasoned information and therefore seek greater attestation of financial statements. Regulatory requirements for audits of de novo banks also may have an affect (Membership Application Process, Federal Reserve Bank of Boston). We hypothesize a negative coefficient. Older banks are more likely to be audited.

We include a series of indicator variables to control for legal form of organization (LFO). Banks can be organized as either S-corporations or C-corporations. Among C-corporations, some banks choose to issue public equity. S-corporations are the simplest LFO, as these firms can issue only one class of stock and can have no more than 100 shareholders. C-corporations can have any number of shareholders and can issue different classes of stock, such as common and preferred. As such, they are more complex and less transparent than S-corporations. Within C-corporations are publicly traded C-corporations. Publicly traded C-corporations are subject to SEC and exchange disclosure regulations. Consequently, they are more transparent and have lower informational asymmetry than do privately held C-corporations. We include SCORP and PUBLIC to control for differences in LFO, with privately held C-corporations being the excluded category. We expect that both *PUBLIC* and *SCORP* firms to be more likely to choose to be audited than our omitted category of privately held C-corporations.

We include *FFE_EXP*, the ratio of furniture, fixtures and equipment expense to total assets, as a measure of agency costs. Managers of banks are notorious for perquisite consumption in the form of company cars, corporate planes, and extravagant executive offices. Consequently, the managers of such firms are expected to be less likely to choose the scrutiny of an audit, so we expect a negative coefficient on *FFE_EXP*.

We include *TTE*, the ratio of tangible common equity (total equity capital less goodwill) to total assets, to control for differences in bank leverage. Minnis (2011) states that the owner of

a highly levered firm has greater incentive to commit to monitoring. The hypothesized sign on the coefficient of TTE is negative.

TLGROWTH is the percentage growth in bank loans. Minnis (2011) states that firm growth is associated with the number of investment opportunities, which create a demand for higher quality financial information to facilitate both internal capital allocation decisions and external capital acquisition. The coefficient on this variable will be positive to the extent that growing banks have greater internal incentives for attestation of their financial statements and also, potentially, greater external incentives as well insofar audits mitigate regulatory resistance to growth strategies.

We include *GOODWILL* as an additional measure of audit complexity. Goodwill is an "intangible asset" that is booked as the difference in the market and book values of an asset. For banks, the primary source of goodwill is accounting for acquisitions of other banks. The difference in what the acquirer pays and the book value of the acquired bank's assets is credited to the acquirer's goodwill account. We expect a positive sign on the coefficient for *GOODWILL*.

INSIDER is the ratio of loans to officers and shareholders of a bank to loans. Once again, the coefficient will be positive if managers seek to mitigate informational asymmetries associated with these loans that may be "subjective" in nature.

For our failure equation (1), we follow the existing literature (see, e.g., Cole and Gunther 1995, 1998; Cole and White 2012):

$$\begin{aligned} FAILURE_{,t+1} &= a_0 + a_1\, AUDIT\_1\_2_{\,i,t} \\ &\quad + a_2\, \mathrm{TTE}_{\,i,t} + a_3\, \mathrm{LLR}_{\,i,t} + a_4\, \mathrm{NPA}_{\,i,t} + a_5\, \mathrm{ROA}_{\,i,t} + a_6\, \mathrm{SEC}_{\,i,t} \\ &\quad + a_7\, \mathrm{RECOM}_{\,i,t} + a_8\, \mathrm{RECON}_{\,i,t} + a_9\, \mathrm{BD}_{\,i,t} + e_{\,i,t} \end{aligned} \qquad (4)$$

We measure our explanatory variables for the year-end prior to the year in which we observe bank failures. *TTE* is the ratio of tangible common equity (total equity less goodwill) to

total assets. Equity is a buffer between the value of the bank's assets and the value of its liabilities, so we expect *TTE* to have a negative influence on the likelihood of failure.

LLR is the ratio of loan-loss reserves to total asset. Loan-loss reserves represent a reduction in the value of an asset (e.g., a loan) against anticipated losses, so they provide an additional buffer between the value of a bank's assets and liabilities. Consequently, we expect *LLR* to have a negative influence on bank failure.

NPA is the ratio of non-performing assets (past due loans, nonaccrual loans and foreclosed real estate) to total assets. Non-performing assets are likely to be recognized as losses in subsequent periods, so we expect *NPA* to have a positive influence on the likelihood of bank failure.

ROA is the ratio of net income to total assets. Profits feed retained earnings, which are a portion of bank equity, so more profits lead to a greater buffer between the bank's assets and liabilities. Hence, we expect *ROA* to have a negative influence on the likelihood of a bank's failing.

SEC is the ratio of securities held for investment plus securities held for sale to total assets. Securities (e.g., bonds) have traditionally been considered to be safe, low-risk and highly liquid investments for banks – especially since banks are prohibited from investing in "speculative" (i.e., "junk") bonds. The subprime mortgage debacle has shown that not all bonds that are rated as "investment grade" by the major credit rating agencies (e.g., CDOs) will necessarily remain in that category indefinitely. Nevertheless, as a general matter, we expect this category (which includes residential mortgage-backed securities) to have a negative relation with

the probability of bank failure, especially for smaller banks that generally refrained from purchasing the subprime-based RMBS that proved so toxic.

RECOM and *RECON* are the ratios of commercial real-estate mortgages to total assets and construction & development loans to total assets, respectively. These are two categories of loans for commercial real estate—such as office buildings, retail malls, and high-rise apartment buildings—that proved especially toxic during the previous banking crisis. We expect that both *RECOM* and *RECON* will be positively related to failure.

BD is the ratio of brokered deposits to total assets. These are deposits that are raised through national brokers rather than from local customers. Although there is nothing inherently wrong with a bank's deciding to raise its funds in this way, brokered deposits have traditionally been seen as a way for a bank to gather funds and grow quickly; rapid growth has often been synonymous with risky growth. Consequently, we expect *BD* to have a positive relation with failure.

4. Data

We obtain our data from two primary sources. First, we identify bank failures from the website of the FDIC, which provides a comprehensive list of each bank that has failed since 2000.[4] We focus on the crisis years of 2009 – 2011, during which almost 400 banks were closed by regulators. We create a dummy variable FAILURE that takes on a value of one if a bank was closed by regulators during 2009 – 2011 and a value of zero otherwise. There were 117 commercial banks that were closed by regulators during 2009; 151 during 2010, and 111 during

[4] See http://www.fdic.gov/bank/individual/failed/banklist.html.

2011. Another 51 banks were closed during 2012 and many more banks will fail in 2013 and beyond from the same or similar underlying causes.

One problem with defining failure based upon banks closed by regulators is the fact that banks which regulators did not close during year *t+1* could subsequently fail in years *t+2* or *t+3*.[5] To ignore these latter groups is to impose a form of right-hand censoring; but, of course, the identities of the banks in this latter group could not be known as of year *t+1*. Rather than ignore them, we follow Cole and White (2012) in estimating their identities as follows: We count as a "technical failure" any bank reporting that the sum of its total equity plus its loan-loss reserves was less than half of the value of its nonperforming assets or, more formally:

$$(TTE + LLR - 0.5 \times NPA) < 0,$$

Our "technical failure" is equivalent to book-value insolvency that would result if a bank was forced to write off half of the value of its bad loans. There were 148 such banks as of year-end 2009, 151 as of year-end 2010 and 131 as of year-end 2011. Thus, for 2009, we place 265 (= 117 + 148) in the *FAILURE* category; for 2010, we place 300 (=151 + 149) in the *FAILURE* category; and, for 2011, we place 280 (=111 + 169) in the *FAILURE* category. For robustness, we also test measure of failure based solely upon banks that actually were closed by regulators during year *t+1*, i.e., without counting the technical insolvencies as failures.

To ignore this latter group is to impose a form of right-hand censoring; but, of course, the identities of the banks in this latter group could not be known as of 2009, 2010 or 2011. Rather

[5] During 2012, the FDIC closed an additional 51 banks, and, as of Dec. 31, 2012, there were 651 banks on the FDIC's "problem bank" list of CAMELS 4- or 5-rated banks, which are considered likely to fail.

than ignore them, we follow Cole and White (2012) in estimating their identities as any bank reporting that the sum of equity plus loan loss reserves was less than half of the value of its nonperforming assets.

Second, we obtain information on external audits as well as investment and funding strategies from the Federal Financial Institutions Examination Council (FFIEC), which processes the Reports of Income and Condition for bank regulators. These reports are informally known as the "Call Reports," and are quarterly financial reports filed by each bank with its primary regulator, providing highly detailed information on the balance sheet and income statement of each bank, as well as supplemental information. Our key analysis variable comes from supplemental information about audit status, which we use to create a dummy variable indicating whether or not a bank chose to undergo an external audit, *AUDIT_1_2* as previously defined. This variable is obtained in a given year is Call Reports for March of the subsequent year. For robustness, we also use data from the March Call Reports for years *t-1*, *t-2* and *t-3*, so that our audit variable takes on a value of one if the bank reported undergoing an external audit in any year during the 2005 – 2008 period, and a value of zero otherwise. Alternatively, we construct a variable *ZEROAUDIT* that takes on a value of one if the bank did not undergo an external audit during the 2005 – 2008 period and takes on a value of zero otherwise.

This approach differs significantly from Jin *et al*. (2011) along a number of dimensions. First, we are analyzing the impact of the *incidence* of audit (i.e., audit/no audit), whereas they analyze the impact of the *intensity* of audit (i.e., audit by Big 4 firm/audit by other firm). Second, our unit of observation is at the bank level rather than at the holding company level. This means that we can more closely associate the effect of audit within the specific unit that may or may not fail.

In this regard, we avoid problems arising from the fact, in Jin *et al.* (2011), multi-bank holding companies can have subsidiary banks that may be unaudited—i.e., banks in a holding company are audited differently, or not at all, independent of the identify of auditor of the holding company itself. For instance, in 2005, Zions Bancorporation—a publicly traded bank holding company—had eight bank subsidiaries. Of these, two conducted an independent audit of the bank in accordance with generally accepted auditing standards by a certified public accounting firm which submitted a report on the bank, five conducted an independent audit of the bank's parent holding company conducted in accordance with generally accepted auditing standards by a certified public accounting firm which submitted a report on the consolidated holding company (but not on the bank separately) and one was unaudited.

5. Results

Descriptive statistics for the variables we use in equations (3) and (4) are presented in Tables 2 and 3, respectively. Results from our bivariate probit model appear in Table 4.

5.1. Descriptive Statistics for Banks by Audit Status

Table 2 presents descriptive statistics for variables used in our audit choice equation, where the dependent variable is *ZEROAUDIT*, our indicator for banks that chose not to be audited at any time during 2005 – 2008. Out of our sample of 5,568 banks, 3,630 chose to be audited at least once during 2005 – 2008, while 1,938 chose not to undergo an external audit during any of these four years. We present means and standard errors for our full sample and separately for the audited and unaudited subsamples. Finally, we calculate the difference in the means of the audited and unaudited subsamples and construct a t-statistic for this difference in means, which is shown in the last column of the table.

We find that audited banks tend to be larger (*LNSIZE* 11.48 vs. 10.92), younger (*LNAGE* 3.82 vs. 4.43) and more complex (*SCORP* 0.231 vs. 0.452; *PUBLIC* 0.142 vs. 0.007; *GOODWILL* 0.0026 vs. 0.0016), as hypothesized. Audited banks tend to incur higher expenses (*FFEEXP* 0.0044 vs. 0.0038). They also are characterized by faster growth (*TLGROWTH* 0.228 vs. 0.084) and higher concentrations of insider loans (*INSIDER* 0.016 vs. 0.011). Each of these differences in means is highly significant at better than the 0.001 level.

5.2. Descriptive Statistics for Banks by Failure Status

Table 3 presents descriptive statistics for variables used in our failure equation, where the dependent variable is *FAILURE,* an indicator for banks that failed during 2009 or were technically insolvent at the end of 2009. Out of our sample of 5,568 banks, 5,394 survived from Dec. 2008 through Dec. 2009, while 174 failed during this period or reported technical insolvency at the end of this period. We present means and standard errors for our full sample and separately for the surviving and failing subsamples. Finally, we calculate the difference in the means of the surviving and failing subsamples, and construct a *t*-statistic for this difference in means, which is shown in the last column of the table.

We find that surviving banks were three times more likely to have no audits during 2005 – 2008 than were failing firms (*ZEROAUDIT* 0.355 vs. 0.121). Among our control variables, we find that surviving banks were better capitalized (*TTE* 0.107 vs. 0.076); had better asset quality (*NPA* 0.027 vs. 0.117); were more profitable (*ROA* +71 b. p. vs. – 204 b. p.); were more liquid (*SEC* 0.214 vs. 0.107); were less exposed to commercial mortgages (*RECOM* 0.147 vs. 0.244) and to construction & development loans (*RECON* 0.058 vs. 0.193); and were less reliant upon brokered deposits for funding (*BD* 0.031 vs. 0.131). Each of these difference in means is highly significant at better than the 0.0001 level.

5.3. Bivariate Probit Results Explaining Audit Status and Failure

Table 4 presents the results from our bivariate probit model of audit choice and failure. In our audit choice equation, the dependent variable is *ZEROAUDIT*, an indicator for banks that chose not to be audited at any time during 2005 – 2008. With respect to those used in the determination of audit choice (Table 2), we find that unaudited banks tend to be smaller (*LNSIZE* negative), older (*LNAGE* positive) and less complex (*SCORP* positive, *PUBLIC* negative and *GOODWILL* negative), as hypothesized. They also are characterized by slower growth (*TLGROWTH* negative) and lower concentrations of insider loans (*INSIDER* negative). This may suggest an attempt by banks to insulate against regulatory scrutiny.

In our failure equation, the dependent variable takes on a value of one for failures and a value of zero for survivors. Our primary variable of interest is *ZEROAUDIT*. Its coefficient is positive but not significantly different from zero, indicating that audit status has no impact on the probability of failure, in contrast to the results reported by Jin *et al*. (2011).

Among our seven control variables, each one has the hypothesized sign and only *SEC* lacks statistical significance at the 0.05 level or better. Banks are more likely to fail when they are less well capitalized (*TTE* negative), have worse asset quality (*NPA* positive), are less profitable (*ROA* negative), are more exposed to commercial mortgages (*RECOM* positive) and construction & development loans (*RECON* positive), and rely more heavily upon brokered deposits (*BD* positive). These results are consistent with those reported by Cole and White (2012).

Finally, we note that the correlation coefficient ρ is negative but not significantly different from zero, indicating that *ZEROAUDIT* is exogenous in this specification. In more parsimonious specifications with fewer explanatory variables (not shown), ρ is positive, large in magnitude and

highly significant, which is consistent with the existence of omitted significant variables in both equations and a signal of endogeneity. Only when we include this full set of explanatory variables does ρ become statistically insignificant.

6. Summary and Conclusions

Our purpose has been to explain the apparent paradox by which auditors constrain risk in banks but do so within banks that, in the recent financial crisis, were more times likely to fail than audited banks. We use a sample of 5,568 commercial banks, of which 3,630 were audited and 1,938 were unaudited and of which 174 failed and 5,394 survived.

Our results indicate that larger, younger and more complex banks are more likely to be audited, and that audited banks are much more likely to fail than are unaudited banks. This latter finding is consistent with a hypothesis whereby failing firms, or firms deemed more likely to fail, have incentives to obtain "certification" benefits (see Haw *et al.*, 2008, and references therein), perhaps in response to enhanced "incentives to commit to monitoring (Minnis, 2011)."

We also show that incidence of audit, after controlling for factors influencing its choice, is unassociated with failure. This contrasts with the conclusion of Jin *et al.* (2011) that Big-4 auditors are better able to "constrain the tendency…to engage in aggressive reporting or fraud." It also contrasts with the belief that auditors can help identify, and mitigate, incipient financial problems (DeBoskey and Jiang, 2012; BCBS, 2008; GAO, 1989; BCBS, 2008; Commercial Bank Examination Manual, 2011; Dahl *et al.*, 1998; and Gunther and Moore, 2003).

Our results are subject to three qualifications. First, they should not be generalized to larger banks, for which audits are mandatory. Second, although we described incidence of audit as a bank's choice, regulators play a role as well by encouraging risky banks to undergo audits. Third, with respect to extensions outside banking, as in Minnis (2011), we note the unique

environment in which banks may be both externally audited as well as examined by regulatory authorities.

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Table 1:
Definition of Analysis Variables

Data were downloaded from the website of the Federal Reserve Bank of Chicago. All variables (except LNSIZE) are expressed as a decimal fraction of total assets.

TTE	Tangible Common Equity (RCFD3210 – RCFD3163)
LLR	Loan Loss Reserves (RCFD3123)
NPA	Non-performing Assets = SUM of (PD3089, PD90+, NonAccrual, OREO):
PD3089	Loans Past Due 30-89 Days but Still Accruing Interest (RCFD1406)
PD90+	Loans Past Due 90+ Days but Still Accruing Interest (RCFD1407)
NonAccrual	Nonaccrual Loans (RCFD1403)
OREO	Other Real Estate Owned (RCFD2150)
RESTR	Restructured Loans (RCFD1616)
ROA	Return on Assets (Net Income) (RIAD4340)
SEC	Securities Held for Investment plus Securities Available for Sale (RCFD1754, RCFD1773)
BD	Brokered Deposits (RCON2365)
RERES	Real Estate Residential Single-Family (1–4) Family Mortgages (RCON1430)
RECON	Real Estate Construction & Development Loans (RCON1415)
CRE	Commercial Real Estate Mortgages (RCON1480)
CI	Commercial & Industrial Loans (RCFD1766)
CONS	Consumer Loans (RCFD1975)
INSIDE	Insider Loans (RCFD6164)
GOODWILL	Goodwill (RCFD3163)
LNSIZE	Natural Logarithm of Total Assets (RCFD2170)
LNAGE	Natural Logarithm of Bank Age in years (2010 – Establishment Year: RSSD9950)
SCORP	S-Corporation (RIADA530)
PUBLIC	Publicly Traded (Based upon list downloaded from SNL Securities)
FFEEXP	Furniture, Fixture and Equipment Expense (RIAD4217)

Table 2:
Descriptive Statistics: Audited vs. Not Audited
Based upon 2004 Q4 financial data obtained from the U.S. FFIEC. Variables are defined in Table 1.

	All Banks			Audited Banks			Unaudited Banks			Difference in Means		
Variable	**Obs.**	**Mean**	**Std.Error**	**Obs.**	**Mean**	**Std.Error**	**Obs.**	**Mean**	**Std.Error**	**Difference**	**t-Stat**	
LNSIZE	5,568	11.29	0.01	3,630	11.48	0.01	1,938	10.92	0.02	0.56	24.7	**a**
LNAGE	5,568	4.03	0.01	3,630	3.82	0.02	1,938	4.43	0.01	-0.61	-31.3	**a**
SCORP	5,568	0.3077	0.0062	3,630	0.2306	0.0070	1,938	0.4520	0.0113	-0.2214	-16.7	**a**
PUBLIC	5,568	0.0946	0.0039	3,630	0.1416	0.0058	1,938	0.0067	0.0019	0.1349	22.2	**a**
FFE_EXP	5,568	0.0042	0.0000	3,630	0.0044	0.0001	1,938	0.0038	0.0000	0.0006	7.7	**a**
TLGROWTH	5,568	0.1782	0.0052	3,630	0.2285	0.0076	1,938	0.0841	0.0034	0.1444	17.3	**a**
GOODWILL	5,568	0.0022	0.0002	3,630	0.0026	0.0003	1,938	0.0016	0.0001	0.0010	3.4	**a**
INSIDER	5,568	0.0142	0.0002	3,630	0.0158	0.0003	1,938	0.0112	0.0003	0.0046	10.3	**a**

Table 3:
Descriptive Statistics: Failures vs. Survivors

Based upon 20084 Q4 financial data obtained from the U.S. FFIEC and failures occurring during calendar year 2009 as listed on the FDIC's website. Variables are defined in Table 1. [a] indicates statistical significance at better than the 0.01 level.

	All Banks			Surviving Banks			Failing Banks			Difference in Means		
Variable	**Obs.**	**Mean**	**Std.Err.**	**Obs.**	**Mean**	**Std.Err.**	**Obs.**	**Mean**	**Std.Err.**	**Difference**	**t-Stat**	
ZEROAUDIT	5,568	0.3481	0.0064	5,394	0.3554	0.0065	174	0.1207	0.0248	0.2347	9.1	**a**
TTE	5,568	0.1062	0.0007	5,394	0.1072	0.0007	174	0.0762	0.0021	0.0310	13.7	**a**
NPA	5,568	0.0300	0.0005	5,394	0.0272	0.0004	174	0.1170	0.0061	-0.0898	-14.7	**a**
ROA	5,568	0.0062	0.0003	5,394	0.0071	0.0003	174	-0.0204	0.0023	0.0275	11.9	**a**
SEC	5,568	0.2111	0.0020	5,394	0.2145	0.0021	174	0.1070	0.0062	0.1075	16.5	**a**
RECOM	5,568	0.1502	0.0015	5,394	0.1472	0.0015	174	0.2440	0.0092	-0.0968	-10.4	**a**
RECON	5,568	0.0627	0.0010	5,394	0.0584	0.0009	174	0.1931	0.0088	-0.1346	-15.2	**a**
BD	5,568	0.0345	0.0010	5,394	0.0314	0.0010	174	0.1305	0.0103	-0.0990	-9.6	**a**

Table 4:
Results from Bivariate Probit Model of Audit and Bank Failure

For the Audit Equation, audit status is based upon reported level of audit in the Mar. 2005 – Mar. 2008 Call Reports, while explanatory variables are based upon Call Report data reported for Dec. 2004.
For the Failure Equation, the dependent variable is based upon Failures occurring during 2009, and the explanatory variables are based upon Call Report data for Dec. 2008. Call Report data are reported to the public by the U.S. FFIEC.

Variable	Coefficient Estimate	Standard Error	t Value	Approx Pr > |t|
Audit Equation				
Intercept	3.375	0.305	11.08	<.0001
LNSIZE	-0.502	0.024	-21.07	<.0001
LNAGE	0.515	0.031	16.53	<.0001
SCORP	0.420	0.041	10.32	<.0001
PUBLIC	-1.094	0.130	-8.43	<.0001
FFE_EXP	-65.715	10.167	-6.46	<.0001
TLGROWTH	-0.356	0.084	-4.23	<.0001
GOODWILL	-5.758	2.574	-2.24	0.0253
INSIDER	-3.292	1.344	-2.45	0.0143
Failure Equation				
Intercept	-1.716	0.317	-5.41	<.0001
ZEROAUDIT	0.104	0.468	0.22	0.8238
TTE	-17.639	2.431	-7.26	<.0001
NPA	9.772	1.046	9.34	<.0001
ROA	-6.644	2.532	-2.62	0.0087
SEC	-0.165	0.552	-0.3	0.7644
RECOM	2.217	0.490	4.53	<.0001
RECON	3.309	0.579	5.71	<.0001
BD	0.972	0.421	2.31	0.0208
Correlation of error terms	-0.086	0.313	-0.27	0.7840