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Brett Cantrell
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will discuss

"Bank Managerial Ability and Accounting: Do Better Managers Report Higher Quality Loan Loss Reserves and Fair Values?"

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Bank Managerial Ability and Accounting:
Do Better Managers Report Higher Quality Loan Loss Reserves and Fair Values?

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ABSTRACT

Given the high level of scrutiny on top executives in recent years, particularly those at banks, examining the impact of bank managers' ability on financial reporting is of great value. This paper builds on models of bank efficiency in the banking literature to derive a measure of bank managerial ability, and examines how bank managerial ability impacts the quality of accounting information related to unique bank accounting issues. I find evidence that higher ability managers report more predictive accounting estimates for the allowance for loan losses and fair values of securities. Additionally, I identify two settings that affect the strength of the relation between bank managerial ability and accounting quality, the Financial Crisis and when capital ratios are binding. The relation is stronger during the recent Financial Crisis but is attenuated when capital ratios are binding. These findings should be of interest to investors, standard setters, and particularly bank regulators tasked with monitoring the stability of banks.

1. INTRODUCTION

The Financial Crisis of 2007-2009 brought bank performance and bank financial reporting to the forefront of public attention. Given the high level of scrutiny on top executives in recent years, particularly those at banks, examining the impact of bank managers' ability on bank performance and financial reporting is of great value. This paper builds on models of bank efficiency in the banking literature to derive a measure of bank managerial ability (hereafter BMA), and examines how BMA impacts the quality of accounting information related to unique bank accounting issues. I examine two questions surrounding critical accounting issues at banks: 1) Do higher ability managers provide higher quality accounting for loan loss reserves and fair values? 2) What settings strengthen or diminish the relation?

Loans and securities make up the vast majority of bank assets (on average 89% in my sample). Losses in the lending and securities portfolios are the primary cause for the capital deterioration that led to bank failures during the recent Financial Crisis (Cullen, 2012). Losses from loans or securities not only affect the individual banks experiencing those losses, but can also have far-reaching and serious negative consequences for liquidity throughout the whole economy (Ivashina and Scharfstein, 2010; European Central Bank, 2004). Evidence on the relation between bank managerial ability and critical bank-specific accounts enhances investors', standard setters', and regulators' understanding of the quality of bank reporting.

The banking industry provides a unique setting to examine the relation between managerial ability and accounting quality. First, the cash flows underlying the allowance for loan losses and securities fair value estimates are unrealized and uncertain. Thus developing high quality estimates requires greater ability than simply following accounting rules about the classification or timing of certain cash flows. Second, the skills required to operate efficiently in

the banking industry are more closely associated with the skills required to develop accounting estimates than other industries.[1] Bank management must gather, synthesize, and weigh information concerning the likely cash flows of loans and securities in order to determine the best investment opportunities and to estimate their own exposures for accounting. In other industries a technical competence in the given field can drive the success of the business (for example, writing computer programming code for a software business or researching and developing new medicines for a pharmaceutical company), but these technical competencies require different skills than those used in accounting. Both the nature of the accounting estimates and the skills required in the banking industry add clarity to the mechanism by which ability can influence accounting. Thus, the banking industry is a powerful setting to examine the relation between ability and accounting.

I define managerial ability as managers' ability to efficiently convert resources to revenues, similar to past studies in the banking and accounting literature. My measure of managerial ability applies to the collective ability of the bank's management team. Thus a bank management team that generates greater revenues from the same set of resources would be deemed a higher ability management team. I define accounting quality for the bank-specific accounts in this study as the ability for reported or disclosed accounting information to predict future economic realizations. Thus, high quality accounting indicates that reported loan loss reserves and security fair values better predict future economic outcomes associated with that type of transaction.

[1] Examining banks provides an additional advantage because there exists considerable overlap between the persons responsible for managing the underlying economics of the asset portfolios and responsible for developing the accounting estimates. For example the CEO, CFO, and the head of the asset management group are involved in developing the practices and procedures that govern the lending operation and in developing loan loss reserve estimates for their outstanding loan portfolio.

While bank management should transfer their information processing skills from investment and resource management decisions to accounting estimates, managers face myriad and diverse reporting incentives that can prompt them to over- or under-report loan loss reserves or fair values of securities. These incentives arise from litigation costs, product market competition, cost of capital concerns, reputation concerns, political pressure and concerns for their own wealth. These diverse reporting incentives may dominate or obfuscate the relation between managerial ability and accounting quality. Banks face unique reporting concerns surrounding stability that differ from those of non-financial firms. The stability-focused reporting environment in the banking industry can cause reporting incentives to dominate the influence of ability differently from non-financial firms. Thus my primary hypothesis remains an empirical question.

I also examine two settings where the relation above may be strengthened or weakened: the Financial Crisis of 2007-2009 and when firm-specific capital ratios are binding. These settings are of particular importance to bank regulators as they represent settings where banks are on average more distressed.

Many banks suffered considerable losses during the recent Financial Crisis, and bank managers were widely criticized in the popular press for their inability to see the oncoming economic problems. While many managers were unable to anticipate and understand the conditions of the recent Financial Crisis, it is unclear whether high ability managers exhibited a differential understanding relative to lower ability managers. In addition, according to task complexity theory in the psychology literature, ability has a lesser impact on relatively easy tasks, but as tasks become more difficult ability becomes more important for judgment performance (Abdolmohammadi and Wright, 1987; Libby and Luft, 1993; Bonner, 1994). The

inherent uncertainty of the Financial Crisis makes developing accounting estimates more complex, so during this period the relation between managerial ability and accounting quality may be strengthened. Thus, ex ante, the relation between managerial ability and accounting quality during the Financial Crisis is unclear.

Also unique to the banking industry, minimum capital requirements are imposed on banks to insure their outstanding deposits. Past research shows that bank accounting estimates are sensitive to binding capital ratios (Moyer, 1990; Beatty, Chamberlain, and Magliolo, 1995; Collins, Shackelford, and Wahlen, 1995; Nissim, 2003). Fear of violating capital ratios may cause all managers, regardless of ability, to report optimistic accounting numbers. If the desire to report favorably dominates the ability to report accurately, one would expect no difference between the quality of accounting estimates reported by high and low ability managers when ratios are binding.

I build on an existing banking literature which uses Data Envelopment Analysis (DEA) to measure a bank's efficiency in converting its resources into revenues (Barr, Seiford and Siems, 1993; Luo, 2003; Kao and Liu, 2004), and I regress my bank efficiency measure on a set of bank characteristics deemed outside of the purview of management. The residual from this regression is my measure of Bank Managerial Ability (BMA).[2]

I find evidence that bank managerial ability, on average, is positively associated with accounting quality. I document a positive and significant relation between BMA and the accounting quality for the allowance for loan losses and for the fair values of securities.

[2] While this approach is similar to the approach adopted by Demerjian, Lev, and McVay (2012), which uses a managerial ability measure based on the DEA procedure for non-financial firms, my BMA measure is designed specifically for the banking sector, allowing me to examine the unique and critical bank accounting estimates.

This positive relation is strengthened in the Financial Crisis, consistent with task complexity theory, but inconsistent with allegations in the popular press. Finally, I find the existence of binding capital ratios weakens the relation between bank managerial ability and accounting quality for the allowance for loan losses, consistent with both high and low ability managers reporting optimistically when capital ratios are tight. However, I find no evidence that binding capital ratios weaken the relation surrounding the fair value of securities.

This study provides the first evidence addressing the impact of bank managerial ability on unique bank accounting issues, the allowance for loan losses and fair value of securities. The quality of accounting surrounding loan quality and securities fair values is of particular interest to investors, bank regulators, standard setters, and the academic community given the recent Financial Crisis. Increasing the quality of reserves for loan losses has been an objective of the SEC, and increasing the quality and use of fair value accounting remains on the agenda of accounting standard setters such as the FASB and the IASB. Understanding how managerial ability impacts financial reporting and the settings that affect this relation should directly aid bank regulators in determining best practices and in efficiently allocating their monitoring resources.

This study is most similar to Demerjian, Lewis, Lev, and McVay (2011), which uses a managerial ability measure based on the DEA procedure for non-financial firms and relates that measure to accounting quality. My BMA measure is designed for the banking sector, allowing the study to examine the unique and critical bank accounting estimates unlike Demerjian et al. (2011). This study extends a growing literature in accounting, finance, and economics that examines the influence of managers on the organizational, investing, financial and accounting practices of firms (Bertrand and Schoar, 2003; Milbourn, 2003; Graham, Li and Qui, 2012; etc.).

The remainder of the paper is organized as follows. Section 2 discusses relevant literature and develops my hypotheses. Section 3 defines the variables used in the study and presents the research design. Section 4 presents the results of the study, and Section 5 concludes.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Managerial Characteristics and Accounting

Recent research in accounting, finance, and economics attempts to understand the impact of managers, particularly CEOs, on the organizational, investing, financial and accounting practices of firms. Bertrand and Schoar (2003) use manager fixed effects to capture a manager's "style" and find CEOs to be instrumental in affecting firm's policy decisions and performance. Manager fixed effects and reputation measures are also linked to the extent and nature of executive compensation (Milbourn, 2003; Graham et al., 2011).[3] Recent survey research by Dichev, Graham, Harvey, and Rajgopal (2012) calls for more research that explores the "human element" to provide "a deeper analysis of the character of the managers running the firm."

Several studies use specific proxies to capture managerial ability to study its relation to accounting quality. The results are mixed. Aier, Comprix, Gunlock, and Lee (2005) finds a significant negative relation between CEO financial expertise (experience, advanced degrees, and professional certifications) and accounting restatements. Francis, Huang, Rajgopal, and Zang (2008) finds a significantly negative relation between CEO media mentions (potentially a

[3] Studies, which use manager fixed effects to reveal that top managers play a role in firm decisions including accounting choices, cannot speak to whether these differences are benign personal preferences or a preferred difference in ability. Additionally, these studies require a manager to switch employers to another firm in the sample during the sample period in order to document the manager's effect, but a DEA measure based on publicly available data can be calculated for a broad sample.

proxy for CEO reputation, but also a potential proxy for other CEO characteristics such as ego) and accounting quality. Demerjian et al. (2011) uses a DEA-based measure of managerial ability for non-financial firms and finds managerial ability at non-financial firms to be positively related to earnings and accruals persistence.

All of the above studies exclude financial firms. This study offers a measure of bank managerial ability to the accounting literature and examines the relation between bank managerial ability and critical bank accounting estimates unexamined by past research.

2.2 Bank Managerial Ability and Accounting Quality

Managing a bank requires a diverse set of skills. Should the bank invest its marginal resources in securities, loans, trading assets, derivatives or federal funds? What mix of loan types (residential real-estate, commercial real-estate, commercial, consumer, etc.) should the bank attempt to initiate, and what credit standards and lending policies will achieve that mix? To answer these questions bank managers must acquire information from numerous sources, comprehend the internal and external factors that influence their business model, and synthesize these components into a successful strategy. For example bank management must understand their own current exposures as well as prevailing market trends in different industries, such as real estate prices or retail spending, to determine the risks and rewards of different investments.

More than other industries the skills associated with managing a bank translate well into developing accurate accounting estimates. The information processing abilities that allow high ability bank managers to identify worthy investments can be used to gather, understand, and weigh information related to estimating the exposures currently present in their lending and securities portfolios. Demerjian et al. (2011) uses a DEA-based measure of managerial ability

for non-financial firms and find accounting quality to be positively associated with this measure. They attribute this relation to higher ability managers being "better able to synthesize information into reliable forward-looking estimates." However, the banking industry offers a setting where the link between ability and accounting is even clearer, as the skills needed to identify worthy potential investments (such as loans and securities) are very similar to those needed to evaluate current investments for accounting purposes (as opposed to an industry where technical ability in the field may drive efficient performance but not be an ability associated with accounting, such as developing new drugs at a pharmaceutical company).

Note that managers face myriad and diverse reporting incentives. The above hypothesis may not hold when managers' incentives to under/over report dominate their ability to report accurately. Managers wish to under-report or over-report their accounting numbers for various reasons. Managers under-report to reduce *ex post* litigation costs (Skinner, 1994; Kasznik and Lev, 1995), to discourage new market entrants (Clarkson et al., 1994), or to protect proprietary information when competition is high (Botosan and Stanford, 2005; Bens, Berger, and Monahan, 2011). Political pressures can also lead managers to under-report firm value (Watts and Zimmerman, 1986). A bank manager could report higher, more conservative loan loss reserves or lower fair values to minimize lawsuits if results are poor or to discourage new entrants to a particular lending market.

On the other hand, managers over-report earnings when trying to raise new equity or debt (Korajczyk et al. 1991; Lang and Lundholm, 2000), to maximize their own equity incentives when selling shares or exercising stock options (Noe, 1999; Aboody and Kasznik, 2000), or to bolster their own job prospects (Fudenberg and Tirole, 1995). A bank manager could report

lower, more optimistic loan loss reserves or higher fair values to bolster the stock price of the bank.

Thus, while higher ability management can offer higher quality accounting estimates on average by transferring their skills from an operating setting to an accounting setting, reporting incentives may dominate the influence of ability.[4] Reporting incentives may have a differential effect in the banking industry relative to other industries, because the reporting climate for banks differs from non-financial firms. Bank regulators are very concerned about bank stability. Thus banks have strong incentives to report in such a manner that enhances their apparent stability.

Similar to prior studies (McNichols and Wilson, 1988; Evans, Hodder, and Hopkins, 2010; Cantrell, McInnis, and Yust, 2012), I define accounting quality for the allowance for loan losses and fair values of securities as the ability for current period estimates to predict future period economic realizations, such as loan charge-offs and gains and losses from securities sales. A stronger association between current loan loss reserves (fair values) and future loan losses (realized gains and losses on sales) represents higher quality accounting. As the existence of the proposed relation is an empirical question I formally state the following hypothesis in the null form:

> *H_1: Higher ability bank managers do not provide higher accounting quality by reporting current period accounting estimates that better predict future economic realizations.*

In addition to investigating the overall relation between bank managerial ability and accounting quality, I identify two settings where the relation could strengthen, weaken or no

[4] Offering accurate disclosures also brings benefits, such as lower cost of capital (Brown, 1979), higher information quality (Easley and O'Hara, 2004; Lambert et al., 2007) or enhanced reputation (Stocken, 2000).

longer exist: the Financial Crisis and when capital ratios are binding. These settings are of particular interest to bank regulators and are discussed in the following subsection.

2.3 Settings That May Influence the Role of Bank Managerial Ability on Accounting Quality

The Financial Crisis of 2007-2009

The Financial Crisis of 2007-2009 provides a unique and important setting to investors and regulators as the uncertainty during the period made understanding the quality of bank accounting estimates more difficult and more critical. The uncertain nature of the period raises interesting questions about whether the ability of managers will impact the predictive ability of accounting estimates.

Task complexity theory posits that as a task becomes more complex, ability has a greater influence on judgment performance (Abdolmohammadi and Wright, 1987; Libby and Luft, 1993; Bonner, 1994). For relatively simple tasks high or low ability individuals reach similar judgments. However, as tasks become increasingly complex, high ability is required to maintain adequate judgment performance; as such, high ability individuals outperform low ability individuals. During the Financial Crisis, gathering, processing, and synthesizing information into accounting estimates would be a much more complex task than during a more stable economic period. The increase in task complexity may cause bank managerial ability to exercise an even greater impact on accounting quality during the Financial Crisis.

However, task complexity theory also posits that if tasks become exceedingly complex, ability no longer improves judgment: "as task complexity exceeds some maximum threshold…variance in skill or motivation is not relevant because performance is uniformly poor (Bonner, 1994)." The complexity of judgments about the future during a period as uncertain as

the Financial Crisis could exceed this maximum threshold where ability no longer increases accounting quality. Banks suffered large losses during the Financial Crisis with numerous bank failings, suggesting that some bank managers did not understand their own current exposures during the period. Fahlenbrach and Stulz (2011) find evidence that on average bank managers lost a considerable portion of their personal wealth during the Financial Crisis. Thus it appears that at least many bank managers did not anticipate the economic conditions. It is uncertain whether on average bank managers of high ability could provide higher accounting quality during the period. Thus I formally state the following hypothesis in the null form:

> *H_2: The relation between bank managerial ability and accounting quality is unaffected during the Financial Crisis.*

Binding Capital Ratios

The second setting I examine is the case where bank managers face binding capital ratios, a unique constraint due to the high level of regulatory oversight of the banking industry. A bank must maintain certain capital reserves (measured with capital ratios) to ensure adequate funding for its deposits. Prior academic research finds that banks' reported accounting numbers, including loan loss reserves, are sensitive to capital adequacy pressures (Moyer, 1990; Beatty et al., 1995; Collins et al., 1995). Even though fair values disclosed under ASC 825-10 (originally SFAS 107) do not directly affect capital ratios, Nissim (2003) provides evidence that banks overstate their disclosed fair values when capital ratios are tight, presumably to appear less risky to the market and bank regulators.

Fear of violating capital ratios or revealing that they are capitally constrained may constrain a bank manager *of any ability* from revealing his or her private information. The

ability to develop more predictive estimates may be dominated by the desire to report favorably. High ability and low ability managers may both choose to report loan loss reserves and fair values that are optimistic to appear more stable to bank regulators and investors. Thus when capital ratio constraints are binding, high ability and low ability bank managers may issue accounting estimates with similar predictive ability. I formally state the following hypothesis in the null form:

> *H_3: The relation between bank managerial ability and accounting quality is unaffected when capital ratios constraints are binding.*

2.4 The Importance of Loan Loss Reserves and Fair Value Estimates

Loans and securities make up an overwhelming portion of a bank's balance sheet (roughly 89% in my sample). Evaluating these accounts is critical in evaluating the bank as a whole. A small change in the expected loss in the lending portfolio can result in a large change in income and bank equity. For example, in my sample the average bank charges off only 0.4% of gross loans in any given year. But 0.1% of gross loans corresponds on average to roughly 12% of the bank's net income, and one standard deviation-change in the percentage of net charge-offs is slightly larger than net income. This is why the American Banking Association refers to managing the credit risk of loan customers as "the most important aspect of the banking business model" (ABA, 2010).

Securities are the second largest asset type held by banks and the largest asset type for which fair value accounting plays a prominent role. The fair value of available-for-sale securities are recorded on the balance sheet with changes recorded in other comprehensive income, while disclosures in the footnotes to the financial statements reveal the fair value of

held-to-maturity securities.[5] The recent financial crisis has placed fair value accounting at the center of a controversy. Critics assert that fair value accounting can increase systematic risk through pro-cyclical trading (European Central Bank, 2004; Plantin, Sapra, and Shin, 2008; Barth and Landsman, 2010), while others assert that no such relationship exists (Badertscher, Burks and Easton, 2012).

Thus, understanding the accounting estimates designed to gauge the value of the loans and securities at a bank is critical to investors and regulators when assessing the value and stability of the bank. Cullen (2012) finds that losses in the lending portfolio are the leading driver of bank failures during the recent financial crisis, with 97.5% of failed banks from 2008 to 2010 experiencing deterioration in their lending portfolio in the quarters prior to failure. He also finds losses from securities to be the second most prominent reason for capital deterioration leading to failures. But reduced capital from loan and securities losses does not only affect the bank. It can have a systematic effect through the industry and the economy as a whole. If capital tightens in the banking industry, the industry as a whole will be less willing to lend leading to a reduction in liquidity to the entire economy and restricting economic growth (Ivashina and Scharfstein, 2010; ECB, 2011). For both fair values and loan loss reserves, understanding the quality of the accounting estimates may prove useful not only in assessing the stability of the individual bank but the stability of the banking system.

High ability bank managers should be more able to determine what information is relevant when estimating the allowance for loan losses and fair values of securities. To estimate the allowance for loan losses banks managers must consider a host of factors, such as the

[5] Designating securities as trading securities is a rare practice at banks as price changes flow through income. Trading securities makes up only 0.5% of total securities in may sample.

payment history of the loan, the financial position of the borrower, collateral values, historical trends, and the economic conditions of the areas in which they invest. Higher ability managers should be better able to assess which factors will drive the performance of a loan or a group of loans and to estimate the resulting losses. For many securities an active market does not exist to provide a clear fair value. Thus to estimate the fair value of securities, managers need to identify similar securities with recent trades (perhaps with significant adjustments to those prices when input assumptions differ) or develop models to discount the future cash flows. Bank managers need to gather information concerning the underlying cash flows or assets of the security (which are often repackaged loans) to identify appropriate comparable securities or to develop discounting models. Higher ability managers should be able to transfer their information processing skills to garner a better understanding of the underlying values of their securities.

3. VARIABLE MEASUREMENT & EMPIRICAL MODELS

3.1 Measuring Bank Managerial Ability

Following a long stream of banking literature, I use Data Envelopment Analysis (DEA) to construct a measure of bank efficiency. I then purge firm-specific factors from this DEA-based bank efficiency measure to arrive at efficiency attributed to managerial ability. The DEA-based measure offers distinct advantages over other measures of managerial ability proposed in prior literature, such as historical stock return, historical ROA, CEO compensation, or CEO tenure. First, the DEA-procedure measures each bank relative to its peers and provides an ordinal ranking of all banks. Second, the DEA-based measure can be calculated for each bank-year, or manager-year, observation without needing explicit CEO data, a long time series of data,

or particular events like CEO turnovers. Thus, the DEA-based measure can be generated for a much larger sample.

The DEA procedure models efficiency with a ratio of outputs (incomes) to inputs (bank resources) similar to a return on investment measure. However, unlike other efficiency ratios of outputs over inputs, the DEA efficiency measure does not require an "a priori specification of weights" (i.e. does not assume that all inputs and outputs are equally valuable across all banks). For a more in depth discussion of the DEA procedure as it relates to this paper and a summary of prior DEA-based banking literature, see Appendix B.[6]

The DEA procedure produces a ratio-based efficiency scores resulting in an ordinal ranking of banks. The efficiency scores are scaled to range from zero to one with higher scores representing more efficient banks. I group banks by year and by size to ensure banks are benchmarked to their reasonable peers.[7] In spite of or perhaps due to the sizeable DEA banking literature, no singular agreed-upon measure of bank efficiency or bank managerial ability exists (Luo, 2003). My objective is to measure the efficiency with which bank management converts the bank's resources into revenues. The inputs and outputs chosen differ from previous bank studies that simply address bank efficiency. In other studies bank equity may serve as a sufficient measure of bank resources in determining the efficiency of a bank. I further differentiate amongst bank resources as the mix of resources can have a significant influence on

[6] Section 1 of Banker, Charnes and Cooper (1984) provides perhaps the most detailed discussion of the intuition behind the DEA procedure.

[7] Grouping by year controls for time variant factors that may influence the conversion of resources to revenues. Prior research notes the unique role of large banks in the economy (Janicki and Prescott, 2006; Khan, 2010). I group the largest 100 banks within each year and calculate the DEA procedure separately for the largest banks and all other banks. When the DEA procedure has many inputs but few banks, many banks will end up on the efficient frontier. I assign 100 banks to the largest tier for each year to ensure an adequate sample size for the DEA procedure (Demerjian et al., 2012).

what investments managers seek. Thus, the inputs selected below better attune this measure towards the contributions of management than past DEA banking studies.

For the largest 100 banks I optimize: [8]

$$\text{Max}_{u,\,v}\ \theta = (u_1\text{Interest Revenue}_{i,t} + u_2\text{Non-interest Revenue}_{i,t}) / (v_1\text{Deposits}_{i,t} + v_2\text{FHLB Advances}_{i,t} + v_3\text{Fed Funds Purchased}_{i,t} + v_4\text{Other Short Term Borrowings}_{i,t} + v_5\text{Goodwill}_{i,t} + v_6\text{Other Acquired Intangibles}_{i,t} + v_7\text{Derivatives}_{i,t} + v_8\text{Loans Sales}_{i,t}) \quad (1a)$$

For average and small banks I optimize:

$$\text{Max}_{u,\,v}\ \theta = (u_1\text{Interest Revenue}_{i,t} + u_2\text{Non-interest Revenue}_{i,t}) / (v_1\text{Deposits}_{i,t} + v_2\text{Borrowings}_{i,t} + v_3\text{Goodwill}_{i,t} + v_4\text{Other Acquired Intangibles}_{i,t} + v_5\text{Derivatives}_{i,t}) \quad (1b)$$

The eight input variables are measured at the beginning of year *t* with the exception of loan sales which are measured over the course of the year. The outputs include both interest and non-interest income, which make up the entire income stream for banks. For bank's resources I model a set of inputs associated with funds available for investment and acquired intangibles as these accounts are influenced by management and impact management's ability to generate revenue. I vary the inputs between the DEA procedure for the largest 100 banks in each year and for the remaining banks due to data availability and the differences in business model between large and small or average banks. Appendix B offers a more in depth discussion of the inputs and outputs selected.

After creating the bank efficiency measure, I purge the measure of bank characteristics that affect efficiency but are outside of the control of management, similar to Demerjian et al.

[8] I estimate numerous variations of Equation 1 including more and less aggregated inputs, combining the two revenue measures, and dropping individual inputs. The inferences of the study remain unchanged across the different DEA specifications.

(2012). I regress the bank efficiency measure on five such characteristics: bank size, bank age, cash availability, leverage, and auditor type. I use a Fama-Macbeth specification of the following regression:

$$\text{Bank Efficiency}_{i,t} = \alpha + \beta_1 \ln(\text{Total Assets})_{i,t} + \beta_2 \ln(\text{Employees})_{i,t} + \beta_3 \text{Free Cash Flow Indicator}_{i,t} + \beta_4 \ln(\text{Bank Age})_{i,t} + \beta_5 \text{Leverage}_{i,t} + \beta_6 \text{BigN}_{i,t} + \text{BMA}_{i,t} \quad (2)$$

The residual from the above regression, BMA, serves as my empirical measure of bank managerial ability.[9] By regressing the DEA bank efficiency measure on firm characteristics that may affect efficiency but are outside of management's control, the residual captures the efficiency that is not related to these firm characteristics. I offer a more detailed discussion of how each of the independent variables included above may influence bank efficiency but not through the purview of management in Appendix B.

As noted in Demerjian et al. (2012) this regression approach likely understates the ability measure as the variables used in the regression above could be influenced by managerial ability or could influence the hiring of a manager (i.e. large firms hiring better managers). But conservatively attributing some managerial ability to the characteristics of the firm increases the likelihood that the residual captures only efficiency related to bank managerial ability and works against finding results in this study.

I am able to estimate the bank efficiency score and BMA for 19,426 bank-year observations. Of this sample, 16,517 bank-year observations have sufficient data available to perform my subsequent hypothesis tests. Table 1 reports the descriptive statistics for these

[9] Similar to Demerjian et al. (2012), my measure of managerial ability applies collectively to the entire management team. In one validation test I attribute bank managerial ability to a specific manager, the CEO, as the manager most responsible for outcomes and most visible to the capital markets (Fee and Hadlock, 2004).

variables as well as others used in my hypothesis tests. The mean bank efficiency score for the sample is 0.538, as expected given the variable ranges from zero to one. The mean BMA is close to zero at -0.013. The value is consistent with the variable's construction as a residual. Higher values of BMA correspond to higher managerial ability, so positive BMA values can be considered above average managers, and negative BMA values can be considered below average managers. However, I use BMA as a continuous variable in my tests.[10]

3.2 Measuring Accounting Quality

I define accounting quality as the ability of current period estimates to predict future period economic realizations, similar to prior studies (McNichols and Wilson, 1988; Evans, Hodder and Hopkins, 2010; Cantrell, McInnis, and Yust, 2012). First I estimate accounting quality for the allowance for loan losses using the following regression:

$$\text{Charge-offs}_{i,t+1} = \alpha + \beta_1 ALL_{i,t} + \beta_2 ALL_{i,t-1} + \beta_3 ALL_{i,t-2} + \varphi_{i,t} \quad (3a)$$

In equation (3a) $\text{Charge-offs}_{i,t+1}$ represents the loans charged-off by bank *i* during year *t* +1 scaled by total gross loans at the end of year *t* and $ALL_{i,t}$ represents the allowance for loan losses for bank *i* at the end of year *t* scaled by total gross loans at the end of year *t*.[11] Appendix A offers detailed variable definitions.

Bank investors are highly concerned with the potential credit risk in the lending portfolio. Expectations of charge-offs significantly impact market prices for banks (Wahlen, 1994). Net

[10] In a dissertation version of this working paper I perform a series of validation tests related to my BMA measure. First, I show that my BMA measure cannot be easily approximated with measures suggested by prior research: historical stock return, historical ROA, CEO compensation, or CEO tenure. Second, my BMA measure is negatively related to short-window stock returns around CEO turnover announcements, consistent with prior research (Hayes and Schaefer, 1999). Finally, I show that higher ability managers as measured by BMA experience lower loan charge-offs, consistent with prior bank DEA research (Barr, Seiford and Siems, 1993).

[11] Total gross loans is the gross historical cost of loans, before considering the allowance for loan losses, as presented on the balance sheet.

charge-offs are loans deemed to be uncollectible and written-off from the bank's balance sheet during the period, net of recoveries and serve as a widely accepted measure of credit loss for loans in the banking literature. [12]

The allowance for loan losses at a bank is analogous to the allowance for doubtful accounts at a non-financial firm, and the bank income statement account the *loan loss provision* is analogous to bad debt expense. At non-financial firms managers focus their estimates on the income statement side (for example bad debt expense as a historical percentage of sales). However, at banks managers are required to derive their estimates using a balance sheet approach. Bank managers estimate the reserve needed based on their current understanding of the loan portfolio, past historical trends, and qualitative information.[13] This estimate is the allowance for loan losses on the balance sheet. Thus one would expect the allowance for loan losses to become realized in the form of future charge-offs, the ultimate realization of loan loss at the bank. Therefore, the relation between the allowance and charge-offs is the appropriate accounting relation to consider when examining accounting quality for loans. Consistent with the conceptual definition of accounting quality above, banks with higher quality accounting surrounding its loan portfolio should report allowance for loan losses more highly correlated with future charge-offs.

The purpose of Equation (3a) is to determine the ability of accounting (the allowance for loan losses) to explain the realization (charge-offs). I include only accounting estimates as independent variables in the model, as I am only concerned with the information conveyed by

[12] Recoveries represent collections, either whole or in part, of previously charged-off loans similar to the collection of a previously written-off receivable balance at a non-financial firm.
[13] This estimate requires regular review of outstanding loans and historical averages/trends across loan types. Banks additionally identify specific loans that require reserves. For a more detailed discussion of the processes used to estimate the allowance for loan losses see http://www.fdic.gov/regulations/laws/rules/5000-4700.html.

accounting estimates. However, the results of my hypotheses tests are unaffected by including prior period economic variables, such as charge-offs at time *t*, in Equation (3a).[14] I include a time series of accounting estimates for the allowance for loan losses as the realization period for charge-offs can span multiple years. The regression coefficients, β's, measure the average relation between the current and lagged accounting and future charge-offs. For example β_1 measures the amount of each dollar of loan loss reserve that gets charged off during the following year.[15] While this slope tells us about the average relation between the loan loss reserve and future charge-offs for the industry, I focus on the residual, φ. As the regression equation estimates the portion of charge-offs that are explained by current accounting, I interpret the residuals as future charge-offs that are not predicted by accounting.

The absolute value of the residual, $Abs|\varphi_{i,t}|$, serves as the empirical proxy for the accounting quality of the allowance for loan losses, where higher values of $Abs|\varphi_{i,t}|$ correspond to more unexplained charge-offs and thus lower accounting quality, and lower values of $Abs|\varphi_{i,t}|$ correspond to higher accounting quality.[16]

[14] The results in following hypotheses tests are robust to several design choices surrounding equation set (3). First results are unchanged if the lagged accounting variables are removed leaving only accounting at period t. Additionally results are unchanged if current period economics are included as independent variables. For example if charge-offs at time t is added to equation (3a) as an independent variable results remain unchanged. Additionally I controlled for non-performing loans at time t in equation (3a) and found similar results. I find similar results if current economics are included as dependent variables and the incremental residual is measured before and after current period accounting is added. Finally results remain unchanged if I consider charge-offs cumulated over numerous periods (2 years and 3 years) as the dependent variable.

[15] While the allowance for loan losses attempts to estimate the losses incurred in the loan portfolio, not all estimated loan losses are expected to reach the realization/charge-off point within the following year. The multi-period, rolling nature of the allowance account leaves one expecting a β coefficients significantly positive yet less than 1.

[16] The methodology described here runs a pooled regression within each year across all banks in the industry to capture the residual deemed accounting quality. Inherent to the approach is the underlying assumption that the average firm is a reasonable benchmark for investors' expectations and for adequate accounting. Comparing firms to the industry norm in developing expectations for the future is an appropriate approach from a financial statement user perspective. This assumption is maintained in numerous other proxy measures in accounting such as bad debt errors in McNichols and Wilson (1988), abnormal accurals in Jones (1991), and accruals quality in Dechow and Dichev (2002).

Similar to the logic above, I define accounting quality surrounding securities fair value estimates as the ability of securities fair values to predict future realized gains and losses from securities sales. Banks commonly estimate the fair value of their available-for-sale (AFS) securities and their held-to-maturity (HTM) securities. The difference between historical cost and fair value of AFS securities is captured in other comprehensive income until those securities are sold. The difference between historical cost and fair value of HTM securities is disclosed in the footnotes as required under ASC 825-10 (originally SFAS 107). Thus, I use the difference between historical cost and management's estimate of fair value for each of these security types to predict future realized gains and loss on securities sales with the following model:

$$\text{RealizedGLSec}_{i,t+1} = \alpha + \beta_1 \text{FVAFSSec}_{i,t} + \beta_2 \text{FVHTMSec}_{i,t} + \varphi_{i,t} \quad (3b)$$

In equation (3b) $\text{RealizedGLSec}_{i,t+1}$ represents the realized gain or loss from securities sales during year *t+1* scaled by the book value of securities at the end of year *t*, $\text{FVAFSSec}_{i,t}$ represents the unrealized gain or loss from AFS securities held by the bank scaled by the book value of securities at the end of year *t*, and $\text{FVHTMSec}_{i,t}$ represents the difference between the disclosed fair value of securities and the book value of securities scaled by the book value of securities at the end of year *t*.

Equation (3b) includes both types of fair value estimates at banks, thus the residual should serve as an appropriate proxy for the accounting quality of securities' fair values. I am only interested in the predictive ability of current period accounting and thus include only accounting estimates as independent variables in Equation (3b). The above model requires no time series of accounting information, as dated fair value information should provide no additional information over the current fair values. Consistent with my definition above, I

measure accounting quality for fair values as the extent that a bank's fair value estimates map into future gains and losses from securities sales.

As fair values attempt to capture what the market is willing to pay for a security, the difference between the fair value and book value of a bank's securities portfolio should be predictive of future gains and losses when securities are actually sold. Higher quality fair value estimates would be better able to predict future gains or losses. The slope coefficient β_1 measures the average gain (loss) in year t+1 for each dollar that the fair value of securities exceeds its historical cost. The residuals estimate the portion of future gains and losses that are unexplained by current accounting. The absolute value of the residual, $Abs|\varphi_{i,t}|$, serves as the empirical proxy for the accounting quality of fair values with higher values representing lower quality accounting.

3.3 Empirical Model to Test Hypotheses

I estimate the following regression equation to test Hypothesis H_1:

$$Abs|\varphi_{i,t}| = \alpha + \beta_1 BMA_{i,t} + \beta_2 \ln(\text{Total Assets})_{i,t} + \beta_3 LoanGrowth_{i,t} + \beta_4 DepositGrowth_{i,t} + \beta_5 BigN_{i,t} + \varepsilon_{i,t} \quad (4)$$

Where $Abs|\varphi_{i,t}|$ is the absolute value of the estimated residual to Equation set (3) for bank *i* during year *t* and $BMA_{i,t}$ is the bank managerial ability measure discussed in Section 3.1 for bank *i* during year *t*. The coefficient β_1 serves as the test for the relation between BMA and accounting quality. Since larger residual values from Equation set (3) correspond to less predictive accounting, a negative β_1 is consistent with high ability bank managers providing better accounting estimates for loan losses and securities fair values.

I include ln(Total Assets)$_{i,t}$, the natural log of total bank *i* assets at the end of year *t*, to control for the effect of size on accounting quality. Large firms may have more stable operations than small firms and thus be better able to estimate their future realizations (Dechow and Dichev, 2002). Conversely large banks may face more pressure to appear stable and thus report more biased and low quality accounting estimates. I use both LoanGrowth$_{i,t}$, the percent change in loans from the beginning of year *t* to the end of year *t*, and DepositGrowth$_{i,t}$, the percent change in deposits from the beginning of year *t* to the end of year *t*, to control for the effect growth may have on accounting quality. Firms experiencing considerable growth may find it more difficult to develop estimates of future realizations due to the changing nature of their size or scope. I include BigN$_{i,t}$, an indicator equal to 1 when bank *i* uses a Big N auditor in year *t* and zero otherwise, to control for the effect of audit quality on accounting quality, as past research suggests that high audit quality correlates with high accounting quality (Becker et al, 1998).[17]

3.4 Data and Descriptive Statistics

I obtain empirical bank data from SNL Financial from 1994 to 2010 to serve as the inputs and outputs for the DEA model as well as other control variables throughout the study. I am able to obtain the necessary data for 16,517 bank year observations to perform tests related to the allowance for loan losses. For the fair value tests machine readable data from SNL Financial begins only in 2005 (primarily during the recent Financial Crisis). I randomly select 300 banks and hand collect data from 1999-2004 to supplement the machine readable data. All empirical tests regarding the accounting quality of the fair values of securities is constrained to the random sample of 300 banks, totaling 2,508 bank-year observations. Table 1 presents descriptive

[17] In untabulated analysis I also include the standard deviation of cash flows over the preceding five years as a control for volatility. This variable considerably limited sample sizes and was not statistically significant in any analyses, and thus is not included in those analyses presented here in the paper. The results are unaffected by the inclusion of this control.

statistics for the BMA measure, accounting quality measures and other variables used in hypothesis tests. The statistics presented are for variables winsorized at the 1% and 99% levels.

[Insert Table 1 here]

BMA has a mean and median value very close to zero by construction, similar to Demerjian et al. (2011, 2012). The mean bank size is roughly $2.2 billion while the median bank size is only $317 million. This skewness reflects the fact that the US banking sector is heavily skewed by a small set of very large "money center" banks (Janicki and Prescott, 2006; Khan, 2010). On average banks establish a reserve equal to 1.4% of gross loans and charge-off roughly 0.4% of loans each year in my sample. Roughly 1.4% of gross loans are non-performing. The distributions of these variables are consistent with prior published studies. While the percentages represent small portions of gross loans, they can represent very large portions of income (Greenawalt and Sinkey, 1988; Hasan and Wall, 2004). Table 2 provides univariate correlations of the variables included in hypothesis tests as well as the tier 1 capital reported by the bank. The univariate correlations show a considerable correlation between bank efficiency and managerial ability (0.543) consistent with more efficient banks being able to higher more able management teams. Most importantly, BMA is negatively correlated with the inverse measure of accounting quality for both the allowance for loan losses and the fair value of securities.

[Insert Table 2 here]

4. RESULTS

4.1 Bank Managerial Ability and Accounting Quality

Table 3 reports the results for Equation (4) related to the allowance for loan losses.[18] Both levels (Column I) and changes (Column II) specifications are presented. For the changes analysis I regress the change in the dependent variable from year *t+1* to year *t+2* on the change in the independent variables from year *t* to year *t+1*. The estimated "levels" coefficient on BMA is -0.134 and is statistically significant at the 5% level (two-tailed tests). The estimated "changes" coefficient on BMA is -0.149 and is statistically significant at the 5% level (two-tailed tests). Recall higher values of $Abs|\varphi_{i,t}|$ correspond to lower accounting quality, thus the significant negative coefficients on BMA and $Abs|\varphi_{i,t}|$ suggest that higher ability bank managers *do* provide higher accounting quality by reporting current period allowances for loan losses that better predict charge-offs. [19]

[Insert Table 3 here]

Columns (III) and (IV) of Table 3 report the levels results of Equation (4) within subsamples of the largest 100 banks and other banks. In both sub-samples I find similar results to the full sample with a negative coefficient of -0.160 for the small and average sample and a coefficient of -0.112 for the largest 100 banks sample. Both coefficients are statistically significant at the 5% level. Thus the relation between BMA and accounting quality exists in both groups.[20]

[18] For all tests in this study I adjust t-statistics using two-way clustering (clustering by firm and by time) as suggested by Petersen (2009) unless otherwise specified.

[19] Additionally, in untabulated analysis I control for time series volatility in loan charge-offs by including the standard deviation of charge-offs over the past three years (t-3 to t-1) divided by the mean charge-off over the interval as an independent variable in the regression equation. Similarly, I control for the composition of the loan portfolio by including commercial loans as a percentage of total loans. The findings are unchanged by the inclusion of these controls.

[20] Levels analysis is tabulated, though inferences are unchanged with a changes specification.

Table 4 reports the results for Equation (4) related to the fair values of securities. Again the estimated coefficients are negative and significant at the 5% level, -0.254 in the levels analysis and -0.292 in the changes analysis. Columns (III) and (IV) break down the levels analysis into large banks and small and average banks and regresses Equation (4) for the fair values of securities. The negative and significant relation holds within each subsample. Thus the evidence from the fair value analysis is consistent with the evidence from the analysis on the allowance for loan losses: higher ability bank managers offer fair values of securities that better predict future securities gains and losses.

[Insert Table 4 here]

Larger banks report lower quality fair value numbers, but size is unrelated to the quality of the allowance for loan losses. The Big N auditor variable correlates with higher quality estimates for the allowance of loan losses but not for fair value estimates. The growth variables were expected to correlate to lower quality accounting estimates (positive coefficients) as managers would generally find it more difficult to develop accounting estimates for an expanding business than a static business. The deposit growth variable does indeed have a positive and significant coefficient in the loans and securities specifications. However the coefficient on the loan growth variable is significantly negative in the allowance for loan losses specification.

One possible explanation is that loans are not likely to incur losses during the year the loan is originated. Banks would rarely lend to borrowers in such poor financial condition that they default in the first year. Thus, managers would find it easy to develop accounting estimates for these new loans as the estimates would be very small. Bank managers with many new loans

(high loan growth) could report higher quality allowances for loan losses than comparable bank managers with few new loans (holding other factors constant), explaining the negative coefficient on loan growth in Table 3. However, having many new loans should not make it easier for managers to develop estimations about securities as the default patterns for these new loans should hold no bearing on the market value of the bank's securities. Therefore I would not expect a negative coefficient on loan growth in the securities analysis presented in Table 4. Indeed the coefficients on loan growth in Table 4 are either insignificant or positive.

4.2 Bank Managerial Ability and the Financial Crisis of 2007-2009

To study the relation between bank managerial ability and accounting quality during the Financial Crisis, I estimate the following model:

$$\text{Abs}|\varphi_{i,t}| = \alpha + \beta_1 \text{BMA}_{i,t} + \beta_2 \text{FC}_{i,t} + \beta_3 \text{BMA*FC}_{i,t} + \beta_4 \ln(\text{Total Assets})_{i,t} + \beta_5 \text{LoanGrowth}_{i,t} + \beta_6 \text{DepositGrowth}_{i,t} + \beta_7 \text{BigN}_{i,t} + \varepsilon_{i,t} \quad (5)$$

where FC is an indicator equal to one when the bank-year observation is in years 2006-2009 and zero otherwise, BMA*FC is the interaction of BMA and the FC indicator, and all other variables are as previously defined.

I expect a positive coefficient β_2 on the financial crisis indicator because I expect the uncertainty of the period to negatively impact accounting quality. Hypothesis H_2 focuses on β_3. Since β_1 is the relation between BMA and accounting quality during normal economic times, the interaction coefficient β_3 tells us whether that relation is strengthen or weakened during the Financial Crisis. Because I find β_1 in Equation (4) to be negative, a significantly negative coefficient (same sign as β_1) would imply the relation between managerial ability and accounting quality is strengthened during the crisis. A significantly positive coefficient (opposite sign from

β_1) would imply a weakened relation, and an insignificant coefficient would imply that we could not reject the null hypothesis of no relation.

Table 5 provides regression results for Equation (5). The coefficient β_1 is negative and significant for the loans specification and the securities specification, as reported in Tables 3 and 4. The coefficient β_2 is positive and significant at the 5% level for both the loans and securities specifications, consistent with lower quality accounting estimates during the financial crisis. Most importantly β_3 is negative and significant in both specifications. Thus I reject the null hypothesis, as the evidence supports a strengthened relation between managerial ability and accounting quality during the Financial Crisis. The evidence is consistent with task complexity theory, with the Financial Crisis providing a more complex setting. Bank managers were widely criticized in the popular press for failing to understand their own exposures during the financial crisis. But the evidence here suggests that higher ability managers did better estimate the exposures in their lending and securities portfolios during the crisis.[21]

[Insert Table 5 here]

4.3 Bank Managerial Ability and Binding Capital Constraints

To test H_3 I select a subsample of all banks in the lowest quintile of Tier 1 capital ratio and label those banks as having binding capital ratios. The model is as follows:

$$\text{Abs}|\varphi_{i,t}| = \alpha + \beta_1 \text{BMA}_{i,t} + \beta_2 \text{CapTight}_{i,t} + \beta_3 \text{BMA*CapTight}_{i,t} + \beta_4 \ln(\text{Total Assets})_{i,t} + \beta_5 \text{LoanGrowth}_{i,t} + \beta_6 \text{DepositGrowth}_{i,t} + \beta_7 \text{BigN}_{i,t} + \varepsilon_{i,t} \quad (6)$$

[21] Inferences are unchanged if changes models are used for the tests of the financial crisis and binding capital constraints. These results are untabulated for space consideration.

Where Captight is an indicator variable equal to one when the bank-year observation is in the bottom quintile of Tier 1 capital ratio in the given year and zero otherwise, BMA*CapTight is the interaction of BMA and the CapTight indicator, and all other variables are as previously defined.

I expect a positive coefficient β_2 on the capital ratio tightness indicator because I expect binding capital ratios to negatively impact accounting quality on average. The coefficient β_3 is the coefficient of interest for testing H_3. Since β_1 is the relation between BMA and accounting quality when capital ratios are not binding, the interaction coefficient β_3 tells us whether the above relation is strengthen or weakened when capital ratios are binding. A negative coefficient (same sign as β_1) would suggest the relation is strengthened, a positive coefficient (opposite sign as β_1) would suggest the relation is weakened, and an insignificant coefficient would suggest that capital ratios have no effect on the relation.

Table 6 presents the regression results for the capital ratio tests. Panel A reports regression results for Equation (6). β_1 is negative and significant in each specification consistent with the primary findings for H_1. β_2 is positive and significant in the loans specification suggesting that when capital ratios are tight banks offer lower quality allowances for loan losses. Most importantly the coefficient β_3 is positive, 0.134, and statistically significant with a t-statistic of 2.86 for the loans specification. This finding suggests that binding capital ratios weaken the relation between BMA and accounting quality for loans. However for the securities

specification β_2 and β_3 are insignificant, providing no evidence that capital ratios influence the quality of securities' fair value estimates.[22]

4.4 Alternative Explanation

Throughout the study I posit that higher ability managers may provide higher quality accounting estimates because the skills necessary to manage a bank efficiently may also be required to develop high quality estimates. In this subsection I discuss and examine another mechanism by which bank managerial ability may be related to higher quality accounting. In addition to "skills transfer," managers with greater ability generate revenues more efficiently (by definition) and thus have stronger operating results. These good managers may be more willing to disclose accurately simply because their strong results reflect favorably on them and the bank. In contrast poor managers may be less inclined to disclose predictive accounting estimates for fear they may reflect unfavorably on them and the bank. As such, low ability managers would be more likely to report optimistically biased accounting estimates because reporting more accurate estimates would reveal poor performance.

This alternative explanation suggests that managers reporting incentives not their skills lead to the increase in accounting quality for high ability managers. I perform two tests related to this alternative explanation. First, I attempt to find evidence for the alternative explanation in my full sample. Second, I select a setting where the reporting incentives are weak and the alternative explanation is least likely to explain the result and test whether the skills-transfer explanation holds.

[22] In addition to the test described here, I also estimate Equation (4) in the subsample of firms with tier 1 capital ratios in the lowest quintile of each year. The coefficient estimates for BMA's relation to accounting quality for this subsample was statistically insignificant from zero for the allowance for loan losses test.

The alternative explanation posits that high ability managers report accurately because they have good results, and low ability managers skew their estimates optimistically because their true results would reflect poorly on them. If the alternative explanation is true then one would expect low ability managers to offer more optimistically biased accounting estimates. Therefore in my first test I regress the signed residual from equation set (3), φ, which I term accounting bias, on BMA and control variables for my full sample.

While the absolute value of these residuals is used to measure how well accounting predicted future economics, the signed residual allows us to see in which direction accounting estimates and realizations differ. For the allowance for loan losses specification negative values of the residual would imply that charge-offs were lower than expected and would represent conservatively biased accounting estimates. Positive values of the residual would imply that charge-offs were higher than expected and are optimistically biased. For the fair values of securities specification negative values of the residual would imply that gains (losses) were lower (higher) than expected and would represent optimistically biased accounting estimates. Positive values of the residual would imply that gains were higher than expected and accounting is conservatively biased.

Table 7 Panel A Column (I) reports the loans specification result with a negative coefficient on BMA, -0.079, which is marginally significant with a t-statistic of -1.72. Column (II) reports the securities specification result with a negative coefficient on BMA, -0.178, which is significant with a t-statistic of -2.42. Thus there is marginal evidence that low ability managers offer more optimistic accounting estimates for the allowance for loan losses. However, high ability managers actually offer more optimistically biased securities fair values. This finding is in direct contradiction to the alternative explanation explored here. Thus Panel A

of Table 7 provides weak evidence that the alternative explanation explains the primary findings of the study.

[Table 7 here]

Next I examine whether my primary findings hold in banks in the top quintile of Tier 1 capital. These banks should be far less concerned about signaling low quality through accounting estimates as they possess considerable capital reserves, thus dampening the impact of reporting incentive. As such, the subsample offers a setting to examine the skills transfer intuition.

Table 7 Panel B reports results of regressing Equation (4) in the top capital-ratio quintile of banks. Consistent with previous findings, I find negative and significant coefficients on BMA for both specifications. The evidence here provides support that the primary finding is driven at least in part by the abilities of managers and not by their reporting incentives.

5. CONCLUSION

The banking industry has been under increased scrutiny in the wake of the recent Financial Crisis. Standard setters and bank regulators have become increasingly concerned with understanding the potential losses at banks and how accounting reflects those exposures. This study examines the role bank management plays in determining accounting quality. Specifically, I examine how bank managerial ability relates to the predictive ability of key accounting estimates surrounding the lending and securities portfolios.

The recent financial crisis highlights how losses in the lending and securities portfolios can have serious ramifications at individual banks (bank failures) and throughout the global economy (reduced lending and liquidity). Investors, standard setters and regulators look to the accounting for loan losses as well as fair value estimates for securities to help evaluate the overall health of the bank. Thus understanding a critical determinant of accounting quality for these estimates should aide these financial statement users in their judgments. Bank regulators in particular could benefit from understanding the relation between bank managerial ability and accounting quality, as identifying high quality managers could help determine best practices in financial reporting for the industry and aide in efficiently allocating monitoring resources.

The banking industry provides a powerful setting to examine the relation between managerial ability and accounting quality. First, the banking estimates require considerable skill to estimate due to the discretion surrounding them and their predictive nature. Second, the skills required to manage a bank efficiently are closely related to the skills required to make accounting estimates. In both contexts managers must gather, understand, and weigh information towards understanding the underlying cash flows and uncertainties surrounding loans and securities. Finally, the banking industry offers two unique sub-settings that can extend our knowledge of the relation between ability and accounting: the Financial Crisis and binding capital ratios.

I use a DEA-based measure of bank managerial ability with model inputs specifically designed for the banking industry. I find that bank managerial ability is positively related to accounting quality, defined as the predictive ability of the allowance for loan losses and securities fair values. High ability managers possess skills in gathering, understanding, and synthesizing information into decisions about how to allocate bank resources. The primary

finding of this study suggests that these high ability bank managers are able to translate those skills to an accounting setting.

Additionally, I find that the relation between managerial ability is strengthened during the Financial Crisis. This finding is consistent with task complexity theory which states that ability has a greater impact on more complex tasks or in more complex settings, but is inconsistent with popular allegations that banks managers were unable to understand their own exposures during the crisis. Finally, I find that the relation between bank managerial ability and accounting quality is weakened by the presence of binding capital ratios for the allowance for loan losses. I do not find evidence that capital ratios impact the relation for the fair value of securities. The findings are consistent with bank managers of any ability offering more optimistic allowances for loan losses in the presence of binding capital ratios, but not more optimistic securities fair values. Taken together the findings support managerial ability playing a significant role in determining the accounting quality of key bank estimates.

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Appendix A

Variable Definitions

Panel A: Variables Used in Measuring Bank Efficiency and Bank Managerial Ability

For all variables the subscript *i* refers to the bank *i*, and the subscript *t* refers to year *t* (during year *t* for income or flow items and end of year *t* for balance or stock items).

Variable	Definition
Bank Efficiency$_{i,t}$	The result of the DEA procedure estimated on Equation (2) as described in Section 3.1.
BMA$_{i,t}$	Bank Managerial Ability as measured by the residual from the residual from Equation (3) described in Section 3.1.
ln(Total Assets)$_{i,t}$	The natural logarithm of the book value of total assets (source: SNL Financial).
ln(Employees)$_{i,t}$	The natural logarithm of the number of full-time equivalent employees of the bank. (source: SNL Financial).
Free Cash Flow Indicator$_{i,t}$	An indicator variable equal to 1 when a bank reports non-negative change in cash on its Statement of Cash Flows (source: SNL Financial).
ln(Bank Age)$_{i,t}$	The natural logarithm of the number of years the bank has been listed in SNL including year *t*.
Leverage$_{i,t}$	The ratio of total liabilities to total equity (source: SNL Financial).
BigN$_{i,t}$	An indicator variable equal to 1 when the bank uses a Big N auditor and zero otherwise (source: SNL Financial).

Panel B: Variables Used in Hypotheses Tests

For all variables the subscript *i* refers to the bank *i*, and the subscript *t* refers to year *t* (during year *t* for income or flow items and end of year *t* for balance or stock items).

Variable	Definition
Charge-offs$_{i,t+1}$	The net loans charged-off (written-off as uncollectable) scaled by total gross loans at the end of year *t* (source: SNL Financial).
ALL$_{i,t}$	The allowance for loan losses scaled by total gross loans at the end of year *t* (source: SNL Financial).
FVAFSSec$_{i,t}$	The unrealized gain or loss from AFS securities held by the bank reported in other comprehensive income scaled by the book value of securities at the end of *t* (source: SNL Financial).
FVHTMSec$_{i,t}$	The difference in the disclosed fair value of securities and the book value of securities scaled by book value of securities under ASC 825-10 (originally SFAS 107) as this amount relates to HTM securities at the end of year *t* (source: SNL Financial and hand collected).
RealizedGLSec$_{i,t+1}$	The realized gain or loss recognized for accounting purposes scaled by total book value of securities at the end of year *t* (source: SNL Financial).

Variable	Definition
$Abs\|\varphi_{i,t}\|$	Accounting quality measured as the absolute value of the estimated residual to Equation set (3) multiplied by 100, as described in Section 3.2. Higher values of $Abs\|\varphi_{i,t}\|$ correspond to lower values of accounting quality. Used to measure accounting quality of the allowance for loan losses, loan fair values and security fair values.
$\varphi_{i,t}$	The signed residual from Equation set (3) multiplied by 100. Used to measure accounting bias.
$FC_{i,t}$	An indicator variable equal to 1 when the bank-year is during the Financial Crisis (years 2006-2009) and zero otherwise.
$Tier1Capital_{i,t}$	The reported tier 1 capital at the end of year *t* (source: SNL Financial).
$CapTight_{i,t}$	An indicator variable equal to 1 when the bank is in the lowest quintile of tier 1 capital at the end of year *t* and zero otherwise (source: SNL Financial).
$ln(Total\ Assets)_{i,t}$	The natural logarithm of the book value of total assets (source: SNL Financial).
$LoanGrowth_{i,t}$	The percent change in loans from the beginning of year *t* to the end of year *t* (source: SNL Financial).
$DepositGrowth_{i,t}$	The percent change in deposits from the beginning of year *t* to the end of year *t* (source: SNL Financial).
$BigN_{i,t}$	An indicator variable equal to 1 when the bank uses a Big N auditor and zero otherwise (source: SNL Financial).

Appendix B

DEA Methodology

Introduced in the late 1970's, DEA uses a nonlinear non-convex programming model to estimate the relative efficiency of distinct "decision making units" at converting inputs (in this case bank resources) into outputs (in this case incomes) (Charnes, Cooper, and Rhodes, 1978). The DEA models efficiency with a ratio of outputs to inputs similar to a return on investment measure:

$$\Sigma^{s}_{i=1}\, u_i y_{ik} \,/\, \Sigma^{m}_{j=1}\, v_j x_{jk} \qquad k = 1,\ldots, n \qquad (7)$$

where s = the set of outputs considered, y = the known value of the output s for the k^{th} bank, m = the set of inputs considered, x = the known value of the input m for the k^{th} bank, and n = the number of decision making units (i.e. banks). However, unlike other efficiency ratios of outputs over inputs, the DEA efficiency measure does not require an "a priori specification of weights and /or explicit delineation of assumed functional forms of relations between inputs and outputs." In other words the DEA procedure does not assume that all inputs and outputs are equally valuable across all decision making units.

DEA is used in the banking literature in a variety of settings. For example DEA is used to measure the efficiency of individual bank branches (e.g. Sherman and Gold, 1985; Sherman and Ladino, 1995), the technical efficiency of banks in converting deposit resources into outstanding loans (Miller and Noulas, 1996; Luo 2003), and overall bank efficiency (Barr, Seiford and Siems, 1993; Luo, 2003; Kao and Liu, 2004).

I group banks by year and size to control for time variant factors and to ensure that banks are benchmarked against reasonable peers. I group the largest 100 banks within each year and

calculate the DEA procedure separately for the largest banks and all other banks.[23] I then maximize Equation (7) for each bank relative to the other banks in the sample. This involves solving for the weights, *u*'s and *v*'s, such that each bank is assigned bank-specific values for each *u* and *v* that maximize its own efficiency score relative to all other banks if those weights are applied. Weights are constrained to be non-negative as each bank input (resource) and output (revenue) are valuable. After each bank has been assigned unique optimal weights, the ratio-based efficiency scores are calculated by multiplying the optimal weights by the inputs and outputs. Efficiency scores are scaled by the highest score in the group. Thus efficiency scores range from zero to one with higher scores representing more efficient banks.[24]

The Inputs and Outputs for Bank Efficiency

In spite of or perhaps due to the sizeable DEA banking literature, no singular agreed-upon measure of bank managerial efficiency or ability exists (Luo, 2003). My objective is to measure the efficiency with which a bank manager converts its resources into revenues. Revenues include both interest and non-interest income, which make up the entire income stream for banks.

For bank's resources I model a set of inputs associated with funds available for investment and acquired intangibles as these accounts are influenced by management and impact management's ability to generate revenue. I vary the inputs between the DEA procedure for the largest 100 banks in each year and for the remaining banks. For the largest banks I include deposits, short-term borrowings, and advances from government regulatory agencies (FHLB

[23] Prior research documents the unique role of large banks in the economy (Janicki and Prescott, 2006; Khan, 2010). I assign 100 banks to the largest tier for each year to ensure an adequate sample size for the DEA to estimate the efficient frontier.

[24] For a more detailed discussion of the intuition behind the DEA procedure see Section 1 of Banker, Charnes and Cooper (1984).

advances and Fed Funds purchased). The mix between different resources can have a considerable impact on the nature of the investments that bank managers will select when investing. Thus I include each source of funds as a separate input in the DEA model. For the banks not in the largest 100 in each year I include deposits and only one borrowings measure equal to the sum of the three borrowing variables reference above (short-term borrowings, FHLB advances and Fed Funds purchased) as a more granular breakdown is not widely available.

For both DEA models I also include Goodwill, other acquired intangibles, such as core deposits, and derivative exposure, as these transactions represent investments that should generate future incomes and can restrict resources for other ventures. Finally for only the largest 100 banks I also include the amount of loans sold over the year (generally in the form of securitizations), as loans sales are at the discretion of management and free up resources for use in other projects. I only include this variable for the top 100 banks because loan sales either do not occur or occur in small percentage for the vast majority of average and small banks.[25]

For the largest 100 banks I optimize:

$$\text{Max}_{u,\,v}\ \theta = (u_1\text{Interest Revenue}_{i,t} + u_2\text{Non-interest Revenue}_{i,t}) / (v_1\text{Deposits}_{i,t} + v_2\text{FHLB Advances}_{i,t} + v_3\text{Fed Funds Purchased}_{i,t} + v_4\text{Other Short Term Borrowings}_{i,t} + v_5\text{Goodwill}_{i,t} + v_6\text{Other Acquired Intangibles}_{i,t} + v_7\text{Derivatives}_{i,t} + v_8\text{Loans Sales}_{i,t}) \quad (1a)$$

For average and small banks I optimize:

$$\text{Max}_{u,\,v}\ \theta = (u_1\text{Interest Revenue}_{i,t} + u_2\text{Non-interest Revenue}_{i,t}) / (v_1\text{Deposits}_{i,t} + v_2\text{Borrowings}_{i,t} + v_3\text{Goodwill}_{i,t} + v_4\text{Other Acquired Intangibles}_{i,t} + v_5\text{Derivatives}_{i,t}) \quad (1b)$$

[25] I estimate numerous variations of the model above including more and less aggregated inputs, combining the two revenue measures, and dropping individual inputs. The inferences of the study remain unchanged across the different DEA specifications.

The eight input variables are measured at the beginning of year *t* with the exception of Loan Sales which is estimated over the course of the year. I run the DEA procedure separately for each year in the sample to allow the efficient frontier to customize to the economic trends and opportunities available to bank managers during the year.

Converting Bank Efficiency to Managerial Efficiency

After creating the bank efficiency measure, I purge the measure of bank characteristics that affect efficiency but are outside of the control of management. I regress the bank efficiency measure on five such characteristics: bank size, bank age, cash availability, leverage and auditor type, similar to Demerjian et al. (2012). I expect large banks to operate more efficiently as they have greater negotiating power concerning rates and economies of scale concerning fixed costs. I proxy for bank size using both the natural log of total assets, as well as the natural log of the number of bank employees. I expect older, more established banks (measured as bank age) to benefit from reputational capital allowing them greater access to investment opportunities and greater negotiating power when entering into contracts, thus greater efficiencies. I expect banks with free cash flows to have few constraints in pursuing investment opportunities, but a highly levered bank would potentially be less efficient because leverage concerns could restrict management's investment choices. I include an indicator for Big N auditor as a proxy for governance or scrutiny. I expect better governed firms with Big N auditors to operate more efficiently due to the policies in place to guide the firm regardless of management decisions.

By regressing the DEA bank efficiency measure on the firm characteristics that may affect efficiency but are outside of management's control, the residual captures the efficiency

that is not related to these firm characteristics. I label the residual bank managerial ability (BMA). I use a Fama-Macbeth specification of the following regression:

$$\text{Bank Efficiency}_{i,t} = \alpha + \beta_1 \ln(\text{Total Assets})_{i,t} + \beta_2 \ln(\text{Employees})_{i,t} + \beta_3 \text{Free Cash Flow Indicator}_{i,t} + \beta_4 \ln(\text{Bank Age})_{i,t} + \beta_5 \text{Leverage}_{i,t} + \beta_6 \text{BigN}_{i,t} + \text{BMA}_{i,t} \quad (2 \text{ repeated}).$$

As noted in Demerjian et al. (2011) this regression approach likely understates the ability measure as the variables used in the regression above could be influenced by managerial ability or could influence the hiring of a manager (i.e. large firms hiring better managers). But conservatively attributing some managerial ability to the characteristics of the firm increases the likelihood that the residual captures only efficiency related to bank managerial ability and works against finding results in this study.

Table A1 presents results from the Equation (2) regression. The log of total assets and employees as well as the Big N auditor indicator estimates are statistically significant with p-values well below 0.05. The coefficient on bank age was marginally significant at the 10% level, and free cash flow and leverage were directionally consistent with predictions though not statistically significant. Several of the factors chosen here differ from those chosen by Demerjian et al. (2012) because of the nature of the banking industry. However, the factors used in this second stage regression by both papers exhibit similar coefficients. Finding significant correlations in Equation (2) supports the notion that the firm characteristics impact the efficiency measure and suggests that they should indeed be removed to create a managerial efficiency measure. Following this logic, I use the residual from Equation (2) as my bank managerial ability measure.

[Insert Table A1 here]

Table 1

Descriptive Statistics

This table reports descriptive statistics for the variables used in hypothesis test regressions and other variables of interest. Bank Efficiency is the result of the DEA procedure estimated for Equation (1) discussed in Section 3.1 in year t. BMA is the residual from Equation (2) described in Section 3.1 in year t. $Abs|\varphi_{i,t}|$ is the proxy for Accounting Quality directly measured as the absolute value of the estimated residual to equation set (3) depending on the type of the accounting estimate in year t described in section 3.2. Total Assets is the total book value of assets at the end of year *t* (here no logarithm is taken for ease of interpretation). LoanGrowth is the percent change in loans from the beginning of year *t* to the end of year *t*. DepositGrowth is the percent change in deposits from the beginning of year *t* to the end of year *t*. ALL is the allowance for loan losses scaled by total gross loans at the beginning of year *t*. Charge-offs is the net loans charged-off (written-off as uncollectable) scaled by total gross loans at the beginning of year *t*. NPL is non-performing loans (loans over 90 days past due but not deemed uncollectible by the bank) scaled by total gross loans at the beginning of year *t*. FVSec is the difference in the disclosed fair value of securities and the book value of securities scaled by total securities cost at the end of year *t*. RealizedGLSec is the realized gain or loss recognized for accounting purposes scaled by total securities cost at the beginning of year *t*. Variables are winsorized at the 1% and 99% level.

	N	Mean	Median	Std. Dev.	25%	75%
Bank Efficiency	16,517	0.539	0.482	0.496	0.363	0.651
BMA	16,517	-0.013	-0.037	0.159	-0.124	0.081
$Abs\|\varphi_{i,t}\|$						
ALL	16,517	0.383	0.227	0.532	0.110	0.410
FVSec	2,447	0.458	0.223	0.768	0.088	0.468
Total Assets ($M)	16,517	$2,194	$317	$8,491	$154	$781
Loan Growth	16,517	11.88%	8.71%	17.41%	1.75%	17.89%
Deposit Growth	16,517	10.82%	6.92%	16.26%	1.41%	15.21%
ALL	16,517	1.41%	1.25%	0.86%	0.98%	1.61%
Charge-offs	16,517	0.40%	0.14%	0.83%	0.00%	0.39%
NPL	16,517	1.38%	0.60%	2.33%	0.22%	1.47%
FVSec	2,447	0.11%	0.00%	0.67%	0.00%	0.09%
RealizedGLSec	2,447	0.02%	0.00%	0.86%	0.00%	0.02%

Table 2

Variable Correlations

This table reports univariate correlations for the variables used in hypothesis test regressions. Bank Efficiency is the result of the DEA procedure estimated for Equation (1) discussed in Section 3.1 in year t. BMA is the residual from Equation (2) described in Section 3.1 in year t. Abs|$\varphi_{i,t}$| is the proxy for Accounting Quality directly measured as the absolute value of the estimated residual to equation set (3) depending on the type of the accounting estimate in year t described in section 3.2. Total Assets is the total book value of assets at the end of year *t* (here no logarithm is taken for ease of interpretation). LoanGrowth is the percent change in loans from the beginning of year *t* to the end of year *t*. DepositGrowth is the percent change in deposits from the beginning of year *t* to the end of year *t*. ALL is the allowance for loan losses scaled by total gross loans at the beginning of year *t*. Tier1Ratio is the reported tier 1 capital at the end of year *t*. Charge-offs is the net loans charged-off (written-off as uncollectable) scaled by total gross loans at the beginning of year *t*. Variables are winsorized at the 1% and 99% level.

Emboldened correlation values represent statistical significance at the 5% for two-tailed tests.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Bank Efficiency	1							
(2) BMA	**0.543**	1						
(3) Abs|$\varphi_{i,t}$| - ALL	**-0.061**	**-0.095**	1					
(4) Abs|$\varphi_{i,t}$| - FVSec	**-0.067**	**-0.057**	**0.107**	1				
(5) Total Assets ($M)	**0.713**	**0.158**	0.032	**0.066**	1			
(6) LoanGrowth	-0.017	**0.060**	**-0.140**	**-0.065**	**-0.141**	1		
(7) DepositGrowth	**0.082**	**0.172**	-0.014	**-0.075**	**-0.092**	**0.616**	1	
(8) Tier1Ratio	**0.225**	**0.041**	**-0.083**	**-0.066**	**-0.288**	**-0.178**	**-0.212**	1

Table 3

Bank Managerial Ability and Accounting Quality of the Allowance for Loan Losses

This table reports results of the residual model described in sub-section 3.3 which regresses accounting quality for the allowance for loan losses on current period bank managerial ability and controls from 1994-2010. These regression equation and results shown below correspond to equation (4) in the text. Panel A reports both levels and changes analysis for the allowance for loan losses. Panel B divides the sample on size into the two subsamples used separately in the DEA procedure described in sub-section 3.1 and examines the allowance for loan losses. The regression results are presented separately for the largest 100 banks in each year and for all other banks. $Abs|\varphi_{i,t}|$ is the proxy for Accounting Quality directly measured as the absolute value of the estimated residual to equation set (3) in year t described in section 3.2. Bank Managerial Ability is the residual from Equation (2) described in Section 3.1 in year t. Ln(Total Assets) is the natural log of total assets at the end of year *t*. $LoanGrowth_{,t}$ is the percent change in loans from the beginning of year *t* to the end of year *t*. $DepositGrowth_{,t}$ is the percent change in deposits from the beginning of year *t* to the end of year *t*. $BigN_t$ is an indicator equal to 1 when the bank uses a Big N auditor in year *t* and zero otherwise. The "Levels" columns present the dependent variables at time t+1 regressed on independent variables at time t. The "Changes" columns present the change in dependent variable from time t+1 to time t+2, regressed on the change in independent variables from time t to time t+1. Variables are winsorized at the 1% and 99% level. The table reports OLS regressions coefficient estimates as well as t-statistics (t-statistics in parentheses) based on standard errors that have been adjusted for clustering by firm and year.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

$$Abs|\varphi_{i,t}| = \alpha + \beta_1 BMA_{i,t} + \beta_2 ln(Total\ Assets)_{i,t} + \beta_3 LoanGrowth_{i,t} + \beta_4 DepositGrowth_{i,t} + \beta_5 BigN_{i,t} + \varepsilon_{i,t}$$

Dependent Variable: Accounting Quality (Abs|φ|)	**Predicted Sign**	**Levels Model (I)**	**Changes Model (II)**	**Small and Average Banks (III)**	**Largest 100 Banks (IV)**
Intercept		0.274***	0.033	0.282***	-0.022
		(5.02)	(0.77)	(3.53)	(-0.08)
BMA	-	-0.134**	-0.149**	-0.160**	-0.112**
		(-2.11)	(-2.28)	(-2.55)	(-2.14)
Ln(Total Assets)	+/-	-0.027*	0.000	-0.026	-0.055*
		(-1.89)	(0.03)	(-1.37)	(-1.91)
LoanGrowth	+	-0.616***	-0.256***	-0.612***	-0.741**
		(-4.08)	(-2.37)	(-4.05)	(-3.58)
DepositGrowth	+	0.366***	0.215**	0.347***	0.511*
		(3.27)	(1.74)	(2.99)	(1.79)
BigN	-	-0.071**	-0.030**	-0.067*	-0.060
		(-2.04)	(-2.03)	(-1.80)	(-1.11)
Adj R^2		0.1308	0.1003	0.1328	0.1413
N		16,517	13,808	14,843	1,674

Table 4

Bank Managerial Ability and Accounting Quality of the Fair Values of Securities

This table reports results of the residual model described in sub-section 3.3 which regresses accounting quality for the allowance for loan losses on current period bank managerial ability and controls from 1999-2010. These regression equation and results shown below correspond to equation (4) in the text. Panel A reports both levels and changes analysis for the fair values of securities. Panel B divides the sample on size into the two subsamples used separately in the DEA procedure described in sub-section 3.1 and examines the fair values of securities. The regression results are presented separately for the largest 100 banks in each year and for all other banks. $Abs|\varphi_{i,t}|$ is the proxy for Accounting Quality directly measured as the absolute value of the estimated residual to equation set (3) in year t described in section 3.2. Bank Managerial Ability is the residual from Equation (2) described in Section 3.1 in year t. Ln(Total Assets) is the natural log of total assets at the end of year *t*. $LoanGrowth_{,t}$ is the percent change in loans from the beginning of year *t* to the end of year *t*. $DepositGrowth_{,t}$ is the percent change in deposits from the beginning of year *t* to the end of year *t*. $BigN_t$ is an indicator equal to 1 when the bank uses a Big N auditor in year *t* and zero otherwise. The "Levels" columns present the dependent variables at time t+1 regressed on independent variables at time t. The "Changes" columns present the change in dependent variable from time t+1 to time t+2, regressed on the change in independent variables from time t to time t+1. Variables are winsorized at the 1% and 99% level. The table reports OLS regressions coefficient estimates as well as t-statistics (t-statistics in parentheses) based on standard errors that have been adjusted for clustering by firm and year.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

$$Abs|\varphi_{i,t}| = \alpha + \beta_1 BMA_{i,t} + \beta_2 ln(Total\ Assets)_{i,t} + \beta_3 LoanGrowth_{i,t} + \beta_4 DepositGrowth_{i,t} + \beta_5 BigN_{i,t} + \varepsilon_{i,t}$$

Dependent Variable: Accounting Quality (Abs|φ|)	**Predicted Sign**	**Levels Model (I)**	**Changes Model (II)**	**Small and Average Banks (III)**	**Largest 100 Banks (IV)**
Intercept		-0.465***	0.006	-.400**	-0.626***
		(-4.26)	(0.59)	(-4.12)	(-5.26)
BMA	-	-0.254***	-0.292**	-0.255***	-0.293***
		(-3.38)	(-2.99)	(2.62)	(-2.99)
Ln(Total Assets)	+/-	0.042***	0.006***	0.033***	0.072***
		(2.92)	(5.86)	(2.63)	(4.51)
LoanGrowth	+	0.233*	0.112	0.048	0.378**
		(1.94)	(0.66)	(0.13)	(2.01)
DepositGrowth	+	0.520***	-0.191	-0.071	-0.053
		(3.19)	(-0.43)	(-0.84)	(-0.19)
BigN	-	0.117	-0.165***	-0.095	-0.077
		(-1.28)	(-3.58)	(-1.01)	(-0.14)
Adj R^2		0.1551	0.1001	0.1084	0.1956
N		2,447	2,160	2,148	299

Table 5

BMA and Accounting Quality During the Financial Crisis of 2007-2009

This table reports results of regressing accounting quality on current period bank managerial ability and controls, as shown in the equations below. Regressions were performed on the sample of all banks-years during the financial crisis (independent variables measured in 2006 to 2009). $Abs|\varphi_{i,t}|$ is the proxy for Accounting Quality measured as the absolute value of the estimated residual to equation set (3) in year t described in section 3.2. Bank Managerial Ability is the residual from Equation (2) described in Section 3.1 in year t. FC_t is an indicator variable equal to one when the bank-year is in the financial crisis and zero otherwise. $Size_t$ is the natural log of total assets at the end of year *t*. $LoanGrowth_{,t}$ is the percent change in loans from the beginning of year *t* to the end of year *t*. $DepositGrowth_{,t}$ is the percent change in deposits from the beginning of year *t* to the end of year *t*. $BigN_t$ is an indicator equal to 1 when the bank uses a Big N auditor in year *t* and zero otherwise. Variables are winsorized at the 1% and 99% level. The table reports OLS regressions coefficient estimates as well as t-statistics (t-statistics in parentheses) based on standard errors that have been adjusted for clustering by firm and year.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

$$Abs|\varphi_{i,t}| = \alpha + \beta_1 BMA_{i,t} + \beta_2 FC_{i,t} + \beta_3 BMA*FC_{i,t} + \beta_4 ln(Total\ Assets)_{i,t} + \beta_5 LoanGrowth_{i,t} + \beta_6 DepositGrowth_{i,t} + \beta_7 BigN_{i,t} + \varepsilon_{i,t}$$

Dependent Variable: Accounting Quality (Abs|φ|)	**Predicted Sign**	**Allowance for Loan Losses (I)**	**Fair Values of Securities (II)**
Intercept		0.289***	-0.436***
		(5.64)	(-4.87)
BMA	-	-0.157**	-0.335***
		(-2.25)	(-3.53)
FC	+	0.220**	0.301***
		(2.28)	(2.62)
BMA*FC	-	-0.219***	-0.412***
		(-3.01)	(-2.77)
Ln(Total Assets)	+/-	0.014	0.077***
		(1.42)	(4.89)
LoanGrowth	+	-0.584***	0.208**
		(-5.12)	(2.04)
DepositGrowth	+	0.321***	0.293**
		(5.13)	(2.37)
BigN	-	-0.024	-0.046
		(-1.19)	(-0.11)
Adj R^2		0.1604	0.1907
N		16,517	2,447

Table 6

BMA and Accounting Quality under Binding Capital Constraints

This table reports results of regressing accounting quality on current period bank managerial ability and controls for the subsample of banks with Tier 1 capital ratios in the lowest quintile of banks from 1994-2010 [1999-2010 for the securities analysis]. $Abs|\varphi_{i,t}|$ is the proxy for Accounting Quality directly measured as the absolute value of the estimated residual to equation set (3) in year t described in section 3.2. Bank Managerial Ability is the residual from Equation (2) described in Section 3.1 in year t. $CapTight_t$ is an indicator variable equal to one when the bank-year is in lowest quintile of tier 1 capital in year t and zero otherwise. $Size_t$ is the natural log of total assets at the end of year *t*. $LoanGrowth_{,t}$ is the percent change in loans from the beginning of year *t* to the end of year *t*. $DepositGrowth_{,t}$ is the percent change in deposits from the beginning of year *t* to the end of year *t*. $BigN_t$ is an indicator equal to 1 when the bank uses a Big N auditor in year *t* and zero otherwise. Variables are winsorized at the 1% and 99% level. The table reports OLS regressions coefficient estimates as well as t-statistics (t-statistics in parentheses) based on standard errors that have been adjusted for clustering by firm and year.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

$$Abs|\varphi_{i,t}| = \alpha + \beta_1 BMA_{i,t} + \beta_2 CapTight_{i,t} + \beta_3 BMA*CapTight_{i,t} + \beta_4 ln(Total\ Assets)_{i,t} + \beta_5 LoanGrowth_{i,t} + \beta_6 DepositGrowth_{i,t} + \beta_7 BigN_{i,t} + \varepsilon_{i,t}$$

Dependent Variable: Accounting Quality (Abs|φ|)	**Predicted Sign**	**Allowance for Loan Losses (I)**	**Fair Values of Securities (II)**
Intercept		0.293***	-0.447***
		(5.30)	(-4.17)
BMA	-	-0.120**	-0.230***
		(-2.45)	(-3.78)
CapTight	+	0.104***	-0.088
		(3.50)	(-0.56)
BMA*CapTight	+	0.134***	0.168
		(2.86)	(1.22)
Ln(Total Assets)	+/-	0.021	0.087***
		(1.52)	(4.44)
LoanGrowth	+	-0.622***	0.223**
		(-4.08)	(2.46)
DepositGrowth	+	0.343***	0.179**
		(3.00)	(2.08)
BigN	-	-0.068**	-0.070
		(-2.00)	(-0.17)
Adj R^2		0.1359	0.1507
N		16,157	2,447

Table 7

Bank Managerial Ability and Accounting Bias

This table reports results of the residual model described in sub-section 3.3 which regresses accounting quality for the allowance for loan losses on current period bank managerial ability and controls from 1994-2010 [1999-2010 for the securities analysis]. Panel A reports the results of regressing BMA and controls on the signed residual to equation set (3), $\varphi_{i,t}$. $\varphi_{i,t}$ is a proxy for the accounting bias directly measured as the signed value of the estimated residual to equation set (3) in year t described in section 3.2. Panel B reports results of regression equation (4) only in the subsample of banks in the top quintile of Tier 1 Capital. Abs|$\varphi_{i,t}$| is the proxy for Accounting Quality directly measured as the absolute value of the estimated residual to equation set (3) in year t described in section 3.2. Bank Managerial Ability is the residual from Equation (2) described in Section 3.1 in year t. Ln(Total Assets) is the natural log of total assets at the end of year *t*. LoanGrowth$_{,t}$ is the percent change in loans from the beginning of year *t* to the end of year *t*. DepositGrowth$_{,t}$ is the percent change in deposits from the beginning of year *t* to the end of year *t*. BigN$_t$ is an indicator equal to 1 when the bank uses a Big N auditor in year *t* and zero otherwise. Variables are winsorized at the 1% and 99% level. The table reports OLS regressions coefficient estimates as well as t-statistics (t-statistics in parentheses) based on standard errors that have been adjusted for clustering by firm and year.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Panel A: Accounting Bias and Bank Managerial Ability

$$\varphi_{i,t} = \alpha + \beta_1 BMA_{i,t} + \beta_2 \ln(\text{Total Assets})_{i,t} + \beta_3 \text{LoanGrowth}_{i,t} + \beta_4 \text{DepositGrowth}_{i,t} + \beta_5 \text{BigN}_{i,t} + \varepsilon_{i,t}$$

Dependent Variable: Accounting Bias (φ)	Predicted Sign	Allowance for Loan Losses (I)	Predicted Sign	Fair Value of Securities (II)
Intercept		-0.076		-0.101***
		(-0.90)		(-2.74)
BMA	-	-0.079*	+	-0.178**
		(-1.72)		(-2.42)
Ln(Total Assets)	?	0.072***	?	0.061***
		(3.53)		(2.59)
LoanGrowth	?	-0.234	?	-0.297*
		(-1.18)		(-1.91)
DepositGrowth	?	0.115	?	0.289**
		(0.67)		(2.32)
BigN	-	-0.157***	-	0.056
		(-2.78)		(0.70)
Adj R^2		0.1173		0.0541
N		16,517		2,447

Panel B: Accounting Quality for Banks in the Top Quintile of Tier 1 Capital

$Abs|\varphi_{i,t}| = \alpha + \beta_1 BMA_{i,t} + \beta_2 ln(Total\ Assets)_{i,t} + \beta_3 LoanGrowth_{i,t} + \beta_4 DepositGrowth_{i,t} + \beta_5 BigN_{i,t} + \varepsilon_{i,t}$

Dependent Variable: Accounting Quality (Abs|φ|)	**Predicted Sign**	**Allowance for Loan Losses (I)**	**Fair Value of Securities (II)**
Intercept		0.234***	0.757***
		(3.27)	(3.18)
BMA	-	-0.131**	-0.249***
		(-1.99)	(-2.82)
Ln(Total Assets)	+/-	0.017	-0.052***
		(1.27)	(-3.20)
LoanGrowth	+	-0.406***	0.241*
		(-3.79)	(1.85)
DepositGrowth	+	0.463***	0.313***
		(3.74)	(2.93)
BigN	-	-0.057**	-0.022
		(-2.15)	(-1.16)
Adj R^2		0.1341	0.1091
N		3,021	342

Table A1: Converting Bank Efficiency to Bank Managerial Ability

This table reports the estimated coefficients and Fama-Macbeth t-statistics for Equation (2) from 1994- 2010. Residuals from this estimation are my Bank Managerial Ability measure, BMA. Bank Efficiency is the result of the DEA procedure estimated on Equation (1) as described in section 3.1. Total Assets is the book value of total assets at the end of year t. Employees is the number of full time equivalent employees employed by the bank at the end of year t. Free Cash Flow Indicator is an indicator variable equal to 1 when a bank reports non-negative cash from operations on its Statement of Cash Flows in year t. Bank Age is the number of years the bank has been listed in SNL at the end of year t. Leverage is the ratio of liabilities to equity at the bank at the end of year t. Big N is an indicator variable equal to 1 when the bank is audited by a BigN auditor during year t and 0 otherwise.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Dependent Variable = Bank Efficiency				
	Predicted Sign	Coefficient (Fama-MacBeth t-statistic)	Percent with Predicted Sign	Percent Significant with Predicted Sign
Intercept		0.06***		
		(3.54)		
Ln (Total Assets)	+	0.047***	85.7%	71.4%
		(3.22)		
Ln (Employees)	+	0.057***	90.5%	71.4%
		(4.11)		
Free Cash Flow	+	0.004	76.2%	28.6%
Indicator		(1.16)		
Ln (Bank Age)	+	0.018*	71.4%	38.1%
		(1.65)		
Leverage	-	-0.002	85.7%	28.6%
		(-1.43)		
BigN	+	0.030**	90.5%	52.4%
		(2.11)		
Year Fixed Effects		Included		
N		19,426		
Adjusted R^2		0.4197		

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EDUCATION

The University of Texas at Austin — Austin, Texas
McCombs School of Business — August 2008-Present
PhD Candidate in Accounting
Area of Interest: Financial Accounting
Research Method: Empirical/Archival

The University of Mississippi — Oxford, Mississippi
Patterson School of Accountancy — May 2006
Master of Accountancy
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College of Liberal Arts — August 2005
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Major: Mathematics
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PROFESSIONAL EXPERIENCE

KMPG LLP — Birmingham, Alabama
Senior Associate: Audit — 2006-2008

RESEARCH INTERESTS

Financial Accounting/Reporting, Capital Markets

TEACHING INTERESTS

Financial Accounting/Reporting, Financial Statement Analysis

DISSERTATION

"Bank Managerial Ability and Accounting: Do Better Managers Offer Higher Quality Loan Loss Reserves and Fair Values?"

RESEARCH PAPERS & WORKS IN PROCESS

"Predicting Credit Losses: Loan Fair Values versus Historical Costs"
Coauthored with John McInnis and Chris Yust
Revising for Third Round Review at The Accounting Review

"The Consequences of Firms' Responses to the Standard Setting Process"
Coauthored with Chris Yust

TEACHING

University of Texas at Austin Summer 2009
Assistant Instructor – Taught Fundamentals of Managerial Accounting

GRADUATE WORK APPOINTMENTS

Research Assistant

Dr. Shuping Chen (Texas)	Fall 2009 - Present
Dr. Urton Anderson (Texas)	Fall 2008-Spring 2008

Teaching Assistant

Dr. Shuping Chen (Texas)	Fall 2009 - Present
Doug deVidal (Texas)	Spring 2012
Dr. Urton Anderson (Texas)	Fall 2008 – Spring 2008
Dr. James W. Davis, (Mississippi)	Fall 2005 –Spring 2006

CONFERENCE & WORKSHOP PRESENTATIONS

2012 University of Mississippi Fall Workshop Series	Oxford, MS
2012 UT Workshop Series (Presenter)	Austin, TX
2012 AAA Annual Meeting (Accepted Paper)	Washington, DC
2012 FARS Section Mid-year Meeting (Presenter)	Chicago, IL
2012 Lone Star Conference (Accepted Paper)	Houston, TX
2009, 2010, 2012 UT Brown Bag Series (Presenter)	Austin, TX

CONFERENCES ATTENDED	2012 AAA Annual Meeting	Washington, DC
	2012 UT Spring Accounting Conference	Austin, TX
	2012 FARS Section Mid-year Meeting	Chicago, IL
	2011 KPMG Bank MD&A Disclosures Workshop	Las Vegas, NV
	2011 KPMG Bank SEC Reporting & Reporting Course	Las Vegas, NV
	2011 UT Spring Accounting Conference	Austin, TX
	2011 Lone Star Conference	Fort Worth, TX
	2011 FARS Section Mid-year Meeting	Tampa, FL
	2010 AAA Annual Meeting	San Fran., CA
	2010 The Intersection of Economics and Psychology	Austin, TX
	2010 FARS Section Mid-year Meeting	San Diego, CA
	2010 FARS Section Doctoral Consortium	San Diego, CA
	2009 Lone Star Conference	Austin, TX
	2009 AAA Annual Meeting	New York, NY
	2009 KPMG IFRS Seminar	Austin, TX
	2009 Accounting and Corporate Governance	Austin, TX
	2008 Financial Economics and Accounting Conference	Austin, TX

ADDITIONAL EDUCATION

2011 University of Texas Summer Stats Inst., Structural Equation Modeling
2010 University of Texas Summer Stats Inst., Data Analysis and Mining
2010 Participant/Leader of Capital Markets Readings Group

PROFESSIONAL CERTIFICATIONS

Certified Public Accountant, Mississippi (inactive)
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HONORS & AWARDS

William W. and Ruth F. Cooper Fellowship – UT Austin 2011
Bonham Fellowship – UT Austin 2010
McCombs School of Business Fellowship – UT Austin 2008-2009, 2012
University of Mississippi Graduate School Fellowship 2005-2006
Friou Scholar – Patterson School of Accountancy 2001-2005
Finley Freshman Scholar - University of Mississippi 2001-2002
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