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An investigation of the pricing of audit services for financial institutions

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Abstract

In this paper we investigate audit pricing for financial institutions. We modify the standard audit fee model for industrial companies by incorporating measures of risk and complexity that are either unique to or more relevant for banks, and that are used by bank regulatory agencies. For a sample of 277 financial institutions in fiscal 2000, we find that audit fees are higher for banks having more transactions accounts, fewer securities as a percentage of total assets, lower levels of efficiency, and higher degrees of credit risk. Higher fees also obtain for savings institutions, for banks that are more involved in acquisition activity, and for institutions that are required by regulatory agencies to maintain higher levels of risk-adjusted capital. Our model reveals that the complexities and risks deemed most important by regulatory agencies are also those that tend to be priced by audit firms. The importance of the audit process for banks is likely to intensify in the future as regulatory changes increase the importance of market discipline in controlling bank risk-taking.

Keywords: Audit fees; Banking; Regulatory risks

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1. Introduction

Banking organizations comprise over 20% of the total public equity market capitalization in the United States. Moreover, banks are vital to the operation of our domestic economy in their role as depository institutions and lenders to both corporations and individuals. Despite the economic importance of the banking industry, however, accounting researchers have done little to investigate the various relationships that exist between banks and their auditors. We examine one such relationship—that of audit pricing—by using extensive industry-specific disclosures to determine which client-specific characteristics are the primary drivers of bank audit fees.

Our setting is relevant for a number of reasons. First, in the spirit of Beaver (1996), the setting allows us to extend the general audit fee model into a very rich institutional context. Specifically, most audit and assurance fee studies (e.g., Simunic, 1980; Francis, 1984; Defond et al., 2000; Copley and Douthett, 2002) exclude financial institutions because banks are "different." That is, although the same general theoretical constructs (size, risk, and complexity) should drive fees for all types of organizations, a number of the empirical proxies typically included in fee models—e.g., financial leverage, current or quick ratio, inventory and receivables as a percentage of total assets—are not meaningful for banks. The fee model developed in this paper incorporates numerous measures that are unique to the banking industry, thereby providing a framework within which bank audit pricing can be examined empirically.

An investigation of the relationship between bank regulatory bodies and audit firms is also important due to the high levels of litigation risk in this industry. [1] Unlike industrial companies, the litigation risks associated with bank audits stem from actions brought by both shareholders and the federal government. For example, in November of 1992 Ernst and Young was required to pay the US government $400 million—almost ten times larger than the largest previous settlement for professional firms—to settle claims related to thrift failures. According to counsel for the Office of Thrift Supervision, this ruling and others like it have effectively established "...a standard for now and the future to govern the audit of depository institutions" (Rosenblatt, 1992). Because bank auditors are subject to such extensive regulatory scrutiny, we believe that bank audit fees are likely to be tied to regulatory risks. If such ties serve to moderate the litigation risks associated with bank audits, our paper could be useful to accounting firms as they evaluate their litigation exposure in this high-risk industry.

[1] Palmrose (1988) shows that banks and savings and loans were responsible for more audit litigation cases than any other three-digit SIC code between 1960 and 1985.

Our analysis is also important to parties other than auditors. Financial institutions are primarily responsible to their respective regulatory authorities. Regulatory agencies, in turn, rely heavily on the work of external auditors as they make their evaluations of banks' financial condition. It is therefore in the interests of many different parties that bank audits emphasize factors that are important to regulators. Stated differently, an audit function that fails to adequately address important regulatory considerations would expose both bank shareholders and the public at large (as users of the banking system) to unnecessary risks. By examining the relationship between fees charged by audit firms and the primary regulatory risks that exist for banks, our paper speaks to this issue directly.

Finally, and more generally, our study is relevant because auditors are vitally important to the banking system. For example, under the Basel Committee for Banking Supervision *New Basel Capital Accord*, the assessment of capital adequacy depends partially on the market discipline that stems from increased transparency of a bank's financial condition. The audit function plays an integral role in providing this transparency. Furthermore, changes in the bank audit system that have occurred since the savings and loan crisis of the 1980s have raised questions about whether the private audit will eventually become a substitute for the public (i.e., governmental) audit. Indeed, in a number of countries—Canada, Denmark, New Zealand, Switzerland, and the United Kingdom—the role of private auditors has expanded substantially, even to the point of *replacing* public audits. Given this potentiality, the increased role of market discipline as mandated by *Basel*, and the need for reliable information at the base of the regulatory structure, it is important that we develop an understanding of the effectiveness and efficiency of the bank audit process. Our initial analysis of the determinants of bank audit fees may serve as a springboard for future research in this area.

Our tests are based on a sample of 277 banks in fiscal 2000. For these banks, our results show that audit fees are strongly related to many of the risk factors deemed important by federal regulatory agencies. We find that audit fees are higher for banks having more transaction accounts and higher degrees of credit risk and capital risk. Higher fees also obtain for institutions that are less efficient operationally and that are more heavily involved in acquisition activity, while banks with more transparent asset portfolios benefit from fee discounts. Finally, savings institutions are charged a significant premium relative to other banks. We contend that this premium likely is attributable to diseconomies of scale in the thrift audit market as well as to the prevalence of complex mortgage-related hedging strategies among these types of institutions. It is also possible, however, that premiums for S&Ls are simply holdovers from the extensive litigation associated with these organizations during the savings and loan crisis of the 1980s.

We also examine the relationship between bank audit fees and auditor industry specialization. Similar to Mayhew and Wilkins' (2003) investigation of industrial firms, we find that an economy of scale-based fee discount does obtain in the bank audit market. However, unlike industrial firm auditors, the leading bank auditors appear to be unable to use their market dominance to recapture this fee discount. One possible explanation for this finding is that dominant bank auditors price their audits more competitively than they perhaps could in order to gain access to clients with greater (and higher margin) non-audit service needs. Our analysis of the relationship between non-audit fees and audit fees for the top two bank audit firms supports this notion.

The remainder of the paper is organized as follows. In the next two sections we provide background information on bank risks and develop our test variables. In Section 4 we describe our sample and in Section 5 we present our data and empirical results. Section 6 provides concluding remarks.

2. Institutional background

Following the banking and thrift crisis of the 1980s, Congress mandated that depository institutions have an external audit performed annually by a public accounting firm. The requirement that both public and private firms in an industry have an external audit is unique to depository institutions and imposes a financial burden that is not felt by non-bank competitors. The external audit adds cost and complexity to the extensive audit requirements that are already in place for depository institutions. Specifically, in addition to the internal audit requirements that exist in this industry, the external audit requirements supplement yet another audit by examiners from the various regulatory authorities—the Office of the Controller of the Currency (OCC), the Federal Deposit Insurance Corporation (FDIC), and the Federal Reserve System (FRS) for commercial banks, and the Office of Thrift Supervision (OTS) for thrifts.

Because managers of banks and thrifts ultimately are answerable to their primary regulatory authority, it seems reasonable to suggest that the audit function should be driven by variables and ratios that these regulators consider important. Indeed, Congress has given regulators the power to close banks and thrifts if their financial condition is unsatisfactory, even if they are solvent. Moreover, the FDIC Improvement Act of 1991 established a risk-based deposit insurance system in which the cost of deposit insurance to the individual bank or thrift is based on evaluations of risk—evaluations which make extensive use of the work of external auditors. In summary, banks are subject to significant regulatory pressures and regulatory agencies rely heavily on auditors in making their evaluations of financial condition. The combination of these two factors leads us to believe that public accounting firms will (and

should) focus their audits on the factors deemed important by regulatory agencies.

The bank risk and complexity proxies we present in this paper are based primarily on the models of the FDIC and the FRS. While the agencies differ somewhat in the exact measures they emphasize, substantial commonalities exist. The FRS adopted the Uniform Bank Surveillance System in the mid-1980s in order to track the financial performance of banks. The system was structured around financial ratios that measured the capital adequacy of the bank as well as its earnings, liquidity, and loan quality. During the same period, the FDIC developed the CAEL (Capital, Asset quality, Earnings, and Liquidity) Surveillance System. [2] More recently, the FRS has developed the Financial Institutions Monitoring System (FIMS) to provide information on the financial condition of banks and thrifts. [3] The primary focus of the FIMS System is on asset quality, but the model also includes capital adequacy, earnings, and investment security ratios as well as asset growth rates.

Based upon the similarity of the variables in these different regulatory models, we focus our fee model on the following dimensions of bank risks: liquidity risk, operating risk, credit risk, capital or solvency risk, and market risk. Liquidity risk relates to the possibility that the bank cannot meet its obligations for cash through the clearing system or from its depositors. Operating risk refers to the possibility of high operating costs depleting the capital account of the bank. Banks with high operating risk will find it difficult or impossible to earn acceptable profit without taking unacceptable risk. Credit risk primarily involves the quality of the bank's assets and the probabilities of default in its loan portfolio, though credit risk may also exist in the securities portfolio. Capital risk refers to the potential that shrinkage in the value of assets will deplete the bank's equity account. Finally, market risk involves the potential for negative impact on the bank's financial viability from adverse movements in interest rates. We develop our empirical proxies for these measures below.

3. Regulatory risks and their association with audit fees

3.1. Overview

Extant theory suggests that audit fees should be a function of the size of the client, the risk of the client, and the complexity of the client's operations. It is

[2] The CAEL System is a variant of the CAMEL (Capital, Asset quality, Management, Earnings, and Liquidity) rating that is used internally by bank examiners. A sixth acronym—S—was added to CAMEL in 1997, representing Sensitivity to market risk. See Lopez (1999) for a discussion of the evolution of the CAMEL rating system.

[3] See Cole et al. (1995) for details.

important to note, however, that what are termed ''bank regulatory risks'' are likely to possess elements of both client risk and client complexity. For example, a bank could be viewed as ''risky'' because it has complex contracts with high-risk borrowers. In these and other cases it would be extremely difficult, if not impossible, to tease out the audit fee effect attributable to ''client complexity'' and the audit fee effect attributable to ''client risk.'' As a result, while we frame our empirical proxies in terms of their regulatory constructs (i.e., risks), their influence on audit fees is likely to stem from both factors (i.e., risk and complexity).

3.2. Liquidity risk

Our two primary proxies for bank liquidity risk involve transactions accounts and investment securities. Transactions accounts normally include non-interest-earning demand deposit accounts (DDAs), interest-bearing checking accounts in the form of negotiable order of withdrawal accounts (NOWs), and automatic transfer from savings (ATS) accounts. Money market deposit accounts (MMDAs) are also often included as transactions accounts, though the number of transactions is limited in these accounts. Demand deposit accounts are held by individuals, corporations and governmental entities. However, most DDAs are held by corporations because they are prohibited from holding interest-bearing NOW accounts.

Transactions accounts arise from the basic banking function of providing a means of payment to consumers and businesses. Banks with large numbers of transactions accounts necessarily have much more complex activities that are costly to perform and to monitor. Moreover, large numbers of transactions accounts are usually associated with a significant number of ATM machines and a large inventory of currency and coin, which are also costly to maintain and monitor. The Federal Reserve's functional cost analysis reported in 1999 that the direct cost of providing transactions accounts was 3.11% per year. In contrast, the direct (non-interest) cost of time deposits was only 0.42%, reflecting their much greater simplicity in processing and monitoring. Banks with a higher proportion of transactions accounts have higher liquidity risk and greater operational complexity. Therefore, these banks should have higher audit fees.

With respect to investment securities, most bank portfolios are comprised of relatively short-term, liquid instruments having reasonably stable, verifiable values. For example, corporate and foreign debt securities have made up less than 3% of the total securities portfolio of commercial banks in recent years. Fraser et al. (2001) report that about 25% of securities held by commercial banks have maturities of less than one year, while almost 40% have maturities between one and five years. Because liquidity risk is decreasing in the proportion of total assets held as securities, banks holding more securities should

have lower audit fees. Fees may also be negatively related to investment securities because the relative transparency of the asset portfolio should make the associated audit work less complicated.

3.3. Operating risk

A commonly used measure of operating risk for banking organizations is the efficiency ratio—defined as the ratio of total operating expense to total revenue (net interest income plus non-interest income). The higher the efficiency ratio (i.e., the lower the efficiency for the bank), the more difficult it is for the bank to earn a profit and thus to bolster its capital account. High efficiency ratios stem from large non-interest expenses relative to revenue generation. Typically, large non-interest expenses—principally for personnel, branches, and data processing—are associated with large volumes of transactions accounts and with a geographically diverse branch system. As such, the efficiency ratio could also be viewed as a proxy for the complexity of bank operations. We anticipate that less efficient banks should have higher audit fees, both because transaction volume and geographic dispersion should complicate the audit function and because fees should be increasing in a bank's operating risk.

3.4. Credit risk

Credit risk is the principal risk faced by most banking organizations. Our measures of bank credit risk relate to banks' loan portfolio composition and to loan quality. Commercial loans typically involve commercial and industrial loans, loans to depository institutions, acceptances issued by other banks, and obligations (other than securities) of states and political subdivisions. We also include commercial mortgage and agricultural loans in our definition of commercial loans. These loans are made for short-term working capital purposes such as to finance receivables and inventory, and for expansion of plant and equipment. Many commercial loans are extended under open lines of credit whereby the timing and the amount of the loans are determined by the actions of the borrower.

Commercial loans are complex transactions and frequently involve significant collateralization. Furthermore, the audit and evaluation of a commercial loan portfolio is difficult because the portfolio lacks transparency, thereby increasing measuring and monitoring costs. Moreover, commercial loans are increasingly syndicated. [4] For the originator and creator of the syndicate,

[4] Dennis and Mullineaux (2000) report that over $1 trillion of commercial loans were syndicated in 1997. Banks tend to syndicate larger loans from higher quality borrowers and keep smaller loans from lower quality borrowers on their own balance sheets.

issues often arise as to the potential liabilities of the originator for loans sold into the syndicate. For buyers of syndicated loans, generally smaller banks, the portfolio is appreciably more difficult to evaluate because the buying bank did not perform the primary credit evaluation for the loan. Because banks with high concentrations of commercial loans are likely to have greater credit risk and less loan portfolio transparency, we expect to find a positive relationship between audit fees and the proportion of commercial loans in an institution's total loan portfolio. This relationship is likely to be particularly important for banks having a large number of non-performing loans and/or inadequate loan loss reserves.

In recent years, losses on commercial and industrial loans have exceeded those on other types of bank loans with the exception of loans to individuals (especially credit card loans). [5] However, the credit risk associated with higher loss ratios on loans to individuals is mitigated by the very high interest rates on these loans and by their small size. Stated differently, the small size of most individual loans makes their net loss ratios as a group both small and highly predictable. In contrast, commercial loans tend to be large—in many cases, large enough that a few defaults could threaten the viability of the lending bank. Auditors associated with such banks could be exposed to significantly higher levels of litigation risk, given that one of their principal audit responsibilities is to verify the adequacy of the loan loss reserve account. In fact, failure to audit loan loss allowances in accordance with GAAS was noted as a key factor both in the Ernst and Young $400 million 1992 ruling mentioned previously and in a $187 million 1994 ruling against KPMG Peat Marwick.

Our final measure of credit risk involves residential mortgage loans. Residential mortgage loans generally involve bank loans secured by 1–4 family residences. The loans typically have very low default rates and, even in default, the loss to the bank lender is usually small. However, the growth of securitization—by which most residential mortgage loans are packaged as securities and sold to outside investors—has had a substantial effect on the risk and complexity of these loans. Loan securitization does reduce the lender's credit risk; however, banks often engage in substantial hedging strategies to mitigate the interest rate risk during the time that these loans are held prior to their packaging into portfolios. The relative lack of transparency in these hedging strategies suggests that audit effort (and hence, audit fees) should be an increasing function of the proportion of residential mortgage loans in a given institution's portfolio. Stated differently, while credit risks certainly exist in a residential mortgage loan portfolio, the complexity associated with auditing

[5] Federal Deposit Insurance Corporation, *Quarterly Banking Performance*. Fourth Quarter, 2000.

the associated hedging strategies may be the primary incremental determinant of audit fees.

3.5. Capital risk

Our main proxy for capital risk is the total risk-adjusted capital ratio, defined as the total amount of bank regulatory capital (i.e., common equity, perpetual preferred stock, loan loss reserves, and some types of subordinated debt) divided by risk-weighted assets. Banks are required to maintain a minimum risk-adjusted capital ratio of 8%. Audit fees should be increasing in the client's level of capital risk; however, the relationship between audit fees and the risk-adjusted capital ratio could conceivably be positive or negative. Practically speaking, riskier banks are often required by regulators to maintain larger regulatory capital cushions. In this instance a positive relationship would be expected between the risk-adjusted capital ratio and audit fees. However it is also reasonable to think that banks are riskier, by definition, when they have lower levels of risk-adjusted capital. As a result, although we anticipate that regulators are relatively proactive with respect to this particular measure, we do realize that a negative relationship between risk-adjusted capital and audit fees may exist.

We also include intangible assets as a proxy for capital risk, though the link is less direct than with the risk-adjusted capital ratio. Bank intangibles typically represent goodwill resulting from mergers and acquisitions. Banks with large amounts of intangible assets are likely to be more complex organizations and may also be viewed as having relatively aggressive, risk-taking management (due to their acquisition activities). Because goodwill is deducted in the calculation of regulatory capital, banks that are aggressive in their risk-taking through acquisitions may impair their capital account. In sum, intangibles combine aspects of complexity and capital risk; as a result, we expect that banks with high relative levels of intangible assets will have higher audit fees.

3.6. Market risk

A sixth measure of bank financial condition was added to the CAMEL rating system in 1997. This measure—S, for "Sensitivity" (resulting in CAMELS)—is designed to determine the extent to which the profitability of the bank and the value of its assets and liabilities are sensitive to changing market conditions. Because most of the assets and liabilities of banking organizations are fixed-rate debt instruments, the regulatory focus for this measure typically is interest rate risk. We measure interest rate risk as interest-sensitive assets minus interest-sensitive liabilities. A value of zero would indicate that the bank is perfectly matched and should experience little change in profit or asset

valuation due to interest rate changes. A positive (negative) value is indicative of an asset- (liability-) sensitive position, whereby a bank's value should increase with increasing (decreasing) interest rates. Thus, the relationship between fees and interest rate sensitivity likely will depend on a bank's exposure (asset- versus liability-sensitive) at a given point in time.

4. Data and summary statistics

Our sample consists of 277 banking organizations that reported audit fees in their 2000 fiscal year proxy statements. These organizations, which represent the banking subset of a hand-collected database of audit fees for approximately 5000 firms in fiscal 2000, include commercial banks and their holding companies as well as savings institutions and their holding companies. Due to the growing similarity among these institutions and for ease of discussion, we refer to all of the organizations in the sample as "banks."

Data for our sample of banks were collected from Sheshunoff Information Services' *Bank Source* database. Selected summary measures are presented in Table 1. Because we have a large number of variables, we restrict our discussion in the text to those that we believe are most important in establishing general firm characteristics and in making comparisons to industry-wide measures. Column 1 of Table 1 describes the summary measure and Column 2 presents the name of the associated regression variable. Our multivariate model uses logarithmic transformations of both audit fees and total assets; however, for ease of interpretation the untransformed values are presented in Table 1. Furthermore, due to the presence of a few very large organizations (e.g., Bank of America, Wells Fargo, and Bank One reported total assets at year-end 2000 of more than $250 billion) our emphasis is on median values.

Table 1 (Panel A) shows that firms in our sample range in market capitalization from roughly $7 million (First Southern Bancshares) to over $95 billion (Wells Fargo), with a median value of $132 million. Total assets have a median value of approximately $1.2 billion and median year-end deposits are $945 million. The median audit fee for the banks in our sample is $124,000, comprising roughly 2% of the absolute value of net income. Similar to the other measures, the distribution of net income across our sample firms is wide, ranging from a loss of over $500 million to a profit of over $7.5 billion. Our measure of general equity risk, the standard deviation of stock returns for one year preceding the end of the 2000 fiscal year, is commonly used in the assurance fee literature. The standard deviation of returns for our sample is much lower (median of 2.7%) than that typically documented in studies of IPO firms. This result is not surprising, of course, because established firms, particularly banks, are likely to have lower levels of equity risk than firms that have recently entered the public equity markets.

Table 1
Selected summary data for 277 bank holding companies reporting audit fees for fiscal 2000

Variable	Regression Variable	Mean	Median	Min	Max
Panel A: Financial information					
Audit fee ($ mil)	LOGFEE	0.306	0.124	0.022	13.175
Market value of equity ($ mil)	–	2013	132	7	95,181
Total assets ($ mil)	LOGASS	9537	1204	150	642,191
Total deposits ($ mil)	–	6132	945	82	364,244
Net income ($ mil)	–	109	11	−511	7517
Std. Dev. of returns (1 year)	STDRET	0.028	0.027	0.008	0.086
Transaction accounts/total deposits	TRANSACCT	0.200	0.199	0.006	0.531
Securities/total assets	SECURITIES	0.229	0.217	0.097	0.580
Efficiency ratio	EFFICIENCY	0.622	0.608	0.306	2.067
Commercial loans/gross loans	COMMLOAN	0.434	0.417	0.001	0.949
Non-performing loans/gross loans	NONPER-FORM	0.008	0.006	0.000	0.066
Net charge-offs/loan loss reserve	CHGOFF	0.181	0.139	−0.492	1.895
Mortgage loans/gross loans	MTGLOAN	0.323	0.305	0.000	0.998
Risk-adjusted capital ratio	CAPRATIO	0.136	0.125	0.081	0.540
Intangible assets/total assets	INTANG	0.009	0.004	0.000	0.071
(rate sens. assets rate-sens. Liabs)	SENSITIVE	0.060	0.040	−0.469	0.696
Audit firm	# Audits	Median audit fee ($ mil)	Median client assets ($ mil)	Median client MVE ($ mil)	
Panel B: Auditor information					
KPMG Peat Marwick	69 (25%)	0.124	1,250	141	
Ernst & Young	39 (14%)	0.250	4,611	795	
Arthur Andersen	38 (14%)	0.173	1,405	174	
PriceWaterhouseCoopers	28 (10%)	0.188	2,785	441	
Deloitte & Touche	25 (9%)	0.138	1,021	183	
Crowe & Chizek	19 (7%)	0.077	562	58	
Grant Thornton	9 (3%)	0.081	630	106	
All others	50 (18%)	0.073	449	45	

The mean and median values for the efficiency ratio—our proxy for bank operating risk—are both approximately 60%, suggesting that for the banks in our sample, roughly 60 cents of every dollar of revenue goes to pay operating expenses. The FDIC's *Quarterly Banking Profile* reported that all banks averaged an efficiency ratio of 58.4% in 2000, so our sample banks appear to be comparable to the industry as a whole. Table 1 (Panel A) also provides

information on loan portfolio composition and credit risk. Over 40% of our banks' loans are commercial loans and over 30% are mortgage loans. However, both of these measures range from roughly zero to almost 100%, indicating that distinct areas of loan specialization exist for different financial institutions. For example, roughly 41% (25%) of the loans made by the 38 thrifts in our sample are mortgage (commercial) loans, relative to only 26% (43%) for the 239 other banking organizations. Across all of our sample observations less than one percent of loans, on average, are classified as non-performing. This is a relatively low number by historical standards.

The remaining measures in Panel A are proxies for capital risk or market risk. For our 277 banks the median risk-adjusted capital ratio is 12.5%. For comparison purposes, the risk-adjusted capital ratio for all banks as of December 31, 2000, was 12.13%. The FDIC's 2000 *Quarterly Banking Profile* reported that for banks with over $10 billion in assets the ratio was 11.48%, and for smaller banks (assets of less than $100 million) the ratio was 17.44%. Assuming size is negatively correlated with risk, these summary figures suggest that higher levels of risk-adjusted capital could be indicative of pressures placed on smaller banking organizations by governmental regulatory agencies.

In Table 1 (Panel B) we break down selected data items by audit firm. Panel B reveals that KPMG has the highest audit market share (25%) in our sample, when market share is defined in terms of the number of institutions audited. However, their clients' median market capitalization is smaller than that of the other Big 5 firms and they have the lowest median audit fee as well. As a point of contrast, Ernst and Young audited 30 fewer banks but their gross audit fees of $21,443,250 were significantly higher than the $17,085,131 earned by KPMG. It is also interesting to note that 28% of the banks in our sample were audited by non-Big 5 accounting firms. While early studies involving public US companies reported comparable rates, recent work has documented non-Big 5 market share levels of only 5% to 15%. Because banks are subject to high levels of litigation risk, our findings with respect to audit market share are consistent with the contention of Simunic and Stein (1996) that increased litigation risk is likely to result in a shift from larger to smaller audit firms.

5. Fee model and results

5.1. Bank audit fee model

To date, the only fee analysis directly related to banks is by Stein et al. (1994), who investigate the determinants of fees and labor hours for 108 financial services companies. Stein et al. (1994) use survey data from 1989 to show that fees for financial institutions are related to size and operational

and reporting complexity (as defined by the auditor), as well as to the auditor's assessment of the client's assistance and internal control systems. While Stein et al.'s (1994) work is a vital first step in extending the audit fee literature to the US banking industry, it is difficult to compare to recent fee studies both because the survey data come from a single public accounting firm and because its focus on proprietary, auditor-reported measures makes it difficult to ascertain which financial characteristics drive bank audit fees. [6] Our audit fee model builds from specifications commonly used in the audit and assurance fee literature. We regress audit fees on measures of firm size, complexity and risk while controlling for industry (explicitly, given that our sample is comprised entirely of banks), time (because the sample is based on a single year of audit fees) and auditor quality. The form of the model is as follows:

$$\begin{aligned}\text{LOGFEEj} = {} & \gamma 0 + \gamma 1\text{LOGASSj} + \gamma 2\text{BIG5j} + \gamma 3\text{LOSSj} \\ & + \gamma 4\text{STDRETj} + \gamma 5\text{TRANSACCTj} \\ & + \gamma 6\text{SECURITIESj} + \gamma 7\text{EFFICIENCYj} \\ & + \gamma 8\text{COMMLOANj} + \gamma 9\text{NONPERFORMj} \\ & + \gamma 10\text{CHGOFFj} + \gamma 11\text{MTGLOANj} \\ & + \gamma 12\text{CAPRATIOj} + \gamma 13\text{INTANGj} \\ & + \gamma 14\text{SENSITIVE} + \gamma 15\text{SAVINGSj} + \varepsilon j \end{aligned} \quad (1)$$

In Eq. (1), LOGFEE is the natural logarithm of the audit fee, LOGASS is the natural logarithm of total assets, and BIG5 is an indicator variable defining firms using Big 5 auditors. Based on previous research we expect the coefficients for LOGASS and BIG5 to be positive. LOSS and STDRET are proxies for firm risk that often are used in the fee literature. LOSS is an indicator variable defining banks having net losses during the 2000 fiscal year and STDRET is the corresponding one-year standard deviation of daily stock returns. Although a positive coefficient for both variables might reasonably be expected, results from previous studies are mixed (and often insignificant).

Our test variables, which are defined both in Section 3 and in Table 1, are represented by coefficients $\gamma 5$ through $\gamma 15$. As discussed previously, higher values for TRANSACCT would be indicative of increasing organizational

[6] Stein et al. (1994) do note that, unlike industrial firms, bank audit fees are not significantly related to financial leverage. However, they do not investigate alternative, industry-specific financial proxies for risk or liquidity.

cost, complexity, and liquidity risk; therefore, $\gamma 5$ should be positive. With respect to our other measure of liquidity risk, securities are liquid assets that are also comparatively easy to value. As a result, audit risk and effort should be decreasing in SECURITIES. So that the directional predictions for this measure align with those of the other risk measures, SECURITIES is operationalized in the regression model as [1 minus (securities/total assets)]. A positive coefficient for $\gamma 6$ would therefore indicate that audit fees are higher for banks with lower relative levels of securities to total assets.

Greater operating efficiency implies lower operating risk and may also provide a signal as to the effectiveness of bank management. We expect firms that are more efficient (lower value for EFFICIENCY) to have lower audit fees. The next four variables—COMMLOAN, NONPERFORM, CHGOFF, and MTGLOAN—proxy for bank credit risk. Our earlier development suggests that audit fees should be increasing in these measures of risk. CAPRATIO and INTANG are our main proxies for capital risk. To the extent that higher values of CAPRATIO are indicative of increased regulatory pressure, we expect $\gamma 12$ to be positive. Similarly, because more complex, risk-taking banks are likely to have higher relative levels of intangible assets and because goodwill decreases banks' regulatory capital, banks with acquisition activity require greater audit effort and have higher capital risks. Therefore, the coefficient estimate for INTANG should be positive.

The final two variables in Eq. (1) are SENSITIVE and SAVINGS. Because interest rates generally were rising during 2000 (benefiting asset-sensitive banks), we expect a negative relationship between SENSITIVE and audit fees. We realize, however, that gap measures typically are noisy representations of interest rate risk; as a result, we expect the relationship between LOGFEE and SENSITIVE to be weaker than the relationship between fees and the other measures of risk and complexity. SAVINGS is an indicator variable that takes a value of 1 if the firm is a thrift or savings institution and 0 otherwise. While commercial banks and thrifts have grown much more alike in recent years and perform similar deposit-taking and lending functions, thrifts tend to be more focused on residential real estate lending. The substantial hedging associated with the securitization of residential mortgage loans creates significant valuation issues both internally for managers and externally for auditors. We anticipate that these complexities should increase audit costs. Furthermore, thrifts are both smaller and less widespread than commercial banks and, historically, have been subject to greater litigation risks. [7] For all of these reasons we expect a positive coefficient for SAVINGS.

[7] The FDIC reported that there were 8315 commercial banks and only 1590 thrifts (*Historical Statistics on Banking*) as of the end of 2000.

5.2. Initial results

We report the results from estimating Equation (1) in Table 2. In almost every case the coefficient estimates are both statistically significant and of the

Table 2
Audit fee model for 277 banks at fiscal year-end 2000

Variable	Expected sign	Coefficient estimate	*t*-Statistics
INTERCEPT	+	2.4761	5.97**
LOGASS	+	0.5265	30.00*
BIG5	+	0.2229	4.51**
LOSS	+	0.0139	0.10
STDRET	+	0.4349	0.18
TRANSACCT	+	0.0045	2.02*
SECURITIES	+	0.6978	3.06**
EFFICIENCY	+	0.0066	3.57**
COMMLOAN	+	0.0071	3.87**
NONPERFORM	+	0.0800	2.34**
CHGOFF	+	0.0018	1.69*
MTGLOAN	+	0.0036	2.01**
CAPRATIO	+	0.0088	1.79*
INTANG	+	0.0791	3.94**
SENSITIVE	−	−0.0007	−0.49
SAVINGS	+	0.1575	2.52**
Adjusted *R*-square	**0.877**		

$LOGFEEj = \gamma 0 + \gamma 1LOGASSj + \gamma 2BIG5j + \gamma 3LOSSj + \gamma 4STDRETj + \gamma 5TRANSACCTj + \gamma 6SECURITIESj + \gamma 7EFFICIENCYj + \gamma 8COMMLOANj + \gamma 9NONPERFORMj + \gamma 10CHGOFFj + \gamma 11MTGLOANj + \gamma 12CAPRATIOj + \gamma 13INTANGj + \gamma 14SENSITIVEj + \gamma 15SAVINGSj + \varepsilon j.$

Because directional predictions are made, *p*-values are one-tailed; **, * denote $p < 0.01$, <0.05, respectively.

LOGFEE = logarithm of audit fee.
LOGASS = logarithm of total assets.
BIG5 = 1 if auditor is a Big 5 accounting firm, = 0 otherwise.
LOSS = 1 if bank had a net loss for the year, = 0 otherwise.
STDRET = standard deviation of daily returns for 250 trading days preceding fiscal year-end.
TRANSACCT = total transaction accounts/total deposits.
SECURITIES = [1 − (total securities/total assets)].
EFFICIENCY = efficiency ratio (total operating expenses/total revenue).
COMMLOAN = total commercial and agricultural loans/gross loans.
NONPERFORM = nonperforming loans/gross loans.
CHGOFF = net charge-offs/loan loss reserve.
MTGLOAN = total domestic real estate and home equity loans/gross loans.
CAPRATIO = total risk-adjusted capital ratio.
INTANG = intangible assets/total assets.
SENSITIVE = rate-sensitive assets minus rate-sensitive liabilities.
SAVINGS = 1 if organization is a savings institution, = 0 otherwise.

expected sign. [8] Consistent with studies involving industrial companies, fees are higher for large firms and are higher if the auditor is a Big 5 firm. We also find that both of our industry-specific measures of liquidity risk are statistically significant. TRANSACCT is positively related to audit fees, indicating that firms with a greater proportion of transaction accounts require more attention from auditors. The positive relationship between audit fees and SECURITIES (again, where SECURITIES is defined as 1 minus securities/assets) is consistent with banks charging more to audit banks that have less liquid, less transparent asset portfolios.

Our proxy for operating risk, EFFICIENCY, is positive and statistically significant, as are our proxies for loan complexity and credit risk. Audit fees are increasing in both commercial loans (COMMLOAN) and residential mortgage loans (MTGLOAN). Both of these findings are consistent with the contention of Khurana and Kim (2003) that loans involve a relatively large amount of subjectivity (and hence more audit attention) with respect to determining fair value. The coefficient estimates for NONPERFORM and CHGOFF are positive and significant as well, indicating that auditors demand more from banks that have lower quality loan portfolios. Given that loan-related issues were cited as a primary factor in the two major rulings mentioned earlier in the paper, the importance of these variables in our fee model may be indicative of audit firms' concerns regarding potential litigation.

The final four variables in Eq. (1) are CAPRATIO, INTANG, SENSITIVE and SAVINGS. The coefficient estimate for SENSITIVE is not statistically significant; therefore, auditors do not appear to price bank market risks. An alternative explanation, as mentioned previously, is that interest rate sensitivity disclosures simply do not adequately capture banks' market risks. Table 2 does reveal a positive, significant relation between the risk-adjust capital ratio (CAPRATIO) and audit fees. This finding indicates that auditors charge more to audit banks that are required by regulators to maintain higher levels of regulatory capital. The significant positive coefficient estimate for INTANG suggests that a premium is charged for audits of banks that have a history of acquisition activity. Finally, the coefficient estimate for SAVINGS reveals a significant premium for audits of savings institutions. [9] We contend that diseconomies of scale, hedging, and litigation issues are likely to be responsible for this premium.

[8] With respect to regression diagnostics, there is no evidence of problematic multicollinearity or heteroskedasticity. The largest variance inflation factor is 2.83 and the *p*-value for the presence of heteroskedasticity is 0.75. When we use *t*-statistics adjusted in the manner of White (1980), our results are not qualitatively different than those presented in Table 2. Furthermore, there is no evidence of non-normality in the residuals.

[9] There are 38 savings and loan institutions in our sample (14% of total observations). Our results do not change when we eliminate these observations from the model.

In summary, our findings suggest that of the factors included in monitoring systems developed by federal regulatory agencies—namely liquidity risk, operating risk, credit risk, capital risk, and market risk—all except market risk are reflected in fees charged by bank auditors. The explanatory power of our model is also higher (adjusted r-square = 88%) than that which typically is reported in the fee literature, suggesting that the presence of significant regulatory pressures may strengthen the association between fees and client-specific risks. Finally, the economic magnitude of the audit pricing effects stemming from these risk factors is non-trivial. For example, the regression model presented in Table 1 would predict an audit fee of $125,584 for a bank that (a) is not a savings institution, (b) has a Big 5 auditor, (c) has positive earnings, and (d) reports the median value of all other independent variables. Holding all other factors constant, a mere 10% increase in the nine significant bank risk factors would increase the predicted audit fee by over 18%, to roughly $148,600. If the bank were a savings institution as well, the predicted fee would rise to almost $174,000. These increases from the baseline audit fee for the "median bank" illustrate the economic significance of bank risks in audit pricing.

5.3. Large versus small banks

Large banks typically have much more complex financial profiles and more sources of liquidity than small banks as well as considerably different risk profiles. For example, Demsetz and Strahan (1997) show that large bank holding companies are allowed to operate with lower capital ratios and typically engage in more risky activities. These and other factors suggest that the pricing of bank audits may differ, based on the size of the institution. In Table 3 we presents results from estimating the basic model separately for "large" and "small" banks. Our size distinction is determined by whether the bank has total assets above or below the median level (approximately $1.2 billion) for the entire sample. [10]

Table 3 shows that a few items—size, audit quality, operating efficiency, and commercial loans—are priced comparably for both large and small banks. However, several important differences obtain as well. For example, mortgage loans and intangible assets positively impact fees at large banks but not at small banks. We conjecture that these relationships may simply reflect the

[10] As in our full sample model, there is no evidence of problematic multicollinearity, heteroskedasticlty, or non-normality in either the small bank subsample or the large bank subsample. The largest Variance Inflation Factor for the small (large) bank subsample is 4.71 (2.21). The p-values for tests of heteroskedasticlty and non-normality for small (large) banks are 0.62 (0.52) and 0.64 (0.95), respectively.

Table 3
Audit fee model results for above-median asset versus below-median asset banks

Variable	Expected sign	Above-median		Below-median	
		Asset banks	*t*-Statistics	Asset banks	*t*-Statistics
INTERCEPT	+	1.7064	2.77**	2.8401	3.04**
LOGASS	+	0.5697	18.31**	0.5238	9.51**
BIG5	+	0.3026	3.10**	0.2012	3.56**
LOSS	+	−0.0574	−0.28	0.1479	0.59
STDRET	+	8.4414	1.68*	−2.3729	−0.83
TRANSACCT	+	0.0087	2.60**	−0.0001	−0.01
SECURITIES	+	0.2797	0.78	0.6556	2.12*
EFFICIENCY	+	0.0061	2.44**	0.0081	2.44**
COMMLOAN	+	0.0081	3.10**	0.0052	1.85*
NONPERFORM	+	0.1145	1.60#	0.0561	1.43#
CHGOFF	+	−0.0003	−0.17	0.0033	2.01*
MTGLOAN	+	0.0055	2.33*	0.0009	0.32
CAPRATIO	+	0.0062	0.73	0.0095	1.50#
INTANG	+	0.1027	3.54**	0.0504	1.65*
SENSITIVE	?	−0.0024	−0.96	−0.0006	−0.36
SAVINGS	+	0.1464	1.45#	0.1414	2.09*
Adjusted *R*-square		**0.857**		**0.536**	

LOGFEEj = γ0 + γ1LOGASSj + γ2BIG5j + γ3LOSSj + γ4STDRETj + γ5TRANSACCTj + γ6SECURITIESj + γ7EFFICIENCYj + γ8COMMLOANj + γ9NONPERFORMj + γ10CHGOFFj + γ11MTGLOANj + γ12CAPRATIOj + γ13INTANGj + γ14SENSITIVEj + γ15SAVINGSj + εj.
Because directional predictions are made, *p*-values are one-tailed; **, *, # denote $p < 0.01$, <0.05, <0.10, respectively.
LOGFEE = logarithm of audit fee.
LOGASS = logarithm of total assets.
BIG5 = 1 if auditor is a Big 5 accounting firm, = 0 otherwise.
LOSS = 1 if bank had a net loss for the year, = 0 otherwise.
STDRET = standard deviation of daily returns for 250 trading days preceding fiscal year-end.
TRANSACCT = total transaction accounts/total deposits.
SECURITIES = [1 − (total securities/total assets)].
EFFICIENCY = efficiency ratio (total operating expenses/total revenue).
COMMLOAN = total commercial and agricultural loans/gross loans.
NONPERFORM = nonperforming loans/gross loans.
CHGOFF = net charge-offs/loan loss reserve.
MTGLOAN = total domestic real estate and home equity loans/gross loans.
CAPRATIO = total risk-adjusted capital ratio.
INTANG = intangible assets/total assets.
SENSITIVE = rate-sensitive assets minus rate-sensitive liabilities.
SAVINGS = 1 if organization is a savings institution, = 0 otherwise.

greater amount of audit effort required in evaluating the loan portfolios and M&A activities of larger, more complex institutions. The finding with respect to intangibles is also consistent with auditors pricing litigation risks more aggressively for larger banks, as "improper accounting" for mergers and

acquisitions was one of the primary drivers in the landmark rulings against Ernst and Young and KPMG Peat Marwick.

CAPRATIO is marginally significant ($p < 0.07$) in the small bank subsample but is not significant in the large bank subsample. The significance of CAPRATIO suggests that audit firms charge fee premiums for smaller institutions that are forced by regulatory agencies to maintain higher levels of risk-adjusted capital, but that such premiums do not exist among large banks. Again, this result is consistent with Demsetz and Strahan (1997), who suggest that regulators allow large banks to operate with lower capital ratios. With respect to SAVINGS, almost 60% of the savings institutions in the overall sample are included in the small bank subsample. Therefore, the fact that SAVINGS is only marginally significant ($p < 0.07$) in the large bank subsample may simply be a question of statistical power.

Finally, our measures of liquidity risk differ substantially for small versus large banks. The volume of transactions accounts (TRANSACCT) is significantly and positively related to audit fees for the large bank subsample, but not for the small bank subsample. This finding is intuitively appealing given the much greater scale and complexity (both geographically and within the organizational structure) of large banks. With respect to SECURITIES, smaller banks rely principally on securities to meet their liquidity needs while large banks have many more options (e.g., through liability management techniques, such as purchases of federal funds). As a result, the SECURITIES variable likely is a cleaner proxy for liquidity risk for small banks than for large banks. Our finding of a significant positive coefficient for SECURITIES in the small bank sample but not in the large bank sample is consistent with this notion.

5.4. Factor analysis of bank risks

In Section 3 we defined and developed five primary risks that are viewed as important by bank regulatory agencies. The models presented in Tables 2 and 3 incorporate ten different measures in an attempt to proxy for these risks. Because there is likely to be some degree of overlap both across the different risk categories and between the variables we use within these categories, we used factor analysis in an attempt to identify, empirically, the commonalities that do exist.

Table 4 (Panel A) presents the standardized scoring coefficients associated with each of the four factors retained by the analysis. [11] None of our risk proxies loads on more than one factor, and only one (EFFICIENCY) does not load on any factor. We label Factor 1 "loan mix" as it loads exclusively on the relative amounts of home mortgage loans and commercial loans in banks'

[11] Estimates are based on the varimax orthogonal rotation method.

Table 4
Factor analysis and revised bank audit fee model

Variable	Factor 1 "Loan mix"	Factor 2 "Capital risk"	Factor 3 "Loan quality"	Factor 4 "Interest-rate risk"
Panel A: Standardized scoring coefficients for bank risk variables				
TRANSACCT	0.116	−0.106	0.072	**0.648**
SECURITIES	0.048	**0.512**	−0.128	0.158
EFFICIENCY	0.142	0.190	0.228	0.120
COMMLOAN	**−0.457**	−0.089	−0.004	0.016
NONPERFORM	−0.036	−0.154	**0.606**	−0.010
CHGOFF	−0.022	−0.009	**0.498**	0.010
MTGLOAN	**0.489**	−0.007	−0.041	0.052
CAPRATIO	0.238	**−0.433**	0.041	0.273
INTANG	0.070	**0.372**	−0.008	−0.050
SENSITIVE	−0.061	0.068	−0.041	**0.491**

Panel B: Regression model with factors included

$LOGFEEj = \gamma 0 + \gamma 1LOGASSj + \gamma 2BIG5j + \gamma 3LOSSj + \gamma 4STDRETj + \gamma 5SAVINGSj + \gamma 6LOANMIXj + \gamma 7CAPITALRISKj + \gamma 8LOANQUALj + \gamma 9RATERISKj + \varepsilon j$

	Coefficient estimate	*t*-Statistics
INTERCEPT	4.4583	18.95**
LOGASS	0.5103	32.41**
BIG5	0.2077	4.03**
LOSS	0.1090	0.80
STDRET	0.2576	0.10
SAVINGS	0.1627	2.48**
LOANMIX (Factor 1)	−0.0051	−0.23
CAPITALRISK (Factor 2)	0.1064	4.70**
LOANQUAL (Factor 3)	0.1123	4.75**
RATERISK (Factor 4)	0.0736	3.43**
Adjusted *R*-square	**0.863**	

**Denotes $p < 0.01$.
Variables are as defined in Tables 2 and 3. Bold print is used in Panel A to highlight coefficients that are significant (in excess of 0.30).

portfolios. The second factor loads most heavily on SECURITIES, CAPRATIO and INTANG. The latter two factors are our primary measures of capital risk; further, investment securities are one of the major determinants of the risk-adjusted capital ratio. As a result, we label the second factor "capital risk." Factor three is labeled "loan quality" because it loads on NONPERFORM and CHARGEOFF. Our final factor loads on SENSITIVE and TRANSACCT. We label this factor "interest rate risk" because SENSITIVE provides one definition of a bank's maturity gap and because the proportion of transaction accounts relative to other funding sources has a significant impact on gap calculations.

In Table 4 (Panel B) we replace our ten risk proxies with the four factors described above. The loan mix factor does not appear to be important in an audit pricing framework. However, audit fees are significantly related to capital risk, loan quality and interest rate risk. The fit of this model is comparable (0.863) to that of the model presented in Table 2 (0.877), and the significance levels of the remaining variables—LOGASS, BIG5, STDRET, LOSS and SAVINGS—are directly comparable as well. Overall, our factor analysis allows for the development of a more parsimonious model of the manner in which accounting firms price bank audits. It is also worth noting, however, that a number of distinct factors are priced (not just a single generic "risk" factor), and that the underlying components are consistent with the focus of regulatory agencies.

5.5. Auditor industry specialisation

Mayhew and Wilkins' (2003) analysis of IPO accounting fees shows that, due to economies of scale, fees in general are decreasing in audit market share. However, in industries where a "differentiated" auditor exists, that auditor is able to recapture the economy of scale-based discount and earn a relative premium for its services. [12] To test for these effects in the banking industry, we calculated the percentage of total sample bank assets audited by each accounting firm to supplement the percentage of sample banks audited. [13] We then included these two market share measures, alternatively, in our regression model, as well as an indicator variable defining the differentiated audit firm in the banking industry. If the findings of Mayhew and Wilkins (2003) hold for financial institutions, the coefficient for the market share measure should be negative and the coefficient defining the differentiated audit firm should be positive.

The estimation of this revised model requires identification of the banking industry's "differentiated" audit firm. Table 1 (Panel A) shows that KPMG audited 25% of the banks in our sample and had a clear market share lead based on that metric. However, KPMG audited only 16.1% of the total sample assets, while PWC and Ernst and Young had asset-based market shares of 34.4% and 25.4%, respectively. As a result, it is not immediately clear which audit firm, if any, is truly "differentiated" in the banking industry. We therefore estimated the model twice with KPMG and PWC defined, alternatively,

[12] To be classified as the differentiated auditor in an industry, Mayhew and Wilkins (2003) require the audit firm to have the largest market share in the industry and to have a market share lead of at least ten percentage points over its closest audit competitor.

[13] Although these values are only rough estimates of audit market share in the banking industry, they are superior to the measures that could be calculated from Compustat, as the "auditor" field in Compustat is missing for a vast majority of financial institutions. We also used proportion of total audit fees (for banks in our sample) as a measure of market share with no difference in results.

as the differentiated audit firm. These two models are shown in the first two columns of Table 5.

When we define the differentiated audit firm in terms of the number of banks audited, the audit market share measure (NUMPCT) is negative and marginally significant ($p < 0.10$). The audit market share measure is negative and more significant ($p < 0.06$) when we define the differentiated auditor in terms of the proportion of total assets audited (ASSETPCT). These results generally support Mayhew and Wilkins' (2003) analysis of IPO fees for industrial firms, in that audit economies of scale seem to give rise to a negative relationship

Table 5
Industry specialization, non-audit services and bank audit fees

Variable	Expected sign	Model 1		Model 2		Model 3	
		Coefficient	*t*-Statistics	Coefficient	*t*-Statistics	Coefficient	*t*-Statistics
INTERCEPT	+	2.2206	5.08**	2.4425	5.84**	2.2710	5.28**
LOGASS	+	0.5397	28.88**	0.5295	29.56**	0.5410	27.93**
BIG5	+	0.3635	3.09**	0.3105	3.99**	0.2199	4.46**
LOSS	+	−0.0247	−0.16	−0.0046	−0.03	0.0070	0.05
STDRET	+	1.7920	0.70	0.2044	0.08	0.9990	0.41
TRANSACCT	+	0.0040	1.90*	0.0042	1.91*	0.0045	2.03*
SECURITIES	+	0.6588	2.76**	0.7006	3.06**	0.7078	3.11**
EFFICIENCY	+	0.0071	3.68**	0.0067	3.62**	0.0067	3.66**
COMMLOAN	+	0.0077	4.01**	0.0070	3.78**	0.0071	3.86**
NONPERFORM	+	0.0668	1.87*	0.0818	2.37**	0.0806	2.37**
CHGOFF	+	0.0021	1.84*	0.0018	1.65*	0.0017	1.56#
MTGLOAN	+	0.0041	2.19*	0.0037	2.10*	0.0036	2.02*
CAPRATIO	+	0.0103	2.01*	0.0085	1.74*	0.0091	1.88*
INTANG	+	0.0829	3.95**	0.0830	4.09**	0.0775	3.87**
SENSITIVE	−	−0.0003	−0.23	−0.0006	−0.42	−0.0007	−0.50
SAVINGS	+	0.1576	2.40**	0.1486	2.37**	0.1554	2.50**
NUMPCT	−	−1.4086	1.30#	–	–	–	–
ASSETPCT	−	–	–	−0.4499	1.56#	–	–
SPECIALIST	+	0.1719	1.15	−0.0194	−0.37	–	–
NONAUDIT	−	–	–	–	–	−0.0248	1.74*
Adjusted *R*-square		**0.876**		**0.877**		**0.878**	

Because directional predictions are made, *p*-values are one-tailed; **, *, # denote $p < 0.01$, <0.05 and <0.10, respectively.
NUMPCT = proportion of sample banks audited by audit firm.
ASSETPCT = proportion of sample bank assets audited by audit firm.
SPECIALIST = 1 if audit firm is industry leader based on NUMPCT (Model 1) or ASSETPCT (Model 2), = 0 otherwise.
NONAUDIT = non-audit fees/audit fees.
All other variables are as defined in Tables 2 and 3.

between audit fees and audit firm market share. However, unlike Mayhew and Wilkins (2003), the insignificance of SPECIALIST in both models suggests that differentiated bank auditors are not able to recapture their economy of scale-based discount. We contend that the fact that KPMG dominates the industry in terms of number of clients while PWC is the leader in total assets audited prevents either firm from earning economic rents on the audit services they provide. This explanation is generally consistent with Pearson and Trompeter's (1994) analysis of audits in the insurance industry.

5.6. Non-audit fees

Another possible explanation for the inability of KPMG or PWC to earn an audit fee premium is that differentiated auditors may price their audits relatively more competitively in order to gain access to more lucrative services. To test this possibility, we calculated the ratio of non-audit fees to audit fees for each sample bank and compared the median values across audit firms. For Arthur Andersen, Deloitte and Touche, and Ernst and Young, the median values of this ratio were 0.471, 0.365, and 0.564, respectively. For KPMG and PWC, the numbers were significantly higher—1.072 and 1.834. Taken in combination with the findings presented in Section 5.5, these results are consistent with the two industry-leading audit firms focusing on clients with greater demands for non-audit services, and pricing their audit services very competitively in order to capture the higher margins associated with non-audit work.

As a final test of the importance of the provision of non-audit services in the banking industry, we added the ratio of non-audit fees to audit fees to equation (1) and re-estimated the model. These findings are presented in the last column of Table 5. Although our univariate analysis suggests that industry-leading audit firms—by virtue of the fact that they have the highest levels of non-audit fee income—are likely to price their audits competitively, we expect that all banks will discount their audit fees for clients with large non-audit service demands. Consistent with this expectation, we find that the coefficient for the non-audit fee ratio is negative and significant ($p < 0.04$). Furthermore, the measure remains significant when KPMG and PWC clients are removed from the model. [14] These findings suggest that, across auditors, significant audit fee discounts do exist when non-audit service revenues are high. The two leading audit firms, however, seem to have been the most successful at maintaining a client base that maximizes non-audit fee revenue.

[14] The coefficient for NONAUDIT also remains significant when SPECIALIST and either NUMPCT or ASSETPCT is included in the model.

6. Concluding remarks

In this paper we use extensive industry-specific disclosures to determine which client characteristics are the primary drivers of bank audit fees. This setting is relevant both because it allows us to extend the general audit fee model into a very rich institutional context and because it allows us to investigate the extent to which bank audits are priced in accordance with federal regulatory monitoring systems. Our findings indicate that audit fees are higher for banks having more transaction accounts, fewer securities as a percentage of total assets, higher efficiency ratios (i.e., less efficient banks), and higher degrees of credit risk. Higher fees also obtain for institutions that have higher risk-adjusted capital ratios and more intangible assets, as well as for savings institutions. Although effort and billable hours are unobservable in our context, our findings with respect to fees are consistent with audit firms allocating resources to areas documented as important by regulatory agencies.

We also find that no single audit firm truly dominates the banking industry. As a result, the top bank auditors are unable to earn a fee premium for their presumably specialized services. An alternative viewpoint is that industry-leading audit firms may forego an "audit specialization premium" in order to gain access to clients with greater (and higher margin) non-audit service demands. Our finding that the two leading audit firms have clients with the highest ratios of non-audit fees to audit fees supports this notion.

While our results provide significant insights into the variables that determine audit fees at the individual bank and industry level, they also have important policy implications. First, accounting firms that are not devoting sufficient resources to audits of issues viewed as important by regulators may wish to re-evaluate their procedures. A close tie with the internal audit function and with the preferences of bank examiners would seem to mitigate the extensive litigation risks that exist in the banking industry. Additionally, regulators rely heavily on external auditors as they make their evaluations of banks' financial condition. Given the cost savings and general efficiencies that should exist if auditors align their processes with those of internal auditors and bank examiners, bank managers may wish to suggest that their audit committees encourage such an alignment. A better mapping between these two functions would also seem to benefit both bank shareholders and the public at large, to the extent that it reduces the likelihood of loss stemming from regulatory action.

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