Did the SEC Impact Banks’ Loan Loss Reserve Policies and their Informativeness?

Paul J. Beck
College of Business
284 Wohlers Hall, MC-706
1206 S. Sixth Street
Champaign, IL 61820
Ph: 217-333-4563
Fax: 217-244-0902
p-beck2@illinois.edu

Ganapathi S. Narayanamoorthy
College of Business
284 Wohlers Hall, MC-706
1206 S. Sixth Street
Champaign, IL 61820
Ph: 217-244-6707
Fax: 217-244-0902
gnarayan@illinois.edu

The authors gratefully acknowledge the data on troubled loans provided by Keefe, Bruyette, and Woods (KBW) and insightful discussions with Brian Kleinhanzl of KBW and Bill Saska of the FDIC. Discussions with S.P. Kothari considerably helped organize and delineate the contributions of the study. The authors also appreciate the detailed comments received from the anonymous referee, Wayne Guay (editor), AAA Annual Meeting discussant Dushyant Vyas, Rashad Abdel-Khalik, Keith Czerney, Theodore Sougiannis, Jayanthi Sunder, William Wright, Trevor Wilkins and participants at the University of Illinois and National University of Singapore Research Forums. Po-Chang Chen and Hui Zhou rendered excellent timely research assistance.
Did the SEC Impact Banks’ Loan Loss Reserve Policies and their Informativeness?

During the late 1990’s, the SEC alleged that banks were overstating their loan loss allowances to establish cookie jar reserves and issued new guidance on allowance estimation designed to improve financial reporting quality. We show that banks’ estimation methods changed in response to the guidance and significantly impacted the informativeness of the allowances, both in explaining future losses and security returns. While the SEC’s guidance has improved the informativeness of allowances for strong banks, it has had the opposite effect on weak banks whose incentives are to understate allowances. Our results help to explain why some (weak) banks delayed loss recognition during the recent financial crisis—a factor that has been recognized as contributing to pro-cyclical lending policies that amplified the severity of the financial crisis. Analysis by loan type shows that allowances of banks with large concentrations of real estate loans had diminished informativeness in response to the SEC’s guidance.

Keywords: Loan Loss Allowances; Provisions; Bank Accounting; Smoothing; SEC; Regulatory Intervention

JEL Descriptors: G14, G21, M41
Did the SEC Impact Banks’ Loan Loss Reserve Policies and their Informativeness?

1. Introduction

During the mid to late 1990’s, the Securities and Exchange Commission (SEC) became concerned that some banks were overstating loan loss allowances to create cookie jar reserves for the purpose of smoothing income over time (Levitt 1998; Wall and Koch 2000). In contrast with traditional bank regulators, who emphasized the monitoring of loan portfolio risk and the adequacy of loan loss allowances and capital, the SEC was concerned that earnings management activities reduced the informativeness of accounting information. To address this concern, the SEC issued Staff Accounting Bulletin (SAB) 102 in 2001. The intent of SAB 102 was to provide guidance to banks in developing their loan loss estimates and implementing controls over the estimation process.

We theorize that SAB 102 guidance, coupled with monitoring by examiners and auditors, encouraged banks to increase the emphasis placed on historical charge-offs and implicitly led to a reduced emphasis on loans classified as non-performing (non-accrual) when developing their loan loss allowance estimates. After controlling for economic conditions and loan portfolio composition, we present evidence consistent with our theoretical arguments. We then examine whether SAB 102 guidance and bank monitoring led to improved informativeness of loan loss provisions and allowances in accordance with the SEC’s objectives. Since previous studies have argued that non-performing loans provide a more timely measure of loss than charge-offs (Beaver et. al. 1989; Liu and Ryan 1995, 2006) there is reason to expect that the informativeness of allowances could be impacted by this change. We consider two measures of informativeness — the ability of allowances to explain future charge-offs and the association between changes in loan loss provisions and short-

---

1 Several studies (Liu and Ryan 1995, 2006 and Kanagaretnam et. al. 1998) provide evidence that banks have attempted to use loan loss provisioning as a means of smoothing reported earnings.
window security returns. Since prior research has demonstrated that earnings management incentives affect banks’ loan loss provisioning (Moyer 1980, Kross and Kim 1998, Kanagaretnam et al. 2004, among others), we partition banks into strong and weak groups based on relative profitability. For strong banks, we find that loan loss allowances and provisions better explain future charge-offs and security returns, respectively, in periods after SAB 102. However, we find the opposite effect for weak banks as the informativeness of allowances and provisions declined in periods after SAB 102 guidance became effective. The improving trend among the strong banks and the deteriorating trend among weak banks after SAB 102 culminated in substantial differences in the informativeness of allowances and provisions just prior to the financial crisis.

We attribute the divergent effects for strong and weak banks to several factors. First, the ability of past charge-offs to explain future charge-offs depends on the stability of the environment. Weak banks are more likely to operate in unstable environments and face greater pressures to make strategic and operational changes to improve performance. Since allowances based on past charge-offs are inherently less informative when banks face unstable environments, any regulation requiring banks to increase the relative weight on charge-offs when estimating allowances should impact weak banks more adversely than strong banks. A further factor reinforcing these effects is that weak banks may delay loss provisioning relative to strong banks (see Liu and Ryan 2006) and such delays will diminish the ability loan loss allowances to explain future losses. Our results indicate that the informativeness of financial reporting improved significantly for strong banks, thus, implying that SAB 102 guidance achieved its objective of constraining earnings management.

---

2 An alternative partition based on capital ratio yields similar results.

3 In un-tabulated results, we find that the association between current and lagged earnings before provisions for the strong banks is approximately triple the corresponding earnings association for weak banks. These substantial differences are consistent with other studies in non-bank contexts (see, for example, Connolly and Schwartz 1985 and Basu 1997) showing higher mean reversion in earnings for firms in weak financial condition.
by strong banks. However, the regulation designed to control overstatement of provisions and allowances by strong banks may have provided weak banks with an opportunity for delaying loss provisioning and reducing their allowances. We speculate that bank regulators may have recognized this unintended consequence of SAB 102 and acted to discourage such behavior by issuing new loan loss guidance that became effective in December 2006. Our results help to explain why some weak banks delayed their loss recognition until the outset of the financial crisis, thus, leading to pro-cyclical lending policies (see Beatty and Liao 2011).

Contemporaneous with regulatory changes, economic conditions and banks’ loan portfolios also changed during the 1992–2008 time interval of our study. We control for changes in regulation and economic conditions by partitioning our data into six time periods and by including macroeconomic variables. Since loan composition changed over time and the ability to predict future losses is likely to vary among loan types (see Liu and Ryan 2006 and Ryan 2007), changes in the composition of banks’ loan portfolios could provide an alternative explanation for the effects that we have attributed to SAB 102. Accordingly, we analyzed separately three types of loans for which data are available: non-mortgage (unsecured) loans to individuals, real estate loans and commercial loans and sorted banks into high and low groups based on their loan proportions in each of the three categories. Our results confirm that the allowance-charge-off associations are sensitive to loan composition. However, given the observed changes for these loan types (real estate loans increased substantially, loans to individuals decreased moderately, and commercial loans decreased slightly), the differences observed in allowance-charge-off associations between banks with high and low loan concentrations are not consistent with loan composition providing a competing explanation for results attributed to SAB 102. The finding that banks with high concentrations of real estate loans had diminished ability to predict future charge-offs in periods after SAB 102 illustrates another

---

4 We acknowledge the anonymous reviewer for encouraging our investigation of loan types.
unintended consequence of the regulation. The finding of delayed loss recognition by banks with high real estate concentration is noteworthy in view of the widespread opinion that problems in the real estate market were a primary factor responsible for the financial crisis (Thomas, Hennessey and Holtz-Eakin 2011).  

Given the importance of loan loss estimates, numerous studies have examined the sensitivity of loan loss allowances and provisions to earnings management incentives, tax incentives, and compliance with regulatory capital requirements. However, this study is the first to analyze the effect of the SEC’s regulatory intervention on loan loss estimates in the banking industry and to document inter-temporal changes in allowance-charge-off associations and to analyze their sensitivity to loan portfolio composition. Finally, our finding that allowances became more responsive to past charge-offs after the SEC’s intervention provides a new explanation why loss provisioning became more delayed and allowance-charge-off associations declined. As noted by Beatty and Liao (2011), delays in loss recognition are important since they exacerbated pro-cyclical lending policies leading up to the recent financial crisis and lend support to the concerns about the implications of delayed loan loss recognition identified by former bank regulators (Dugan 2009 and Ludwig 2009).

---

5 In any longitudinal study over an extended period (1992 to 2008), many factors in the banking environment are subject to change both individually and in combination. We have attempted to control for several of these factors by partitioning into sub-periods, including macro-economic effects using the unemployment rate and Case-Shiller real estate price index and for changes in loan composition using three disaggregated loan categories that are available for the entire time period. Our differences-in-differences analysis shows striking changes in banks’ allowances around the time of the SEC’s intervention. Notwithstanding the efforts to control for other factors described above, we acknowledge that it is possible there are other factors (that we do not have controls for) that may have contributed to the inter-temporal changes documented. At a minimum, our results indicate that the SEC’s intervention was a turning point in the way in which banks’ estimated their loan loss allowances.

6 Several early studies (see Moyer 1990, Wahlen 1994, Beatty et.al. 1995, and Collins et. al. 1995) hypothesized that banks’ motivation to maintain capital ratios to satisfy bank regulators would influence loan loss provisioning. These studies examined the trade-offs between the tax advantages of accelerating the expensing of loan losses to reduce taxes, the incentives to smooth income, and compliance with capital ratios.
The remaining sections of this paper are organized as follows. Section 2 presents a further
discussion of bank regulation and factors that would be expected to impact banks’ loan loss
allowances and their ability to predict future losses and, thus, provides conceptual support for the
hypotheses presented in Section 3. In Section 4, we discuss the research design and present
empirical results in Section 5. Section 6 contains our conclusions and research implications.

2. Background

2.1 Loan Portfolio Risk Metrics

In 1980, the Federal Financial Institutions Examination Council (FFIEC) issued the Uniform
Credit Classification and Account Management Policy (UCCAMP) requiring banks to classify
retail loans based on risk, charge-off delinquent loans, and report this information privately to bank
regulators. Paralleling UCCAMP guidance, banks also have been required since 1983 to
supplement their financial statements with risk-based disclosures of non-performing loans (NPL)
and charge-offs. Keeton and Morris (1987) contend that charge-offs and NPL are the two most
important risk metrics for evaluating loan portfolio risk and loan loss allowance adequacy and
recommend that the metrics be utilized concurrently.\(^7\)

Both NPL classifications and charge-offs are based primarily on the length of time elapsing
since borrowers stopped making payments. UCCAMP requires banks to classify retail loans as NPL
and discontinue the accrual of interest when they are 90 days’ delinquent unless they are protected
against losses by collateral or the loans are currently being restructured. UCCAMP also requires
banks to charge-off loans when they become delinquent by 120 to 180 days (depending on loan

\(^7\)The Comptroller’s Handbook also provides guidance to bank examiners in evaluating the adequacy of allowances.
Examiners are required to evaluate several key ratios (that depend on charge-offs and NPL) in assessing the adequacy
of loan loss allowances. Examples include: allowance to net charge-offs, Allowance to total loans and allowance to
non-accrual loans and leases.
However, it should be noted that banks have the ability to implement shorter time intervals for classifying loans as NPL and recording charge-offs.\textsuperscript{8} The Comptroller’s Handbook: Rating Credit Risk (2001, p. 32) states: “There is no requirement that a loan must be delinquent for 90 days before it is placed on nonaccrual. Once reasonable doubt exists about a loan’s collectability, the loan should be placed on nonaccrual.”

The relative informativeness of charge-offs and NPL as risk metrics involves trade-offs between relevance and reliability. Since shorter time periods are typically used in classifying loans as NPL relative to those used for writing-off loans as uncollectible (i.e., recording charge-offs), NPL can be viewed as a timelier indicator of loan risk than charge-offs (see Liu and Ryan 1995, 2006). However, NPL is a noisy indicator of the future loss in that it represents the book value of loans that are deemed to be at risk and, thus, fails to consider the offsetting loss protection provided by collateral.

\textit{2.2 Loan Loss Guidance before the SEC’s Intervention}

During the mid to late 1980’s, numerous banks experienced substantial loan losses from defaults (Liu and Ryan 1995). Since bank regulators have responsibility for protecting bank depositors and the banking system as a whole against such losses, they responded to the increased loss threat by issuing additional guidance (e.g., FFIEC 1993 Policy Statement) to bank managers and bank examiners regarding loan and lease losses and by increasing bank scrutiny. The 1993 FFIEC Policy Statement provides both quantitative benchmarks and guidance based on

\textsuperscript{8} In July 1999, the FFIEC issued further guidance for loan classifications and charge-offs that was to become effective in December of 2000. However, in July 2000, the FFIEC issued revised guidance. The 2000 guidance re-affirmed the 90-day limit for classifying loans as non-performing and the general (maximum) time periods (of 120 to 180 days depending on loan type) for recording charge-offs. However, the new guidance imposed shorter time frames for charging-off loans where the borrowers have filed for bankruptcy (60 days) or have become deceased (30 days). These shorter time frames should improve the timeliness of charge-offs as a risk indicator used in estimating allowances for loan losses.
consideration of qualitative factors (e.g., economic conditions, past loss rates, and lending policies) for bank managers and examiners to use when evaluating the adequacy of allowances. We note the prominence of the charge-off history and non-performing loans (NPL) risk metrics in the FFIEC’s quantitative allowance guidelines: 50% for loan portfolios classified as doubtful (non-performing), 15% for loan portfolios classified as sub-standard, and the average net charge-off rate over the prior two years for all loans not included in the two preceding categories. After presenting the quantitative guidelines, the 1993 Policy statement (p. 8) made it clear that these percentages were “neither a floor nor a safe harbor” and that banks need to incorporate “an additional margin to reflect the imprecision inherent in estimates of expected credit losses.” The FFIEC 1993 Policy Statement (p. 38) also addresses the issue of using historical loss rates to estimate allowances for loan and lease losses (ALLL):

Although historical loss experience provides a reasonable starting point for the institution's analysis, historical losses, or even recent trends in losses are not, by themselves, a sufficient basis to determine the appropriate level for the ALLL. Management should also consider any factors that are likely to cause estimated credit losses associated with the institution’s current portfolio to differ from historical loss experience…


Although historical loss experience provides a reasonable starting point for the bank's analysis, historical losses, or even recent trends in losses, cannot be accepted without further analysis. Regardless of the methodology used, the bank must adjust the historical loss percentage for each pool to reflect the impact of any current conditions on loss recognition. The adjustment should reflect management's best estimate of the level of charge-offs that will be recognized. (emphasis added)

2.3 The SEC’s Intervention and Response by Bank Regulators
The traditional focus by bank regulators on the adequacy of loan loss allowances and capital to absorb charge-offs constrained the ability of weak banks to understate their loan loss provisions and allowances. However, bank regulators did not have comparable incentives to challenge banks that inflated their loan loss provisions and allowances. Thus, an asymmetric regulatory environment was created with respect to upward and downward management of loan loss allowances. Recognizing the asymmetric focus by bank regulators on allowance adequacy, the SEC became concerned that financial reporting quality was being jeopardized by banks’ inflating allowances to create cookie jar reserves for smoothing income (See Levitt 1998, Wall and Koch 2000, and Liu and Ryan 2006).

The SEC’s concerns about earnings management by banks led to several regulatory initiatives. The early initiatives included mailing letters to banks questioning their loan loss allowances and the highly publicized investigation of SunTrust Bank that culminated in a large downward $100 million restatement of their loan loss allowance. Following the SunTrust investigation and restatement, the SEC’s regulatory initiatives became a major source of concern to both banks and bank regulators who jointly encouraged the US Congress to hold hearings. During Congressional testimony, a member of the Board of Governors of the Federal Reserve (Meyer 1999), in responding to the SEC’s investigation of SunTrust bank, stated that:

The SEC raised concerns regarding the loan loss reserve practices of some banking organizations [by] requiring one banking organization to reduce its reserves by $100 million. The federal banking agencies were concerned about these actions from a safety and soundness standpoint….In addition, around this time, the SEC issued letters to a number of banking organizations regarding their loan loss allowance disclosure practices. Taken together, these developments generated additional uncertainty in the banking industry and may have created a perception that loan loss allowances would have to be reduced.

Senior Deputy Comptroller for Bank Supervision, Emory Rushton (1999) also took direct issue with the SEC’s position that banks were inflating their loan loss allowances. During Congressional testimony, Rushton (1999, p. 1) stated:
Our opinion is that national banks, as a group, are not materially over-reserved or under-reserved. That’s why we’re so concerned about any [SEC] action that might have the effect, albeit unintended, of applying general downward pressure on bank reserves.

2.4 SAB 102/FFIEC 2001 Policy Statement

Despite the concerns voiced by banks and bank regulators during Congressional hearings, the SEC issued new loan loss guidance to banks in SAB 102 and succeeded in pressuring the FFIEC (2001) to issue contemporaneously a Policy Statement affirming the guidance provided by SAB 102. At face value, the FFIEC’s 2001 Policy Statement represents a public commitment to enforce SAB 102 guidance through their examination and other regulatory monitoring activities. Meeting this commitment, however, would require bank regulators to alter their traditional focus on allowance adequacy by also scrutinizing allowances for overstatement. Given the prior opposition of bank regulators to the SEC’s intervention, an alternative interpretation is that the FFIEC’s 2001 Policy Statement served primarily as a symbolic or political gesture to placate the SEC and encourage their timely departure from the realm of bank regulation. Under the latter interpretation, it is possible that bank regulators retained their traditional focus on the adequacy of loan loss allowances and did not vigorously enforce SAB 102/FFIEC guidance.

SAB 102 and the FFIEC (2001) Policy Statement provide guidance for the loan loss estimation process within the context of US GAAP. SAB 102 guidance requires banks to use a consistent loan loss estimation methodology and also implement controls over the loan loss estimation process.

---

9 Statement of Financial Accounting Standards (SFAS) 5 requires banks to anticipate losses on pools of homogeneous loans (e.g., credit card and residential mortgage). However, under SFAS 114, banks establish allowances for heterogeneous loans (e.g., commercial loans) on an individual basis and wait until evidence exists that a particular loan has become impaired before establishing an allowance. Since the allowances on heterogeneous loans under SFAS 114 are based on loan-specific factors and the methods used to value collateral in the event of borrower default and were not changed by SAB 102, banks with high concentrations of heterogeneous loans are unlikely to be impacted as much as those with high concentrations of homogeneous loans. However, within the homogeneous loan category, there are differences (presence of collateral and special UCCAMP rules for risk classifications of residential one to four family real estate loans) that affect the ability of NAL and charge-offs to measure risk and the ability of allowances to explain future losses.
While SAB 102/FFIEC guidance to banks and the attendant control monitoring by examiners and financial statement auditors do not force banks to base their loan loss provisions exclusively on historical charge-offs, we argue that they nonetheless create several mutually reinforcing incentives for banks to increase their reliance on historical charge-off rates when estimating loan loss allowances. First, in direct contrast with the guidance in the 1993 FFIEC Policy Statement and Comptroller’s 1996-1998 Handbook requiring banks to adjust historical loss rates when estimating allowances, SAB 102 guidance permits adjustment, but fails to make adjustment of historical loss rates a requirement. A second feature of SAB 102 is that banks are required to implement a control requiring periodic comparisons of loan loss provisions and allowances with actual loss (charge-off) rates. We contend that this control implicitly creates an obligation to justify deviations between allowance estimates and charge-offs. Furthermore, as bank examiners and auditors are required by SAB 102 to review controls over the allowance estimation process, their control monitoring activities are expected to reinforce its importance. Thus, banks have a further motivation for basing allowances on historical charge-off rates to reduce the risk of regulatory challenge and provide a strong defense in the event of regulatory challenge. Finally, as historical charge-off rates were already being documented and reported to bank regulators, no incremental informational burden was being imposed on banks.

2.5 New FFIEC Policy Statement

In December of 2005, the FFIEC issued additional guidance to both banks and bank examiners regarding ALLL that became effective for reporting periods after December 2006. We conjecture that issuance of the policy statement was motivated by growing concerns at the time about the dangers of placing heavy reliance on historical charge-off rates in the midst of changing economic conditions. In any event, the new FFIEC statement emphasized the need for banks to adjust their historical charge-off rates (used in estimating ALLL) for changes in economic conditions and their
own lending policies. However, this guidance stops well short of the 1993 Policy Statement and 1996-1998 Comptroller’s Handbook requirement that banks must adjust historical loss rates. A further difference is that the Policy Statement requires banks to provide justification for adjustments in supporting documentation and perform independent reviews of the documentation by persons within the bank who were not involved in preparing the estimates. Additionally, the bank’s board of directors is now required to review annually the bank’s loan loss policies and procedures and documentation while bank examiners and external auditors are required to evaluate the adequacy of banks’ ALLL’s and controls over loan loss policies. Another notable feature of the FFIEC’s new guidance is that losses on impaired, collateral-dependent loans be measured by valuing the underlying collateral and comparing it with the loan book value. In summary, while the 2005 FFIEC Policy Statement has modified the SAB 102/FFIEC 2001 Policy Statement by recognizing the need to make adjustments to historical loss rates when estimating allowances under changing conditions, it maintains constraints on banks’ discretion in estimating ALLL’s, and thus, stops well short of restoring to banks the discretion permitted by the 1993 FFIEC Policy Statement and 1996-1998 Comptroller’s Handbook.

3. Hypotheses

Dating back to Beaver, Eger, Ryan, and Wolfson (1989), accounting researchers have included NPL or non-performing assets (NPA) as a control for loan portfolio risk. The NPL category reported by banks to regulators (and to the SEC) represents an aggregation of two separate components: non-accrual loans (NAL) and troubled debt restructured loans. NPA is even broader in

---

10 The FDIC’s (2005) Risk Management Manual of Examination Policies (section 3.2) states that, “While historical loss experience provides a reasonable starting point, historical losses, or even recent trends in losses, are not by themselves, a sufficient basis to determine an adequate level. Management should also consider any factors that are likely to cause estimated losses to differ from historical loss experience.” The FDIC manual goes on to identify several change factors including: “lending policies, loan volume, loan types, economic conditions, controls (lending policies and procedures, loan review, board oversight, experience of lending managers), and the volume and severity of past due, nonaccrual, restructured, or classified loans, and concentrations of credit.”
that it includes both NPL and foreclosed assets. Since restructured loans and foreclosed assets are reported at realizable value, expected losses on those loans already have been recorded. Thus, we would expect NAL to have a stronger association with future charge-offs than the more aggregate measures of NPA and NPL. As such, we employ non-accrual loans (NAL) as a risk measure and formulate the hypotheses accordingly.\(^\text{11}\)

Consistent with regulators’ reliance on charge-offs and NAL as loan risk metrics, we expect that banks’ loan loss allowances (ALLL) will be positively associated with both NAL and charge-offs. However, since SAB 102/FFIEC regulatory guidance requires banks to justify their ALLL vis-à-vis past charge-offs, we expect ALLL to become more highly associated with past charge-offs after the SEC’s intervention and less associated with NAL, thus, leading to the following hypothesis:

H1: After the SEC’s intervention, current ALLL will be more associated with past charge-offs and less associated with NAL.

3.2 Bank Size Effects and Allowance Associations

While H1 predicts that banks will place a greater emphasis on past charge-offs in structuring ALLL and less emphasis on NAL, we do not expect that all banks will respond uniformly to SAB 102 guidance. Many small banks tend to be privately owned and do not come under the SEC’s jurisdiction. A further size-related factor causing variation in the enforcement of SAB 102/FFIEC guidance among large and small banks is related to the role of bank examiners and auditors. The Federal Deposit Insurance Corporation Improvement Act (FDICIA) requires financial statement auditors and bank examiners to evaluate controls of banks having assets over 500 million USD (later 1 billion USD). Altamuro and Beatty (2010) present evidence that these control provisions of the FDICIA regulation led to differences in financial reporting quality between large and small

\(^{11}\) To ensure that our results are not sensitive to the NAL specification, however, we have also used the NPL specification in our robustness tests. As NAL accounts for a very high percentage of NPL and NPA, it is not surprising that the results are not affected by the specification.
banks. We have argued in Section 2 that the SAB 102/FFIEC control requiring periodic comparisons between ALLL and past charge-offs can serve to create added pressure on banks to emphasize historical charge-offs in the ALLL estimation process. As such, the bank size criterion for control evaluation under FDICIA should lead to greater enforcement of SAB 102 guidance among large banks. Furthermore, the size effect will be reinforced in later periods by the Sarbanes-Oxley Act (SOX) as auditors of public banks following the Public Company Accounting Oversight Board’s (PCAOB) control evaluation guidance are required to extend the evaluation of controls from design to operating effectiveness.\textsuperscript{12} Thus, we hypothesize the following size effect associated with enforcement of SAB 102/FFIEC guidance:

\textbf{H2:} The association between current ALLL and past charge-offs (NAL) will increase (decrease) more among large banks than among small banks after issuance of SAB 102/FFIEC guidance.

### 3.3 Earnings Management Incentives and Allowance Associations

In this section, we develop hypotheses about how the effects of SAB 102 will vary cross-sectionally based on bank profitability. Prior research indicates that high and low profit banks have incentives to manage ALLL in different ways (Liu and Ryan 2006, Kanagaretnam, Lobo, and Yang 2004). In particular, the smoothing hypothesis implies that profitable (strong) banks have incentives to accelerate loss provisioning while weak banks will have incentives to delay provisioning. Thus, bank regulators concerned with the adequacy of ALLL will direct their focus toward the weak banks since they are the ones expected to delay loss provisioning. Furthermore, when bank regulators

\textsuperscript{12} Control evaluations performed in accordance with FDICIA and bank audit/ examination guidance only require evaluations of control design. Under the PCAOB’s Audit Standard (AS) 2 (and later Standard 5), controls over accounting estimates are highlighted as a significant risk area and, thus, are within the scope of Section 404 control evaluations for virtually all public companies subject to SOX. Furthermore, under AS 2 (and later AS 5) auditors are required to go beyond control design evaluation under FDICIA by evaluating the operating effectiveness of controls. Thus, SOX control evaluation will accentuate the size effects of SAB 102/FFIEC guidance as it applies to public banks but not to the small private banks.
evaluate the adequacy of ALLL for weak banks, they are likely to focus on whether the changes in ALLL are consistent with changes in loan portfolio risk metrics (both NAL and charge-offs). Thus, the regulatory scrutiny provided by bank regulators will induce a strong association between the ALLL and both risk metrics for weak banks. In contrast, the SEC’s concerns with overstated ALLL led them to focus on the association between ALLL and past charge-off rates when exercising regulatory scrutiny and in formulating their SAB 102 guidance. Thus, assuming that bank regulators retain their regulatory focus on ALLL adequacy even after SAB 102, we expect that the SAB 102 effects to be more pronounced for strong banks than for weak banks as indicated in the two following hypotheses:

H3a: The association between current ALLL and past charge-offs will increase more among strong banks than among weak banks in periods after SAB 102/FFIEC guidance became effective.

H3b: The association between current ALLL and NAL will decline more among strong banks than among weak banks in periods after SAB 102/FFIEC guidance became effective.

While H3a and H3b predict that banks’ ALLL will become more highly associated with charge-offs in response to SAB 102 guidance, an important issue is whether financial reporting quality is improved. In the next two hypotheses, we extend our cross-sectional analysis to examine the consequences of SAB 102 adoption. The hypotheses differ in their assumptions about the informativeness of ALLL pre-SAB 102. While the SEC’s concerns about earnings management clearly motivated their issuance of SAB 102 and investigations of banks like SunTrust, there is also a stream of research (see, for example, Ahmed, Takeda, and Thomas 1999) that argues that bank managers employ earnings management to signal private information about the bank’s future.

---

13 Prior research has measured bank profitability as earnings before provisions (EBP) to avoid the obvious confounding that would arise if banks’ net incomes were used to measure profitability. While we partition firms based on EBP to control for differences in earnings management incentives, these partitions may exhibit other systematic differences in terms of their stability and/or their risk level. For example, it is possible that banks earn higher pre-provision profits by assuming more risk (e.g., relaxing credit policies). We discuss the stability and risk level issues in Section 5.
performance.\textsuperscript{14} All things remaining the same, if \textit{ALLL} were previously structured to optimize the prediction of future charge-offs (i.e., weights on risk indicators were optimal), SAB 102’s pressure on banks to emphasize charge-offs would be expected to diminish overall the informativeness of \textit{ALLL} for all banks.

We argued in Section 2.1 that, when the banks operate under conditions of stability, past and current charge-offs are likely to be highly informative with respect future charge-offs. However, when conditions are less stable (e.g., economic conditions, loan portfolios and lending policies are changing) the informativeness of charge-offs will be diminished while the relative informativeness of \textit{NAL} will be increased (Liu and Ryan 1995, 2006; Ryan 2007; and Bhat, Ryan, and Vyas 2011). A priori, we would not expect strong banks and weak banks to operate under equal levels of stability, so the informativeness of charge-offs will likely vary in the cross-section. In particular, strong banks are more likely to operate under stable conditions than are weak banks.\textsuperscript{15} Thus, if all banks were subjected to equal regulatory pressure to rely heavily on charge-offs in response to SAB 102 (per H1), the informativeness of \textit{ALLL} would decline more for weak banks than for strong banks.

Enforcement pressure on banks to implement SAB 102 guidance, however, is unlikely to be uniform across the bank population. In developing hypotheses H3a and H3b, we argued that strong banks will face greater regulatory scrutiny from the SEC, while weak banks will face greater scrutiny from bank regulators who are likely to retain their focus on allowance adequacy and less

\textsuperscript{14} Altamuro and Beatty (2010) contend that suppression of earnings management activities by bank regulation could diminish the informativeness of banks’ loan loss provisions if such suppression interferes with the ability of management to signal their private information.

\textsuperscript{15} Several factors could drive the relationship between profitability and stability. Changing conditions may adversely impact a bank’s profit and also necessitate changes in business strategies and lending policies. Unprofitable banks will be more likely to change their lending policies leading to greater instability in the future.
likely to enforce SAB 102 guidance with the same level of commitment as the SEC. Thus, weak banks, in contrast with strong banks, will face less pressure to change their allowance methodology in response to SAB 102. The non-uniform enforcement effect will oppose the stability effect, thus, leading to the following non-directional hypothesis regarding differences in the informativeness of $ALLL$ for strong and weak banks:

H4: SAB 102 will reduce forward $ALLL$ charge-off associations, but the impact will not differ between strong and weak banks.

The maintained assumption underlying H4 is that, prior to SAB 102, banks structured allowances to maximize their informativeness. Such an assumption, however, is inconsistent with the SEC’s stated premise behind SAB 102 that some (strong) banks were overstating $ALLL$ to smooth income and, thereby, reducing the informativeness of their financial reports. In developing H4, we argued that past charge-offs are likely to be informative for strong banks operating under stable conditions. Thus, from the SEC’s perspective, encouraging strong banks to increase reliance on charge-offs and simultaneously constraining their ability to create cookie jar reserves by inflating $ALLL$, SAB 102/FFIEC guidance together have the potential to increase the informativeness of $ALLL$ for the strong banks.

For weak banks, however, we do not expect $ALLL$ to become more informative in response to SAB 102. First, making $ALLL$ more dependent on charge-offs under SAB 102 guidance is unlikely to improve its informativeness when reliance on a more timely risk indicator like $NAL$ would be more appropriate due to the lower level of stability. Second, recall that the smoothing hypothesis predicts that weak banks will want to delay loss provisioning and understate $ALLL$.\footnote{As loan loss provisioning reduces capital, weak banks have additional incentives (apart from earnings management) for delaying loss provisioning. During the time period of our study (1992-2008) delaying loan loss provisions increases both reported income and banks’ capital ratios. This is in contrast with earlier time periods studied by Collins et. al.} As such, SAB
102 guidance will not impose any incremental constraints on the ability of weak banks to delay loss provisioning and understate \textit{ALLL}. In fact, it is possible that some weak banks actually could misuse SAB 102 guidance to cloak their earnings management activities. To the extent that reliance on charge-offs (a lagging risk indicator relative to \textit{NAL}) can be used to justify delays in provisioning when their \textit{ALLL}’s are subjected to scrutiny from bank regulators, then earnings management by weak banks could actually increase after SAB 102. Such behavior might arise, for example, when economic conditions change adversely (as in the period just prior to the financial crisis) so that continued reliance on historical (low) charge-offs would justify delayed loss provisioning and understated \textit{ALLL}. Based on these arguments, we state the following alternative hypothesis about changes in the forward associations of strong and weak banks based on pre- and post-SAB 102 regulatory regimes under the smoothing hypothesis:

H4 Alternative: The forward \textit{ALLL} -charge-off associations of strong banks will improve in periods after SAB 102 due to earnings management suppression, while the forward \textit{ALLL} -charge-off associations of weak banks will decline.

Note that the differences between H4 and H4 alternative are predicated on different a priori assumptions about earnings management activities of banks and the informativeness of \textit{ALLL} before SAB 102. Under the assumption that banks were previously striving to maximize the informativeness of \textit{ALLL}, SAB 102 is predicted by H4 to have adverse effects on the informativeness of \textit{ALLL} for all banks. However, under the smoothing hypothesis, H4 Alternative makes opposing directional predictions about how SAB 102 impacts the informativeness of \textit{ALLL} for strong and weak banks. While both H4 and H4 Alternative both predict that weak banks’ allowances will become less informative in the aftermath of SAB 102, they make opposing predictions regarding the informativeness of \textit{ALLL} for the strong banks.

3.4 Security Returns

Under the assumption that the market recognizes the impact of SAB 102 on forward $ALLL$-charge-off associations, we expect the associations between unexpected loan loss provisions and short-window (three-day) security returns to mirror the association between current $ALLL$ and future charge-offs as stated below:

H5: There will be no difference in the decline in security return associations between weak banks and strong banks in periods after SAB 102.

H5 Alternative: Security return associations will decline for the weak banks, but increase for the strong banks in periods after SAB 102.

While H5 and H5 Alternative parallel H4 and H4 Alternative, respectively, regarding forward charge-off associations, there are two further complicating issues that could cause the security returns associations to differ from the $ALLL$-charge-off associations. First, the market may not recognize how SAB 102 interacts with banks’ smoothing incentives. Second, even if the market does recognize the interplay between SAB 102 and smoothing incentives, a further issue concerns the tethering of loan loss provisions and $ALLL$ to past charge-offs. To the extent that SAB 102 makes $ALLL$ more mechanistic, the incremental information provided to the market by strong banks could be reduced even if H4 Alternative were valid. The market has access to a variety of information sources other than accounting estimates that may be potentially relevant in predicting future loan collections and cash flows. Thus, even if SAB 102 guidance were to enhance the ability of accounting estimates to explain future charge-offs, the association between short-window security returns and the accounting estimates may not reflect that enhancement.

4. Research Design

4.1 Aggregate Association Tests
To test hypothesis H1 about allowance determinants at an aggregate level, we estimate the association between the current allowance and past charge-offs using the following regression model\textsuperscript{17}:

$$\text{ALLOW} = \alpha + \beta_1 \text{AVECHO} + \beta_2 \text{NAL} + \beta_3 \text{POST} + \beta_4 \text{POST} \times \text{AVECHO} + \beta_5 \text{POST} \times \text{NAL} + \beta_6 \text{FREAL} + \beta_7 \text{SIZE} + \beta_8 \text{CSRET} + \beta_9 \text{DUNRATE} + \varepsilon. \quad (1A)$$

The $\text{ALLOW}$ variable in (1A) is the end-of-quarter loan loss allowance ($\text{ALLL}$) scaled by end-of-quarter loans receivable. $\text{NAL}$ is the ending book value of loans classified as non-accrual also scaled by ending quarterly total loans receivable. $\text{AVECHO}$ is a four-quarter moving average of the quarterly charge-offs percentages (each quarterly charge-off is scaled by the average loan balance in each quarter since charge-offs are assumed to be recorded uniformly within periods).\textsuperscript{18}

To capture changes in $\text{ALLL}$ in response to the SEC’s regulatory intervention, we introduce the $\text{POST}$ indicator variable that takes on a value of one during periods after SAB 102 became effective (years 2001 through 2008) and zero in years 1992-97. The 1992 starting point is chosen to exclude data from regulatory regimes before Basel and the 2008 ending point is imposed to ensure the availability of at least one future holdout year (2009) for our tests of future losses. The years 1992 through 1997 are clearly defined as the pre-SEC intervention period. However, as conflict existed between the SEC and other bank regulators during the transitional years (1998-2000), we follow the approach taken by Altamuro and Beatty (2010) by initially excluding them from our aggregate level analysis.

\textsuperscript{17}All variable definitions have also been provided in the Appendix.

\textsuperscript{18}We have also used beginning loan balances for scaling charge-offs and the results are unaffected. Additionally, $\text{AVECHO}$ multiplied by four is analogous to the sum of the past four quarterly charge-offs.
We interact \( POST \) with \( AVECHO \) and \( NAL \). Under H1, we expect that \( ALLOW \) will exhibit greater responsiveness to \( AVECHO \) in periods after the SEC’s intervention so the \( POST \) variable’s interaction with \( AVECHO \) is expected to be positive (\( \beta_4 > 0 \)). H1 also predicts that the \( ALLOW \)-\( NAL \) association will decline if SAB 102 guidance induces banks to increase their reliance on charge-offs. Thus, a negative interaction between \( POST \) and \( NAL \) implies that \( \beta_5 < 0 \). Of course, it is possible that the SEC’s action prompted banks to make one-time only adjustments to \( ALLOW \) (like Sun Trust did in reducing their allowances by USD 100 million). Under such conditions, \( \beta_2 \) could be positive while the coefficient, \( \beta_5 \) on the interaction between \( POST \) and \( NAL \) would be insignificant.

Since our analysis is based on an extended time interval (1992-2008), changes in the composition of banks’ loan portfolios could impact our results since the percentage of residential real estate loans increased substantially. Thus, our first control is \( FREAL \)—the proportion of real estate loans.\(^{19}\) The next control related to loan composition is collateral value. To control for changes in collateral value, we use \( CSRET \): the return on the Case-Shiller real estate index: \( \frac{CS INDEX_t - CS INDEX_{t-1}}{CS INDEX_{t-1}} \). We follow Beatty and Liao (2011) by adding a control for macro-economic conditions (\( DUNRATE \)) representing the change in the quarterly unemployment rate and a size control: \( SIZE \) -- the natural logarithm of beginning of period (lagged) total assets.

The choice of \( ALLOW \) as the dependent variable is because the focus of bank regulators and the SEC has been on allowances with SAB 102/FFIEC guidance applying directly to the estimation of loan allowances. However, to facilitate comparisons between our allowance results and those of prior studies that have focused on provisions, we estimate a second regression model in which

\(^{19}\) In Section 5.4, we perform a disaggregated analysis that considers separately the fractions of commercial loans and non-mortgage loans to individuals, respectively and their interactions with time. In addition, we also present an alternative proxy for residential real estate loans.
ALLOW is replaced by the loan loss provision (PROV). Consistent with the scaling of ALLOW in (1A), PROV is divided by ending loans receivable:

$$PROV = \alpha + \beta_1 CHO + \beta_2 NAL + \beta_3 POST + \beta_4 POST * CHO + \beta_5 POST * DNAL + \beta_6 FREAL + \beta_7 SIZE + \beta_8 CSRET + \beta_9 DUNRATE + \beta_{10} ALLOWLAG + \epsilon . \quad (1B)$$

As PROV is a flow variable, a few minor changes in the explanatory variables are made to accommodate the dependent variable specification in (1B). The first is to replace NAL and AVECHO with DNAL (the change in NAL) and CHO (the current quarter’s charge-off). A further change is to add the prior quarter’s ending allowance (ALLOWLAG) to control for any over-accrual or under-accrual present at the beginning of the current quarter that would require a provision adjustment. A large balance in the beginning of period allowance, ceteris paribus, will allow banks to reduce their provisioning, whereas a small beginning balance will require banks to increase their provisions. Thus, we expect the coefficient on ALLOWLAG to be negative in (1B). While this variable controls for the size of the allowance at the beginning of the period, it is an imperfect proxy for the extent of under or over-funding of ALLOWLAG is not directly observable. All other explanatory variables in (1B) are the same as in (1A). Based on H1, we expect the $\beta_4$ coefficient on the POST*CHO interaction to be positive in (1B) and the POST*DNAL interaction, $\beta_5$ to be negative (assuming that the increased focus on CHO causes banks to reduce the emphasis placed on DNAL).

4.2 Temporally Disaggregated Analysis of Loan Loss Allowances

While the regression approach using the POST indicator provides an efficient means of analyzing the overall effects of the SEC’s regulatory intervention, it does not provide a means of isolating the effects of banks’ incentives to manage earnings and variation in the SEC’s regulatory scrutiny both in the cross-section and over time. Accordingly, we extend the preceding analysis in
two respects. First, we divide the 1992 to 2008 time interval into six periods to better control for changes in the macro-economic environment and regulatory scrutiny over time. Second, banks are partitioned cross-sectionally within each of the six periods to distinguish between the regulatory scrutiny accorded large and small banks. In addition, we also partition strong and weak banks based on their relative profitability. As noted above, under the smoothing hypothesis, a bank’s incentives to manage earnings depends on its relative profitability. Figure 1 below presents our partition of the sample into six periods.

**Insert Figure 1 Here**

Period 1 begins with year 1992 (after implementation of Basel) and also includes the 1993 FFIEC Policy Statement that became effective in December of 1993. We also note that the economy was in a recession at the beginning of Period 1, so the smoothing hypothesis predicts that many banks would have incentives to draw down their loan loss allowances. Period 1 ends with the 1994 phase-in of the 1992 FDICIA that impacted banks’ controls (Altamuro and Beatty 2010). Period 2 begins in 1995 after FDICIA and SFAS 114 became effective and ends in 1997 before the SEC began its investigation of SunTrust Bank for allegedly overstating its loan loss allowance. During Period 2, the economic recovery strengthened so the smoothing hypothesis predicts that many banks would begin to increase the adequacy of their allowances. Period 3 is characterized by the SEC’s intervention that began in year 1998 when the investigation of SunTrust Bank was launched and ends in year 2000 just prior to the SEC’s promulgation of SAB 102. As noted in Section 2.1, the FFIEC issued guidance in 1999 and 2000 regarding loan classifications and charge-offs based on type that became effective in December of 2000. Period 4 includes years 2001

---

20 In robustness tests, we also partition banks cross-sectionally based on loan composition.

21 As noted above, this period is excluded from the aggregate analysis used in performing our initial tests of H1 as it was marked by considerable regulatory competition between the SEC and other FFIEC bank regulators.
through 2004 during which time banks first became subject to SAB 102/FFIEC 2001 guidance. With the exception of the fourth quarter of 2001 in the aftermath of the 9/11 terrorist attacks, the economy was characterized by strong growth in the real estate sector. During Period 5 (years 2005 and 2006), publicly owned banks became subject to SOX. During Period 5, real estate prices (as measured by the Case-Shiller Index) reached a peak in the second quarter of 2006. Period 6 (years 2007 and 2008) was characterized by declining real estate prices and loan defaults as many banks developed financial problems in connection with their real estate loans. Another distinguishing feature of Period 6 is that the FFIEC’s (2005) Policy Statement became effective for reporting periods that began after December 2006. As noted previously, this new Policy Statement modified the guidance in the SAB 102/FFIEC 2001 Policy Statement by encouraging banks to anticipate changes in the economic environment. Based on the new guidance in effect throughout Period 6, we expect banks to have a greater ability to deviate from the charge-off based loss estimation models encouraged by SAB 102/FFIEC guidance in Periods 4 and 5. Thus, given the changes in guidance applicable in Period 6, our tests of the effects of SAB 102 focus on a comparison of the regressions estimated for Periods 1 and 2 (pre-SAB 102) with regressions estimated for Periods 4 and 5 (post-SAB 102).

4.2.1 Regulatory Scrutiny and Bank Size

To test hypothesis H2 regarding bank size and regulatory scrutiny, we construct two extreme samples that vary on these dimensions. For the first sample, we sort banks each quarter based on total asset size and select the fifty largest banks. We select private banks with assets less than USD 500 million for our second sample. We then separately estimate equation (1A) for the small and large bank groups. Since the regressions are estimated separately for each of the six periods in

---

22 Alternative size and regulatory scrutiny sample partitions are presented in Section 5.
Figure 1, the \textit{POST} indicator and its interactions are removed. We expect that, based on H2, large banks will follow SAB 102 guidance more closely than small banks. Thus, the current allowances of large banks are expected to become more responsive to charge-offs in periods following the SEC’s intervention and SAB 102 guidance. For regressions estimated in periods after SAB 102, H2 predicts that the $\beta_1$ coefficients on \textit{AVECHO} will be significantly larger in regressions estimated for the large banks than for those estimated for the small banks. However, as the new FFIEC guidance moderating the 2001 Policy Statement became effective at the end of 2006, we expect smaller differences in the \textit{AVECHO} coefficients estimated for large and small banks in Period 6 relative to the coefficient differences in Periods 4 and 5.

4.2.2 Bank Profitability and Earnings Management

In addition to size, hypotheses H3a and H3b predict that bank profitability will impact banks’ loan loss allowance determinants and H4 and H4 Alternative predict that their informativeness also will be affected. Accordingly, we sort banks each quarter based on their relative profitability before loan loss provisions and partition banks into “strong” and “weak” groups based on whether they are above or below the median level of profitability each quarter. Profitability is defined as the earnings before provisions (scaled by lagged total assets). In response to SAB 102, H3a predicts that \textit{AVECHO} coefficient will increase more for strong than for weak banks while H3b predicts that the \textit{NAL} coefficient will decrease more for the strong banks than for weak banks.

Hypotheses H4 and H4 Alternative are tested by separately estimating the following regression for the strong and weak bank partitions:\footnote{A further justification for using a one-year (four-quarter) horizon for measuring future losses is provided by the OCC Handbook (1998, p. 13) stating that, “Many Banks consider coverage of one year’s losses an appropriate benchmark of an adequate reserve for most pools of loans. Except in situations discussed below, OCC examiners should generally view this level of coverage as appropriate.” All results are robust to having \textit{IND} and \textit{COM} as controls instead of \textit{FREAL}.}
All of the explanatory variables in (2) are now subscripted to denote explicitly the temporal relationships. The dependent variable, $AVECHO_{t+4}$ is an average of four quarterly charge-off percentages for (future) quarters $t+1$ through $t+4$ and is analogous to the one year-ahead annual charge-off percentage used as the dependent variable by Altamuro and Beatty (2010). Other minor differences are that while we include a control for loan portfolio composition ($FREAL$), we exclude $DUNRATE$ and $CSRET$ from equation (2) as the allowance estimates should anticipate future economic conditions based on information gleaned from current micro and macro-economic sources. Thus, exclusion of these variables facilitates an evaluation of the ability of loan loss allowances to explain future charge-offs on a stand-alone basis.

Under H4, if allowances had optimal predictive ability pre-SAB 102, $\beta_1$ and $R^2$ would be expected to decline for both weak and strong banks in periods after the SEC’s intervention. The decline for the strong banks relative to the weak banks will be larger (smaller) if the stability (enforcement) effect dominates. In contrast, $H4$ Alternative predicts an increase in informativeness post-SAB 102 for the strong banks, which means an increase in $\beta_1$ and $R^2$. For weak banks, however, $H4$ Alternative predicts the opposite parametric changes. Finally, as discussed above, since the FFIEC issued new guidance that modified SAB 102/FFIEC guidance and became effective for reporting periods beginning after December 2006, we would expect these differences between the strong and weak banks to be attenuated in Period 6 relative to Periods 4 and 5.

**4.3 Security Return Analysis**

Our final regression focuses on short window stock returns around earnings announcements that we use to test $H5a$ and $H5b$. We analyze the contemporaneous association between security returns and quarterly changes in profit (cash flow) before loan loss accruals ($DEBP$) and quarterly changes
in loan loss provisions $DPROV$ variables in regressions estimated for each period and bank group (strong and weak) using the following change specification to control for market expectations:

$$RET = \alpha + \beta_1 EBP + \beta_2 PROV + \beta_3 DEBP + \beta_4 DPROV + \beta_5 FREAL + \beta_6 SIZE + \varepsilon,$$  \hspace{1cm} (3)

where $RET$ is the value-weight-adjusted return in a three day window (Day -1 to day +1) around the earnings announcement date.

$DEBP$ and $DPROV$ are each scaled by ending total assets. We also include cash flows and loss provisions ($EBP$ and $PROV$) as additional explanatory variables.\(^\text{24}\) Once again, $FREAL$ and $SIZE$ are used as controls for real estate loan proportion and asset size, respectively, as in equation (1B). As discussed above, $DPROV$ serves as a proxy measure for the unexpected provision component in (3). Thus, if the market regards an increase in loan loss provisions as portending an increase in future charge-offs (losses), the $DPROV$ coefficient ($\beta_4$) in (3) will be negative. However, the magnitude of $\beta_4$ depends on the extent to which the market can extract similar (or perhaps even better) information about provisions from other sources.

Similar to the arguments supporting H4, H5 predicts that $R^2$ will decrease and $\beta_4$ will become less negative for both strong and weak banks. Assuming that the association between the allowance and future charge-offs increases for strong banks as predicted by H4 Alternative, then H5 Alternative predicts that the significance of $DPROV$ in (3) will increase in periods after the SEC’s intervention for the strong banks. Thus, under H5 Alternative, the $\beta_4$ coefficient in (3) is expected to be more negative and the $R^2$ values are expected to be higher for strong banks in periods after the SEC’s intervention while the opposite effects are expected for the weak banks.

5. Empirical results

\(^{24}\) The model is analogous to a typical capital market regression of short-window returns against earnings and changes in earnings except that earnings has been disaggregated into $EBP$ and $PROV$. Note that $EBP-PROV = Earnings$. 
Table 1 provides the sample summary statistics for all variables organized by the six periods identified previously in Figure 1. The mean total assets of the banks in our sample during Periods 1 and 2 increased from 3.30 billion dollars and 3.99 billion dollars to means of 11.57 billion dollars and 12.58 billion dollars in periods 5 and 6, respectively. The average allowances (scaled by loans outstanding) were 1.88 percent and 1.56 percent in Periods 1 and 2. They fell to 1.39 percent and 1.26 percent in Periods 4 and 5, respectively, before rising to 1.32 percent in Period 6. After the SEC’s intervention, allowances decreased in Periods 4 and 5 relative to Periods 1 and 2. Loan loss provisions (PROV) closely track ALLOW.

Data are also presented for the proportion of total loans belonging to each of three loan categories: non-mortgage loans to individuals (IND), commercial loans, (COM), and real estate loans (FREAL) as a disaggregated analysis based on loan types is presented in Section 5.4. The composition of banks’ loan portfolios changed over time with IND and COM both steadily declining while FREAL increased over time. The substantial change in FREAL over time warrants the inclusion of FREAL as a control variable in cross-period regressions. Unfortunately, FREAL includes commercial and industrial loans and residential real estate loans since banks did not report them separately to regulators on a consistent basis. For that reason, we present a second real estate loan variable denoted by RES. The new variable is calculated as: \( RES = 1 - COM - IND \). Unlike FREAL, RES is constructed to exclude commercial loans.

The two loss metrics, non-accrual loans (NAL) and charge-offs (CHO) both decline over time through Period 5 before increasing during the financial crisis in Period 6. There are a small number of CHO and PROV observations that are negative. To avoid survivor bias concerns, we have retained them in our analysis. However, all results are robust to the exclusion of these observations. The profitability of banks is represented by earnings before provisions (EBP) and the change in EBP denoted by DEBP. We also construct two indicator variables based on EBP. The first indicator
is the proportion of banks having $EBP$ above the mean for the quarter denoted by $PROFIT$ while the second represents the proportion of banks with negative $EBP$ denoted by $LOSS$. $LOSS$ varied from 3.42 percent of the banks during period 1 down to a low of 1.28 percent in Period 5 before climbing to 9.31 percent during the financial crisis in Period 6. Finally, we include two variables reflecting macro-economic conditions: the Case-Shiller return ($CSRET$) and the change in unemployment rate ($DUNRATE$).

**INSERT TABLE 1 HERE**

### 5.1 Aggregate Association Tests

As discussed previously in Section 4, our initial analysis is performed at an aggregate level where the $POST$ indicator contrasts loan loss allowances before and after the SEC’s intervention with the transitional years’ being excluded. Panel A of Table 2 presents two regressions that are employed to test hypothesis H1. Both regressions explain $ALLOW$ using average charge-offs for the past four quarters ($AVECHO$) and current $NAL$. The two regressions differ in that the first uses reported $CHO$ as the basis for calculating $AVECHO$, while the second adjusts quarterly charge-offs with future recoveries before averaging. The standard errors and $t$-values in all regressions are conservative in that they are adjusted for both year-level and firm-level clustering using the two-way clustering approach advocated in Petersen (2009).

---

25 Another indicator of financial condition is a bank’s capital ratio. Since many banks did not report their Tier 1 capital ratios, we constructed our own capital ratio proxy defined as the ratio of common stock on total assets as $CAPRATIO$. Although un-tabulated, the average $CAPRATIO$ varied between a low of 8.8% in Period 5 to a high of 9.22% in Period 3.

26 Liu and Ryan (2006) argue that banks will have incentives to provide justification for increased loan loss provisioning by inflating charge-offs. However, they argue that this will be revealed ex post by large charge-off recoveries. Accordingly, we attempt to remove the effects of such charge-off management by adjusting charge-offs for recoveries.

27 When calculating standard errors, prior studies have either not employed cluster analysis or employed one-way clustering adjustments. The two-way clustering approach used herein makes our $t$-values much more conservative.
In Panel A of Table 2, the POST indicator is negative and significant (p<.01) in both regressions implying that banks’ loan loss allowances declined (as a percentage of loans outstanding) after SAB 102. The decline implies an overall downward shift in allowances following the SEC’s intervention. Furthermore, as predicted by H1, the POST interactions with AVECHO are positive and significant (p<.01), while POST interactions with NAL are negative and significant (p<.01). When AVECHO is adjusted for recoveries, the POST interaction with AVECHO is 2.206, thus, indicating that the association between current allowances and past charge-offs increased from .605 during the pre-intervention period to 2.911 (.605+2.206) during the post-intervention period. In the same regression, the POST interaction with NAL is -.262, thus, indicating that the allowance-NAL association declined from 0.335 in the pre-intervention period to less than a fourth at 0.073 (0.335 – 0.262) in the post period. These results are fully consistent with H1 in that, in periods after the issuance of SAB 102, banks’ allowances became much more responsive to AVECHO, but less responsive to NAL. The control variables, FREAL, CSRET, and DUNRATE are all significant in both allowance regressions, while SIZE is not significant in either allowance regression.

In Panel B of Table 2, we present two regressions that explain current loan loss provisions. The first provision regression is based on (1B) while second provision regression excludes ALLOWLAG. In the first provision regression, the coefficient on ALLOWLAG is negative and significant as predicted. Paralleling the results for the allowance regressions, the POST indicator is negative and significant in both provision regressions, thus, implying a downward shift in provisions following the SEC’s intervention. Furthermore, the POST interactions with CHO are positive and significant (p<.01) in both provision regressions, thus, indicating that banks’ loan loss provisions became more responsive to charge-offs after issuance of SAB 102. However, the POST interactions with DNAL are insignificant, suggesting that the effect of DNAL on provisions has not significantly changed.
following the SEC’s intervention. The \textit{FREAL} control is not significant in either of the provision regressions, while the \textit{DUNRATE} and \textit{CSRET} controls remain significant in both provision regressions.

Since the SEC’s regulatory intervention is not hypothesized to impact all banks equally, more powerful tests are structured by taking into account cross-sectional differences among banks. We discuss the results of these tests in the following sub-sections.

\textit{5.2 Disaggregated Analysis of Loan Loss Allowances}

In this section, we take a more detailed look at the impact of the SEC’s intervention on banks’ loan loss allowances by disaggregating the bank observations along two dimensions. Given the long time period of our study (1992 to 2008), we subdivided the sample into six, shorter time periods that helps to control for differences in regulation and economic conditions that could cause parameter instability.\textsuperscript{28} Since regressions are estimated separately for each of the six periods, the \textit{POST} indicator variable (and its interactions) can be eliminated from Equation (1A). A further advantage of our inter-temporal disaggregation is that we can examine the effect of the SEC’s intervention on $R^2$ in addition to the effects on the regression coefficients. In the interest of brevity, we simplify by presenting results only for the allowance regressions with unadjusted charge-offs since the results are similar to those obtained using provisions and adjusted charge-offs.

\textit{INSERT TABLE 3 HERE}

\textit{5.2.1 Cross-sectional analysis using Bank Size}

\textsuperscript{28} Needless to add, while we document differences along hypothesized lines in each of the sub-periods, the results are only stronger if the sub-periods are pooled into pre- and post- SEC action partitions.
Within each time period, we partition banks based on size and estimate regressions separately for each size group to test H2. The allowance regression results for the large banks are presented in Panel A of Table 3. AVECHO is significant in all periods except for Period 1 and its significance increases over time. In contrast, NAL is highly significant in Periods 1-3, but not in Periods 4 and 5. Another notable trend among the large bank results is that the $R^2$ values are consistently larger in Periods 4-6 than in Periods 1 and 2. The main comparison, however, is between the AVECHO coefficients in Periods 1 and 2 and those in Periods 4 and 5. The average coefficient on AVECHO for Periods 1 and 2 is 1.200 (average of 1.144 and 1.257) and in Periods 4 and 5, it is more than double at 2.448 (average of 2.632 and 2.265). In contrast, the average coefficient on NAL was 0.575 (average of 0.466 and 0.683), but only 0.058 (average of 0.044 and 0.069) in Periods 4 and 5. The results in Panel B of Table 3 for the small banks are quite different from those of the large banks. Consistent with the H2 prediction that the allowances of small banks will not be as responsive to AVECHO as those of the large banks, we find only a marginal increase in the responsiveness to AVECHO in periods immediately after SAB 102 and a more muted decline in responsiveness to NAL than was evident among the large banks. 29

Figure 2 presents a graph of the AVECHO and NAL coefficients estimated separately for the large and small banks in each of the six time periods. Note that, for the large banks, the NAL coefficients decline while the AVECHO coefficients increase systematically over time as predicted by hypothesis H2. The coefficients for the small banks, however, do not exhibit such a crossing-line profile over time nor do their $R^2$ values increase substantially as is the case for large banks.

29 To address the possibility that our size results are driven by changes in loan composition between the large and small partitions, we also performed joint sorts based on both size and loan composition (fraction of commercial loans) and separately estimated regressions for each sub-group. We find that the before-versus-after SAB 102 differences are greater among the large banks (under greater scrutiny) than the small banks (under less scrutiny) for both high and low partitions of the commercial loan fraction. The effects of loan composition are separately analyzed further in Section 5.4.
5.2.2 Cross-sectional analysis by Bank Profitability

In addition to size, bank profitability was hypothesized in Section 3 to affect banks’ incentives to manage earnings and loan loss allowances. Panel A of Table 4 reports the allowance regression results for the “strong” banks that had above-median profitability (before provisions), while Panel B reports the results for the “weak” banks with below-median profitability. In Panel A of Table 4, we find that the allowances of the strong banks exhibit greater responsiveness to AVECHO and less responsiveness to NAL in periods after SAB 102 consistent with H3a and H3b. Even though the NAL coefficients became smaller (as predicted by H3b), the $R^2$ values for the allowance model increased substantially (more than tripled) in periods after SAB 102 implying that the allowances of strong banks became much more closely tied to AVECHO than in earlier periods. However, the results for the weak banks in Panel B of Table 4 are very different from those reported for the strong banks. The AVECHO coefficients remain significant, but do not increase significantly over time as was the case for the strong banks.\footnote{If EBP is higher for banks that make riskier loan portfolios, then partitioning banks based on EBP could result in strong banks having riskier loan portfolios. If these banks anticipate the elevated default risk and increase their allowances, then the stronger correlations between current charge-offs and allowances among profitable banks could be driven mechanistically by differences in default risk rather than by SAB 102. However, if strong banks really do have elevated default risk, we should also observe higher allowance-NAL associations. Thus, it is not obvious why allowance-charge-off associations would increase for strong banks, but allowance-NAL associations do not. Furthermore, in our differences-in-difference design, the risk-taking argument applies both before and after SAB 102. Thus, elevated risk-taking among strong banks fails to explain why the allowances of strong banks should become more highly associated with charge-offs, but not with NAL relative to those of weak banks only in periods after SAB 102 became effective.} Furthermore, the $R^2$ values for the weak banks actually exhibit a substantial decline in periods after SAB 102 (particularly in Period 5) and are much smaller than those reported for the strong banks during the same time periods. The Chow tests confirm the significance of these differences.

\textbf{INSERT TABLE 4 HERE}
Figure 3 presents graphs of the regression coefficients and $R^2$ over the six periods and shows that the coefficients on $AVECHO$ and $R^2$ increased substantially for the strong banks, but not for the weak banks. For the strong banks, we see larger coefficients on $NAL$ in Periods 1 and 2 before SAB 102 and larger declines post-SAB 102 relative to the weak banks. Thus, we observe a dramatic crossing pattern between the graphs of the two bank groups that indicates that SAB 102 guidance did not have a uniform impact on the structure of banks’ allowances. We have argued that $AVECHO$ is less likely to be successful in explaining losses for weak banks operating under less stable environments than strong banks. Thus, our results for the weak banks are consistent with bank regulators’ recognizing the inherent limitations of charge-offs as a risk indicator in unstable environments and, thus, encouraging weak banks to retain a more balanced emphasis on both $AVECHO$ and $NAL$ when structuring their allowances. In contrast, the SEC’s scrutiny of strong banks and their SAB 102 guidance tethering allowances to charge-offs resulted in a dramatic increase in the association between $ALLOW$ and $AVECHO$ in periods after the SEC’s intervention.

**INSERT FIGURE 3 HERE**

While the structural changes in the $ALLOW$ regressions depicted in Figure 3 are consistent with differences in regulatory scrutiny being exercised by bank regulators and the SEC, the consequences of these changes remain an empirical question. In Table 5, we present the forward association tests for the strong banks in Panel A. The coefficient on $ALLOW$ increases by more than 400 percent and the $R^2$ more than triples for the strong banks. In contrast, the average coefficient on $ALLOW$ in Periods 1 and 2 is almost the same as the average in Periods 4 and 5. However, the latter average obscures the fact that the association between allowances and future charge-offs declined for the weak banks most prominently in Period 5-- just prior to the financial crisis. The $R^2$ values

---

also exhibit diverging trends with major increases for strong banks up to 78.1 percent in Period 5, but decreases for weak banks down to 13.4 percent in Period 5. Overall, our comparisons between the strong and weak banks provide strong support for H4 Alternative versus H4. The improvement in the predictive ability of the allowances of the strong banks is likely due to an increase in the association with $AVECHO$ and a decline in the associations with $NAL$ under SAB 102 guidance.\textsuperscript{32} The reduction in the predictive ability of the allowances for the weak banks, however, appears to have been an unintended consequence of SAB 102 guidance. The decline in the association for weak banks especially just prior to the financial crisis is suggestive of weak banks’ misusing SAB 102 guidance to justify delays in provisioning going into the financial crisis.

**Insert Table 5 Here**

### 5.3 Security Return Association Tests

Table 6 reports the response of (short-window) security returns to accounting and economic information using the regression in equation (3). Panel A of Table 6 reports the market tests for the strong bank sub-sample, while Panel B reports market tests for the weak banks. Controlling for the bank’s $EBP$ and $DEBP$, we expect the $DPROV$ coefficient to be significantly negative if the increase in provisions provides fresh information to the market. For the strong banks in Panel A, $DPROV$ is indeed negative in all periods and is significant in Periods 1 and in Periods 4-6—consistent with the predictions of H5 Alternative. For the weak banks in Panel B, consistent with both H5 and H5 Alternative, $DPROV$ is also negative in all periods and is significant in Periods 1, 3, 4, and 6. Neither $FREAL$ nor $SIZE$ is significant in any period for either the strong or weak banks. The Chow test indicates that the strong and weak banks have significantly different coefficients in

\textsuperscript{32} In un-tabulated tests, we tested the relative abilities of historical charge-offs and $NAL$ to explain future charge-offs. The results confirm the stability argument that, strong banks should rely on charge-offs and weak banks primarily on $NAL$ in estimating their allowances.
Periods 1, 2, 4, and 5. Also consistent with H5 Alternative, the coefficients of $DPROV$ are more negative for weak banks in the pre-SEC intervention period, while they are more negative for strong banks in Period 5. The coefficient for strong banks is -11.108, while the coefficient for the weak banks is positive and much smaller in magnitude at 0.233. The lack of informativeness for weak banks in Period 5 is consistent with a diminished ability of allowances (Table 5 Panel B) to explain future charge-offs among the weak banks during this period. These security return results are similar to the allowance-associations and are likely explained by SAB 102 constraining earnings management among strong banks. However, for the weak banks, less stable conditions (making charge-offs less informative) and increased opportunities for earnings management by weak banks appear to have combined to diminish the informativeness of loss provision changes in periods after SAB 102.

5.4 Loan Composition and other Robustness Tests

As noted previously, the composition of banks’ loan portfolios changed substantially over our extended time period. While we previously included $FREAL$ as a covariate to control for inter-temporal changes in banks’ real estate loan composition in our empirical specifications, other loan composition changes occurred. During the period 1992-2008, the Y-9C Bank data base includes complete data for three disaggregated loan categories: commercial loans, total loans secured by real estate, and non-mortgage loans to individuals. The descriptive results in Table 1 indicate that commercial loans ($COM$) declined slightly from .195 in Period 1 to .153 in Period 6. A more emphatic downward trend, however, is evident for unsecured loans to individuals ($IND$) with systematic declines from .165 in Period 1 to .054 in Period 6. In contrast, $FREAL$ increased from .575 in Period 1 to .746 in Period 6. These inter-temporal changes in loan composition are
potentially important in that the losses for each loan category can vary in terms of their predictability (see Ryan 2007).

To address the possibility of loan composition changes providing an alternative explanation for our results attributed to SAB102, we perform two types of robustness. The first is to replace $FREAL$ with $IND$ and $COM$ --the fractions of commercial loans to total loans and non-mortgage loans to individuals to total loans, respectively, and re-estimate the allowance and provision regressions. The two controls are also interacted with $POST$ to address the possibility that the changing loan compositions may interact with economic conditions that change with time and these interactions might explain the results attributed to SAB 102. Table 7 presents the allowance and provision regressions re-estimated with $IND$ and $COM$ replacing $FREAL$.

**Insert Table 7 Here**

The results in Panel A of Table 7 closely parallel the results reported previously in Table 2. In the two allowance regressions, the $POST$-$AVECHO$ interactions are positive and significant ($p<.01$) while the $POST$-$NAL$ interactions are negative and significant ($p<.01$). The $COM$ control is positive and significant in both allowance regressions while the $IND$ control is insignificant in both regressions. The $POST$-$IND$ interaction is not significant in either allowance regression, but the $POST$-$COM$ interaction is negative and significant when allowances are estimated using adjusted $AVECHO$. The two provision regressions in Panel B also are similar to the earlier provision regression results in that $POST$ interactions with $CHO$ are positive and significant while $POST$ interactions with $NAL$ are insignificant. The $IND$ control is not significant in either provision regression while the $COM$ control is significant in the regression estimated using unadjusted $CHO$.

While the preceding analysis incorporates additional information about loan composition there still remains a possibility that there are indirect effects associated with loan composition that could
provide a competing explanation for our association findings. Accordingly, we perform a second type of robustness test in which we sort banks each quarter based on the loan category proportion being analyzed and then assign banks to high (low) groups based on whether their loan proportion is above (below) the median proportion of loans of all banks for that category during the quarter. We estimate regressions separately for each loan category and then repeat the entire process for each of the six time periods.

The first loan category analyzed is IND. Panel A of Table 8 presents the associations between the allowances and AVECHO for banks with high IND, while Panel B presents the associations for the low IND group. Within Panel A, the coefficients on AVECHO in periods 1 and 2 average 1.45 (average of 1.590 and 1.323). For periods 3 and 4, this average jumps to 3.1 (average of 2.514 and 3.757) for banks in the high concentration group. The banks in the low group have average AVECHO coefficient of 1.45 in Periods 1 and 2 and 1.40 (average of 1.232 and 1.568) in Periods 4 and 5. In summary, the coefficients increased by 1.65 for banks with high IND while declining slightly by 0.05 for banks with low IND. The results in Panels A and B, indicate that SAB 102 has impacted the allowances of banks with high IND more than the allowances of banks with low IND. For these results to explain banks’ increased reliance on AVECHO and reduced reliance on NAL in later periods, the proportion of such loans would need to be higher in later periods (after SAB 102) than in earlier periods. The descriptive results in Table 1, however, indicate that the IND loan proportion declined systematically over time and, thus, was lower in the periods after SAB 102 than in earlier periods. Thus, the IND change over time does not help to explain why banks increased their increased reliance on AVECHO in the later periods that we attribute to SAB 102.

Insert Table 8 Here
In addition to the historical charge-off association analysis, we also performed forward association tests in which we separately estimated equation (2) for the low and high IND groups. As these loans have future losses that are likely to be predictable using current charge-offs (see Ryan 2007) and charge-offs are likely to be timely for such loans (see Keeton and Morris 1987), we would expect that banks with a high percentage of such loans would exhibit stronger forward associations following SAB 102 than banks having a low proportion of such loans. Consistent with these expectations, the forward associations for the high IND group reported in Panel A of Table 9 have average $R^2$ values that increased from .317 (average of .266 and .367) in Periods 1 and 2 to .703 (average of .613 and .794) in Periods 3 and 4. The average allowance coefficient also increased from .070 (average of .0534 and .0871) in Periods 1 and 2 to .215 (average of .217 and .213) in Periods 4 and 5. In contrast, the results in Panel B for the low IND group indicate that the average adjusted $R^2$ actually declined from .236 (average of .330 and .142) in Periods 1 and 2 to .152 (average of .224 and .079) in Periods 4 and 5 while the average allowance coefficient also declined slightly.

**Insert Table 9 Here**

We also performed a parallel analysis of commercial loans (COM) to determine whether our results are sensitive to the commercial loan proportion using the same approach as described above for IND loans. Un-tabulated results show that the allowance-historical charge-off associations were nearly identical for the low and high COM banks in Periods 1 and 2 (pre-SAB 102). However, in later periods allowance associations increased substantially for the low COM banks but did not increase for the high COM banks. If the COM changes were driving the results attributed to SAB 102, we should have seen a similar pattern in differences across the partitions pre- and post-SAB 102 periods. Since we see differences in the differences pre- and post-SAB 102, the changes in COM are unlikely to be a competing explanation for the results attributed to SAB 102. Given that
losses on \( COM \) loans tend to be more difficult to predict (see Liu and Ryan 2005 and Ryan 2007), we would expect banks with high concentrations of \( COM \) loans to have weaker forward allowance-charge-off associations than banks with low \( COM \). The un-tabulated results indicate that, for banks with high concentrations of \( COM \), the average \( R^2 \) increased from .210 in Periods 1 and 2 to .291 in Periods 4 and 5. However, for banks in the low \( COM \) group, the average \( R^2 \) values more than doubled from .355 in Periods 1 and 2 to .73 in Periods 4 and 5. These results confirm the expectation that allowances of high \( COM \) banks are actually less able to explain future charge-offs in periods after SAB 102 than are low \( COM \) banks.

A third loan type that did change substantially from early periods before SAB 102 to later periods after SAB 102 is real estate loans. Unfortunately, however, residential and commercial real estate loans are not reported separately in the Y-9C data base over the entire time period of our study. The most closely related category available for all years is total loans secured by real estate \((FREAL)\) --- a category which represents an aggregation of both residential and commercial real estate loans. \( FREAL \) increased substantially from an average of .48 in Period 1 to .75 in Period 5. Panels A and B of Table 10 indicate that the backward allowance-charge-off associations for the low and high \( FREAL \) groups exhibit a crossing pattern. In Periods 1 and 2 before SAB 102, the \( AVECHO \) coefficients are larger for the high \( FREAL \) banks than for the low \( FREAL \) banks. However in periods after SAB 102, the \( AVECHO \) coefficients are much larger for the low \( FREAL \) banks. The \( NAL \) coefficients are highly significant for both bank groups before SAB 102 and remain significant after SAB 102. For the low \( FREAL \) banks, \( NAL \) is significant before SAB 102, but only in Period 4 after SAB 102. We also note that, while \( R^2 \) increased systematically over time
from .444 in Period 1 and 2 to .795 in Periods 5 for the low *FREAL* group, the reverse was true for high *FREAL* banks as *R*² values declined from .446 to .257 in the corresponding periods.\(^{33}\)

**INSERT TABLE 10 HERE**

While the results in Table 10 indicate that the allowance-charge-off associations are quite sensitive to the proportion of real estate loans held by banks, the change in *FREAL* does not provide a competing explanation for our SAB 102 results. As *FREAL* increased substantially over time, we would need to observe stronger allowance-charge-off associations for banks in the high *FREAL* group than in the low *FREAL* group. However, consistent with Keeton and Morris (1987) who contend that banks do not recognize charge-offs on a timely basis for secured loans, we find that the banks in the high *FREAL* group actually exhibited weaker allowance-charge-off associations than banks in the low *FREAL* group. Thus, given the inverse relationship between the change in *FREAL* and changes in allowance-charge-off associations, the increasing *FREAL* concentration from pre-SAB 102 to post-SAB 102 periods (see Table 1) actually makes it more difficult to obtain the result that banks’ allowance sensitivity to charge-offs increased without SAB 102.

Table 11 presents the results of our forward association tests with Panels A and B in which we compare the high and low *FREAL* groups, respectively. The average *R*² in Periods 1 and 2 for banks in the high *FREAL* group was .209 (average of .218 and .200) versus .226 (average of .314 and .139) for banks in the low *FREAL* group. However, in Periods 4 and 5 after SAB 102 became effective, we find that the average *R*² for the high *FREAL* group decreased to .138 (average of .192 and .085)

\(^{33}\) Typically, we find a greater divergence in the allowance associations across all three loan type partitions post-SAB 102 relative to pre-SAB 102. Thus, an increasing divergence in the means / medians over time across the loan partitions can potentially explain the result. However, consistent with an overall trend in all banks towards portfolios heavily concentrated in real estate, the divergence between the means of the high and low bank groups for all three loan types actually declined over time.
while the average $R^2$ for the low $FREAL$ group increased substantially to .663 (average of .561 and .766). The $ALLOW$ coefficients exhibit similar trends for both the low and high $FREAL$ groups.

**INSERT TABLE 11 HERE**

The results for Period 6 in Table 11 are noteworthy in that allowance-charge-off associations were much lower for the banks with high real estate loan concentrations during the financial crisis (.362 $R^2$) than for banks in the low $FREAL$ group (.655 $R^2$). The clear contrast between the allowance-charge-off associations for the low and high $FREAL$ banks still evident in period 6 is consistent with the widespread opinion that problems in the real estate sector caused the financial crisis (Thomas, Hennessey and Holtz-Eakin 2011). As noted by Beatty and Liao (2011), delayed loss provisioning contributed to exacerbating pro-cyclical lending policies, which, in turn, worsened the financial crisis. Finally, the Period 6 results indicate that the new guidance provided by the FFIEC’s Policy Statement (effective December 2006) requiring banks to consider changes in economic conditions when estimating allowances did not eliminate the SAB 102 effects.

Since $FREAL$ includes both residential real estate loans and some commercial loans that would be expected to provide a challenge for using charge-offs as a risk indicator of future losses (see Ryan 2007), we constructed an alternative real estate loan proxy variable denoted by $RES$. $RES$ is computed as $1 - IND - COM$. The $RES$ loan proportion is similar to $FREAL$ in that unsecured loans to individuals are excluded, but differs from $FREAL$ in that commercial real estate loans (which are included in $COM$) are also excluded. While imperfect, $RES$ provides an alternative proxy for the residential real estate loan proportion that specifically excludes commercial loans. The sensitivity of allowance-charge-off associations exhibited by banks partitions based on $RES$ are similar to those based on $FREAL$. Once again, we find that $AVECHO$ coefficients (un-tabulated) increased for banks in the low $RES$ group, but decreased for banks in the high $RES$ group after SAB 102. The forward
association results based on the $RES$ partition confirm our results based on $FREAL$ showing that the allowances and provisions for banks with high real estate loan concentrations actually became less informative in explaining future charge-offs in periods after SAB 102, thus confirming the unintended consequence of SAB 102.

A number of other robustness checks have also been performed on the results. While we employed the median profitability approach outlined in Liu and Ryan (2006) to sort banks into strong and weak groups, there is a concern that such sorting could introduce a bias in that bank profitability can influence the types of loans that are made and vice versa. One such possibility is that banks with higher profitability ($EBP$) make a higher percentage of consumer and credit card loans whose default losses are potentially more predictable as we previously demonstrated for non-mortgage individual loans.\footnote{We acknowledge the contribution of the anonymous Reviewer in identifying this problem.} An analysis of the $EBP$ means for the two non-mortgage individual loan groups, however, shows that they are not meaningfully different, being two orders of magnitude smaller than the differences across, say, the strong and weak bank groups that we induced by partitioning on $EBP$. To further alleviate concerns about this issue, however, we also considered alternative metrics for classifying banks into strong and weak groups. Two alternative measures used were capital ratios ($CAPRATIO$) and the presence or absence of quarterly operating losses (LOSS).\footnote{For brevity, only results for $CAPRATIO$ are tabulated.} The results are similar in that banks in the high $CAPRATIO$ group (Table 12) had average $AVECHO$ coefficients of 1.635 (average of 1.798 and 1.473) in the backward association tests in Periods 1 and 2 as compared with 3.192 (average of 2.590 and 3.794) in Periods 4 and 5. In contrast, banks in the low $CAPRATIO$ group had average $AVECHO$ coefficients of 1.091 (average of 1.015 and 1.166) in Periods 1 and 2 versus 1.023 (average of 1.200 and .846) in Periods 4 and 5. Thus, our results based on $CAPRATIO$ partitions parallel those previously reported using $EBP$ in
that the backward associations for high \textit{CAPRATIO} banks improved, while the ones for low \textit{CAPRATIO} banks did not.

\textbf{Insert Table 12 Here}

As a further sensitivity analysis for our bank size results, we considered two alternative specifications to redefine the large bank group. The first was to include the 100 largest banks and the second was to include all banks above the median size in each quarter. Under both size specifications, our results remain qualitatively identical in that large banks were more affected by SAB 102. Finally, a sensitivity analysis was performed on our six time period cut-offs. We adjusted the cut-offs points used for defining the six time periods by up to four quarters and obtained similar association results.

\textbf{6. Summary and Implications}

Our results show that banks, as a group, changed their loan loss allowances in response to SAB 102/FFIEC guidance by placing increased reliance on past charge-offs and reduced reliance on \textit{NAL}. However, we find that the impact of SAB 102 is much more pronounced among large banks than among small banks and also more pronounced among banks in strong financial condition relative to those in weak condition. Paralleling the structural shift toward reliance on historical loss rates under SAB 102/FFIEC guidance, we find the forward associations for strong banks increased. These results are consistent with the SEC’s contention that banks’ earnings management activities diminished the informativeness of financial reporting in the pre-SAB 102 environment. For the strong banks, SAB 102 appears to have fulfilled the SEC’s objectives by improving the informativeness of financial reporting. In contrast, the SEC’s intervention appears to have had the unintended consequence of reducing the informativeness of financial reports for the weak banks—especially in Period 5 just prior to the financial crisis. The security return results reinforce the
forward allowance-charge-off association findings that the informativeness of allowances improved for the strong banks, but not for weak banks.

We also find that the effects of SAB 102 are sensitive to the composition of banks’ loan portfolios. Banks having a high proportion of non-mortgage loans to individuals exhibited increasing allowance-charge-off associations while banks with a high proportion of commercial loans had decreasing associations. Perhaps more interesting are the results for banks with high concentrations of real estate loans. Our findings indicate that, in periods before SAB 102, the allowances of banks with high and low concentrations of real estate loans were nearly equal in their ability to explain future charge-offs. However, after SAB 102, the allowance-charge-off associations for banks with low real estate loan concentrations actually improved substantially while the associations for banks with high real estate loan concentrations actually declined. Although not reported, we obtained qualitatively similar results for security returns using these real estate loan partitions.

We believe that the FFIEC regulators recognized the potential for misuse of SAB 102/2001 FFIEC guidance and speculate that these concerns motivated the issuance of the new Policy Statement that became effective at the end of December 2006. While the FFIEC’s new guidance was particularly applicable to real estate loans during Period 6 during and after the financial crisis, we find that the allowances of banks in the high real estate loan group continued to exhibit much weaker forward associations than did the allowances of banks in the low real estate group. These results raise questions about the extent to which banks actually modified their loan loss estimation processes in response to the new FFIEC guidance and, thus, help to explain banks’ delaying loss recognition that has been alleged to have induced pro-cyclical lending policies—a factor identified by Dugan (2009) and Beatty and Liao (2011) to have exacerbated the financial crisis.
References


## Variable Names and Descriptions

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALLOW</strong></td>
<td>Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3123 / BHCK2122.</td>
</tr>
<tr>
<td><strong>ALLOWLAG</strong></td>
<td>Allowance at the beginning of the quarter.</td>
</tr>
<tr>
<td><strong>AVECHO</strong></td>
<td>The average of CHO or CHO (Adj.) for the current and past three quarters.</td>
</tr>
<tr>
<td><strong>AVECHO_{t+4}</strong></td>
<td>Average of CHO or CHO (Adj.) for the four subsequent quarters.</td>
</tr>
<tr>
<td><strong>CAPRATIO</strong></td>
<td>The end of quarter Total Equity scaled by Total Assets.</td>
</tr>
<tr>
<td><strong>CHO</strong></td>
<td>Charge offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK4635.</td>
</tr>
<tr>
<td><strong>CHO (Adj.)</strong></td>
<td>CHO adjusted by next quarter’s recoveries and scaled by the average loans outstanding for the quarter. Year-to-date recoveries are available as data item BHCK4605.</td>
</tr>
<tr>
<td><strong>COM</strong></td>
<td>Commercial Loans as a fraction of Total Loans. Computed as BHCK1766 / BHCK2122.</td>
</tr>
<tr>
<td><strong>CSRET</strong></td>
<td>The return on the Case-Shiller Real estate Index over the quarter.</td>
</tr>
<tr>
<td><strong>DEBP</strong></td>
<td>The change in EBP this quarter from the previous quarter.</td>
</tr>
<tr>
<td><strong>DNAL</strong></td>
<td>The change in NAL from the beginning of the quarter to the end.</td>
</tr>
<tr>
<td><strong>DPROV</strong></td>
<td>The change in PROV this quarter from the previous quarter.</td>
</tr>
<tr>
<td><strong>DUNRATE</strong></td>
<td>The change in the unemployment rate from the beginning of the quarter to the end.</td>
</tr>
<tr>
<td><strong>EBP</strong></td>
<td>Earnings before provisions computed as the company’s earnings after tax plus provisions for the quarter (scaled by lagged Total Assets). Year-to-date provisions are available as data item BHCK4230.</td>
</tr>
<tr>
<td><strong>FREAL</strong></td>
<td>Fraction of loans outstanding that are secured by real estate. Computed as BHCK1410 / BHCK2122.</td>
</tr>
<tr>
<td><strong>IND</strong></td>
<td>Individual Non-Mortgage Loans as a fraction of Total Loans. Computed as BHCK1975 / BHCK2122.</td>
</tr>
<tr>
<td><strong>LOSS</strong></td>
<td>An indicator variable that takes on a value of one if the bank declared a loss for the year and zero otherwise.</td>
</tr>
<tr>
<td><strong>NAL</strong></td>
<td>Non-accrual loans at of the end of the quarter divided by total loans outstanding at the end of the quarter.</td>
</tr>
<tr>
<td><strong>PROFIT</strong></td>
<td>An indicator variable that equals one if the company’s EBP is in the upper half of the industry wide distribution of EBP for the quarter and zero otherwise.</td>
</tr>
<tr>
<td><strong>PROV</strong></td>
<td>Loan Loss Provisions for the quarter. Year-to-date provisions are available as data item BHCK4230.</td>
</tr>
<tr>
<td><strong>RES</strong></td>
<td>Residual Loans as a fraction of Total Loans. Computed as 1-COM-IND.</td>
</tr>
<tr>
<td><strong>RET</strong></td>
<td>The value-weighted index adjusted three day return (day -1 through day +1) for the bank around its earnings announcement date.</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>The natural logarithm of Total Assets.</td>
</tr>
<tr>
<td><strong>STRONG BANKS</strong></td>
<td>Banks in the upper half of each quarter’s distribution of EBP.</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td>The end of quarter total assets of the bank holding company in millions. Available as data item BHCK2170.</td>
</tr>
<tr>
<td><strong>WEAK BANKS</strong></td>
<td>Banks in the lower half of each quarter’s distribution of EBP.</td>
</tr>
</tbody>
</table>
Figure 1

Time Line for Regulatory Intervention

Period 1                    Period 2                  Period 3              Period 4                 Period 5                  Period 6

SEC
Investigates
SunTrust
in 1998

SAB 102/
FFIEC 2001
Policy
Statement
Issued

SFAS 114
Effective in
1995

Basel
Effective in
1992 and

FFIEC
2006
Policy
Statement
Figure 2

Determinants of Allowance – AVECHO and NAL Coefficients across Periods

Top 50 Banks

Small Private Banks
Figure 3

Determinants of Allowance – AVECHO and NAL Coefficients across Periods

**Strong Banks**

**Weak Banks**
<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PANEL A: PERIOD = 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets ('000)</td>
<td>10164</td>
<td>3,304,962</td>
<td>13,921,797</td>
<td>20,070</td>
<td>254,246,000</td>
</tr>
<tr>
<td>FREAL</td>
<td>10164</td>
<td>0.5746</td>
<td>0.1753</td>
<td>0.000</td>
<td>1.0487</td>
</tr>
<tr>
<td>ALLOW</td>
<td>10164</td>
<td>0.0188</td>
<td>0.0100</td>
<td>0.000</td>
<td>0.1232</td>
</tr>
<tr>
<td>PROV</td>
<td>10164</td>
<td>0.0011</td>
<td>0.0029</td>
<td>-0.0996</td>
<td>0.0500</td>
</tr>
<tr>
<td>NAL</td>
<td>10164</td>
<td>0.0122</td>
<td>0.0162</td>
<td>0.000</td>
<td>0.2104</td>
</tr>
<tr>
<td>EBP</td>
<td>10164</td>
<td>0.0109</td>
<td>0.0081</td>
<td>-0.1600</td>
<td>0.1303</td>
</tr>
<tr>
<td>SIZE</td>
<td>10164</td>
<td>13.2313</td>
<td>1.4859</td>
<td>9.9070</td>
<td>19.3538</td>
</tr>
<tr>
<td>CHO</td>
<td>10164</td>
<td>0.0016</td>
<td>0.0029</td>
<td>-0.0027</td>
<td>0.0523</td>
</tr>
<tr>
<td>CHO (Adjusted)</td>
<td>10164</td>
<td>0.0011</td>
<td>0.0028</td>
<td>-0.0475</td>
<td>0.0494</td>
</tr>
<tr>
<td>LOSS</td>
<td>10164</td>
<td>0.0342</td>
<td>0.1819</td>
<td>0.000</td>
<td>0.0000</td>
</tr>
<tr>
<td>PROFIT</td>
<td>10164</td>
<td>0.4777</td>
<td>0.4973</td>
<td>0.000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RET$_t$</td>
<td>424</td>
<td>-0.0021</td>
<td>0.0353</td>
<td>-0.1403</td>
<td>0.2169</td>
</tr>
<tr>
<td>IND</td>
<td>10164</td>
<td>0.1651</td>
<td>0.1182</td>
<td>0.000</td>
<td>0.0000</td>
</tr>
<tr>
<td>COM</td>
<td>10164</td>
<td>0.1945</td>
<td>0.1214</td>
<td>0.000</td>
<td>0.9576</td>
</tr>
<tr>
<td>RES</td>
<td>10164</td>
<td>0.6404</td>
<td>0.1538</td>
<td>0.000</td>
<td>1.0000</td>
</tr>
<tr>
<td><strong>PANEL B: PERIOD = 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets ('000)</td>
<td>13577</td>
<td>3,991,724</td>
<td>19,830,201</td>
<td>26,618</td>
<td>366,574,000</td>
</tr>
<tr>
<td>FREAL</td>
<td>13577</td>
<td>0.5985</td>
<td>0.1802</td>
<td>0.000</td>
<td>1.0610</td>
</tr>
<tr>
<td>ALLOW</td>
<td>13577</td>
<td>0.0156</td>
<td>0.0074</td>
<td>0.000</td>
<td>0.1461</td>
</tr>
<tr>
<td>PROV</td>
<td>13577</td>
<td>0.0009</td>
<td>0.0023</td>
<td>-0.1191</td>
<td>0.0626</td>
</tr>
<tr>
<td>NAL</td>
<td>13577</td>
<td>0.0072</td>
<td>0.0091</td>
<td>0.000</td>
<td>0.1416</td>
</tr>
<tr>
<td>EBP</td>
<td>13577</td>
<td>0.0116</td>
<td>0.0073</td>
<td>-0.0512</td>
<td>0.2071</td>
</tr>
<tr>
<td>SIZE</td>
<td>13577</td>
<td>13.2863</td>
<td>1.4293</td>
<td>10.1893</td>
<td>19.7197</td>
</tr>
<tr>
<td>CHO</td>
<td>13577</td>
<td>0.0007</td>
<td>0.0018</td>
<td>-0.0104</td>
<td>0.0452</td>
</tr>
<tr>
<td>CHO (Adjusted)</td>
<td>13577</td>
<td>0.0007</td>
<td>0.0029</td>
<td>-0.2636</td>
<td>0.0431</td>
</tr>
<tr>
<td>LOSS</td>
<td>13577</td>
<td>0.0099</td>
<td>0.0992</td>
<td>0.000</td>
<td>1.0000</td>
</tr>
<tr>
<td>PROFIT</td>
<td>13577</td>
<td>0.4322</td>
<td>0.4954</td>
<td>0.000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RET$_t$</td>
<td>1090</td>
<td>0.0024</td>
<td>0.0306</td>
<td>-0.1975</td>
<td>0.1513</td>
</tr>
<tr>
<td>IND</td>
<td>13577</td>
<td>0.1555</td>
<td>0.1175</td>
<td>0.000</td>
<td>0.0000</td>
</tr>
<tr>
<td>COM</td>
<td>13577</td>
<td>0.1871</td>
<td>0.1226</td>
<td>0.000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RES</td>
<td>13577</td>
<td>0.6575</td>
<td>0.1583</td>
<td>0.000</td>
<td>1.0000</td>
</tr>
<tr>
<td><strong>PANEL C: PERIOD = 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets ('000)</td>
<td>15481</td>
<td>4,816,162</td>
<td>34,131,698</td>
<td>30,364</td>
<td>902,210,000</td>
</tr>
<tr>
<td>FREAL</td>
<td>15481</td>
<td>0.630</td>
<td>0.175</td>
<td>0.000</td>
<td>1.014</td>
</tr>
<tr>
<td>ALLOW</td>
<td>15481</td>
<td>0.014</td>
<td>0.006</td>
<td>0.000</td>
<td>0.106</td>
</tr>
<tr>
<td>PROV</td>
<td>15481</td>
<td>0.001</td>
<td>0.002</td>
<td>-0.044</td>
<td>0.072</td>
</tr>
<tr>
<td>NAL</td>
<td>15481</td>
<td>0.006</td>
<td>0.007</td>
<td>0.000</td>
<td>0.137</td>
</tr>
<tr>
<td>EBP</td>
<td>15481</td>
<td>0.011</td>
<td>0.009</td>
<td>-0.044</td>
<td>0.221</td>
</tr>
<tr>
<td>SIZE</td>
<td>15481</td>
<td>13.239</td>
<td>1.367</td>
<td>10.321</td>
<td>20.620</td>
</tr>
<tr>
<td>CHO</td>
<td>15481</td>
<td>0.001</td>
<td>0.002</td>
<td>-0.005</td>
<td>0.056</td>
</tr>
<tr>
<td>CHO (Adjusted)</td>
<td>15481</td>
<td>0.001</td>
<td>0.002</td>
<td>-0.044</td>
<td>0.056</td>
</tr>
<tr>
<td>LOSS</td>
<td>15481</td>
<td>0.012</td>
<td>0.107</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>PROFIT</td>
<td>15481</td>
<td>0.439</td>
<td>0.496</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>RET$_t$</td>
<td>1391</td>
<td>0.001</td>
<td>0.049</td>
<td>-0.251</td>
<td>0.298</td>
</tr>
<tr>
<td>IND</td>
<td>15481</td>
<td>0.1267</td>
<td>0.1032</td>
<td>0.000</td>
<td>0.9729</td>
</tr>
<tr>
<td>COM</td>
<td>15481</td>
<td>0.1809</td>
<td>0.1170</td>
<td>0.000</td>
<td>0.9765</td>
</tr>
<tr>
<td>RES</td>
<td>15481</td>
<td>0.6924</td>
<td>0.1459</td>
<td>0.0233</td>
<td>1.0000</td>
</tr>
<tr>
<td>Variable</td>
<td>N</td>
<td>Mean</td>
<td>Std Dev</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>----------</td>
<td>----</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>PANEL D: PERIOD = 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets ('000)</td>
<td>25419</td>
<td>6,262,300</td>
<td>53,507,530</td>
<td>37,778</td>
<td>1,484,101,000</td>
</tr>
<tr>
<td>FREAL</td>
<td>25419</td>
<td>0.6820</td>
<td>0.1595</td>
<td>0.0000</td>
<td>1.0104</td>
</tr>
<tr>
<td>ALLOW</td>
<td>25419</td>
<td>0.0139</td>
<td>0.0072</td>
<td>0.0000</td>
<td>0.2283</td>
</tr>
<tr>
<td>PROV</td>
<td>25419</td>
<td>0.0011</td>
<td>0.0026</td>
<td>-0.0151</td>
<td>0.1332</td>
</tr>
<tr>
<td>NAL</td>
<td>25419</td>
<td>0.0073</td>
<td>0.0094</td>
<td>0.0000</td>
<td>0.2283</td>
</tr>
<tr>
<td>EBP</td>
<td>25419</td>
<td>0.0106</td>
<td>0.0087</td>
<td>-0.0611</td>
<td>0.3611</td>
</tr>
<tr>
<td>SIZE</td>
<td>25419</td>
<td>13.2267</td>
<td>1.3421</td>
<td>10.5395</td>
<td>21.1181</td>
</tr>
<tr>
<td>CHO</td>
<td>25419</td>
<td>0.0011</td>
<td>0.0026</td>
<td>-0.0191</td>
<td>0.1436</td>
</tr>
<tr>
<td>CHO (Adjusted)</td>
<td>25419</td>
<td>0.0008</td>
<td>0.0024</td>
<td>-0.0235</td>
<td>0.1344</td>
</tr>
<tr>
<td>LOSS</td>
<td>25419</td>
<td>0.0013</td>
<td>0.0026</td>
<td>-0.0151</td>
<td>0.1332</td>
</tr>
<tr>
<td>PROFIT</td>
<td>25419</td>
<td>0.4370</td>
<td>0.4960</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RETt</td>
<td>1969</td>
<td>0.0034</td>
<td>0.0369</td>
<td>-0.1622</td>
<td>0.4524</td>
</tr>
<tr>
<td>IND</td>
<td>7435</td>
<td>0.0922</td>
<td>0.0896</td>
<td>0.0000</td>
<td>0.9799</td>
</tr>
<tr>
<td>COM</td>
<td>7435</td>
<td>0.1662</td>
<td>0.1002</td>
<td>0.0000</td>
<td>0.8357</td>
</tr>
<tr>
<td>RES</td>
<td>7435</td>
<td>0.7416</td>
<td>0.1288</td>
<td>0.0201</td>
<td>1.0000</td>
</tr>
<tr>
<td>PANEL E: PERIOD = 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets ('000)</td>
<td>7435</td>
<td>11,566,527</td>
<td>88,525,487</td>
<td>61,427</td>
<td>1,884,318,000</td>
</tr>
<tr>
<td>FREAL</td>
<td>7435</td>
<td>0.7390</td>
<td>0.1514</td>
<td>0.0000</td>
<td>1.0093</td>
</tr>
<tr>
<td>ALLOW</td>
<td>7435</td>
<td>0.0126</td>
<td>0.0080</td>
<td>0.0000</td>
<td>0.2303</td>
</tr>
<tr>
<td>PROV</td>
<td>7435</td>
<td>0.0007</td>
<td>0.0017</td>
<td>-0.0133</td>
<td>0.1271</td>
</tr>
<tr>
<td>NAL</td>
<td>7435</td>
<td>0.0051</td>
<td>0.0067</td>
<td>0.0000</td>
<td>0.1271</td>
</tr>
<tr>
<td>EBP</td>
<td>7435</td>
<td>0.0105</td>
<td>0.0103</td>
<td>-0.0420</td>
<td>0.2938</td>
</tr>
<tr>
<td>SIZE</td>
<td>7435</td>
<td>14.0310</td>
<td>1.3921</td>
<td>11.0256</td>
<td>21.3568</td>
</tr>
<tr>
<td>CHO</td>
<td>7435</td>
<td>0.0007</td>
<td>0.0020</td>
<td>-0.0121</td>
<td>0.0560</td>
</tr>
<tr>
<td>CHO (Adjusted)</td>
<td>7435</td>
<td>0.0005</td>
<td>0.0017</td>
<td>-0.0125</td>
<td>0.0432</td>
</tr>
<tr>
<td>LOSS</td>
<td>7435</td>
<td>0.0013</td>
<td>0.0026</td>
<td>-0.0125</td>
<td>0.0432</td>
</tr>
<tr>
<td>PROFIT</td>
<td>7435</td>
<td>0.4662</td>
<td>0.4989</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RETt</td>
<td>812</td>
<td>0.0006</td>
<td>0.0358</td>
<td>-0.1634</td>
<td>0.2279</td>
</tr>
<tr>
<td>IND</td>
<td>7435</td>
<td>0.0613</td>
<td>0.0773</td>
<td>0.0000</td>
<td>0.9696</td>
</tr>
<tr>
<td>COM</td>
<td>7435</td>
<td>0.1540</td>
<td>0.0967</td>
<td>0.0000</td>
<td>0.7714</td>
</tr>
<tr>
<td>RES</td>
<td>7435</td>
<td>0.7847</td>
<td>0.1216</td>
<td>0.0304</td>
<td>1.0000</td>
</tr>
<tr>
<td>PANEL F: PERIOD - 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets ('000)</td>
<td>6307</td>
<td>12,577,047</td>
<td>105,825,682</td>
<td>71,152</td>
<td>2,358,266,000</td>
</tr>
<tr>
<td>FREAL</td>
<td>6307</td>
<td>0.7462</td>
<td>0.1490</td>
<td>0.0000</td>
<td>1.0068</td>
</tr>
<tr>
<td>ALLOW</td>
<td>6307</td>
<td>0.0131</td>
<td>0.0087</td>
<td>0.0000</td>
<td>0.2283</td>
</tr>
<tr>
<td>PROV</td>
<td>6307</td>
<td>0.0018</td>
<td>0.0039</td>
<td>-0.0077</td>
<td>0.0743</td>
</tr>
<tr>
<td>NAL</td>
<td>6307</td>
<td>0.0125</td>
<td>0.0182</td>
<td>0.0000</td>
<td>0.2768</td>
</tr>
<tr>
<td>EBP</td>
<td>6307</td>
<td>0.0076</td>
<td>0.0119</td>
<td>-0.1642</td>
<td>0.2650</td>
</tr>
<tr>
<td>SIZE</td>
<td>6307</td>
<td>14.0703</td>
<td>1.2602</td>
<td>11.1726</td>
<td>21.5812</td>
</tr>
<tr>
<td>CHO</td>
<td>6307</td>
<td>0.0014</td>
<td>0.0034</td>
<td>-0.0197</td>
<td>0.0617</td>
</tr>
<tr>
<td>CHO (Adjusted)</td>
<td>6307</td>
<td>0.0013</td>
<td>0.0032</td>
<td>-0.0239</td>
<td>0.0544</td>
</tr>
<tr>
<td>LOSS</td>
<td>6307</td>
<td>0.0931</td>
<td>0.2906</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>PROFIT</td>
<td>6307</td>
<td>0.4140</td>
<td>0.4926</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RETt</td>
<td>347</td>
<td>0.0039</td>
<td>0.0596</td>
<td>-0.2081</td>
<td>0.2433</td>
</tr>
<tr>
<td>IND</td>
<td>6307</td>
<td>0.0543</td>
<td>0.0752</td>
<td>0.0000</td>
<td>0.8607</td>
</tr>
<tr>
<td>COM</td>
<td>6307</td>
<td>0.1535</td>
<td>0.0960</td>
<td>0.0000</td>
<td>0.7964</td>
</tr>
<tr>
<td>RES</td>
<td>6307</td>
<td>0.7922</td>
<td>0.1200</td>
<td>0.0341</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

**ALLOW**: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3123 / BHCK2122. **CHO**: Charge offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK4635. **CHO (Adj.)**: CHO adjusted by next quarter’s recoveries and scaled by the average loans outstanding for the quarter. Year-to-date recoveries are available as data item BHCK4605. **COM**: Commercial Loans as a fraction of Total Loans. Computed as BHCK1766 / BHCK2122. **EBP**: Earnings before provisions computed as the company’s earnings after tax plus provisions for the quarter (scaled by lagged Total Assets). Year-to-date provisions are available as data item BHCK4230. **FREAL**: Fraction of loans outstanding that are secured by real estate. Computed as BHCK1410 / BHCK2122. **IND**: Individual Non-Mortgage Loans as a fraction of Total Loans. Computed as BHCK1410 / BHCK2122. **LOSS**: An indicator variable that takes on a value of one if the bank declared a loss for the year and zero otherwise. **NAL**: Non-accrual loans at the end of the quarter divided by total loans outstanding at the end of the quarter. **PROFIT**: An indicator variable that equals one if the company’s EBP is in the upper half of the industry wide distribution of EBP for the quarter and zero otherwise. **PROV**: Loan Loss Provisions for the quarter. Year-to-date provisions are available as data item BHCK4230. **RES**: Residual Loans as a fraction of Total Loans. Computed as 1 - COM - IND. **RET**: The value-weighted index adjusted three day return (day -1 through day +1) for the bank around its earnings announcement date. **SIZE**: The natural logarithm of Total Assets. **Total Assets**: The end of quarter total assets of the bank holding company in millions. Available as data item BHCK2170.
### Table 2

**Determinants of Allowance and Provisions**

**Panel A: Allowance**

\[
\text{ALLOW} = \alpha + \beta_1 \text{AVECHO} + \beta_2 \text{NAL} + \beta_3 \text{POST} + \beta_4 \text{POST} \times \text{AVECHO} + \beta_5 \text{POST} \times \text{NAL} + \beta_6 \text{FREAL} + \beta_7 \text{SIZE} + \beta_8 \text{CSRET} + \beta_9 \text{DUNRATE} + \epsilon.
\]

**Panel B: Loss Provisions (Adjusted Charge-Offs)**

\[
\text{PROV} = \alpha + \beta_1 \text{CHO} + \beta_2 \text{NAL} + \beta_3 \text{POST} + \beta_4 \text{POST} \times \text{CHO} + \beta_5 \text{POST} \times \text{DNAL} + \beta_6 \text{FREAL} + \beta_7 \text{SIZE} + \beta_8 \text{CSRET} + \beta_9 \text{DUNRATE} + \beta_{10} \text{ALLOWLAG} + \epsilon.
\]

<table>
<thead>
<tr>
<th>Unadjusted Charge-Offs</th>
<th>Adjusted Charge-Offs</th>
<th>Provision Model 1</th>
<th>Provision Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALLOW (Eq. 1A)</strong></td>
<td><strong>ALLOW (Eq. 1A)</strong></td>
<td><strong>PROV (Eq. 1B)</strong></td>
<td><strong>PROV (Eq. 1B)</strong></td>
</tr>
<tr>
<td>AVECHO</td>
<td>1.468 *** (14.66)</td>
<td>ALLOWLAG -0.027 ** (2.44)</td>
<td>ALLOWLAG</td>
</tr>
<tr>
<td>NAL</td>
<td>0.261 *** (15.67)</td>
<td>CHO 0.669 *** (24.82)</td>
<td>CHO 0.632 *** (30.23)</td>
</tr>
<tr>
<td>FREAL</td>
<td>-0.002 *** (-2.64)</td>
<td>DNAL 0.054 *** (5.41)</td>
<td>DNAL 0.059 *** (6.19)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000 (1.07)</td>
<td>FREAL 0.000 (-0.72)</td>
<td>FREAL -0.000 (-0.12)</td>
</tr>
<tr>
<td>POST</td>
<td>-0.002 *** (-3.69)</td>
<td>SIZE 0.000 (0.04)</td>
<td>SIZE -0.000 (-0.63)</td>
</tr>
<tr>
<td>POST*AVECHO</td>
<td>1.108 *** (2.87)</td>
<td>POST 0.000 * (-1.83)</td>
<td>POST -0.000 (-0.76)</td>
</tr>
<tr>
<td>POST*NAL</td>
<td>-0.197 *** (-7.60)</td>
<td>POST*CHO 0.219 *** (3.66)</td>
<td>POST*CHO 0.208 *** (3.74)</td>
</tr>
<tr>
<td>DUNRATE</td>
<td>-0.001 * (-1.91)</td>
<td>POST*DNAL 0.020 (1.55)</td>
<td>POST*DNAL 0.015 (1.20)</td>
</tr>
<tr>
<td>CSRET</td>
<td>0.012 *** (3.35)</td>
<td>DUNRATE 0.000 ** (2.56)</td>
<td>DUNRATE 0.000 *** (2.79)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.011 (5.46)</td>
<td>CSRET -0.002 *** (-3.33)</td>
<td>CSRET -0.003 *** (-4.19)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intercept 0.001 *** (3.67)</td>
<td></td>
</tr>
</tbody>
</table>

**N** 58,454 58,452 58,393 58,393

**adj. R-sq** 0.527 0.473 0.611 0.606

* t statistics in parentheses (standard errors adjusted for two-way clustering
  - firm and year)

* p<0.1, ** p<0.05, *** p<0.01

**ALLOW**: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3123 / BHCK2122.

**ALLOWLAG**: Allowance at the beginning of the quarter. **AVECHO**: The average of CHO or CHO (Adj.) for the current and past three quarters. **CHO**: Charge offs for the quarter divided by the average loans outstanding for the quarter. **NAL**: Charge offs for the quarter scaled by total loans outstanding at the end of the quarter. **POST**: An indicator variable that takes on a value of one for the years 2001-2008 and a value of zero for the years 1992-1997. **DUNRATE**: The change in the unemployment rate from the beginning of the quarter to the end. **FREAL**: Fraction of loans outstanding that are secured by real estate. **SIZE**: The natural logarithm of Total Assets. **Total Assets**: The end of quarter total assets of the bank holding company in millions. **CSRET**: The return on the Case-Shiller Real estate Index over the quarter. **DNAL**: The change in NAL from the beginning of the quarter to the end. **POST**: The change in unemployment rate from the beginning of the quarter to the end. **FREAL**: Fraction of loans outstanding that are secured by real estate. **Allow**: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3123 / BHCK2122.
Table 3
Determinants of Allowance for Large and Small Banks \(^1\) [Eq. 1 without the indicator variable]

\[
\text{ALLOW} = \alpha + \beta_1 \text{AVECHO} + \beta_2 \text{NAL} + \beta_3 \text{FREAL} + \beta_4 \text{SIZE} + \beta_5 \text{CSRET} + \ \epsilon
\]

<table>
<thead>
<tr>
<th></th>
<th>PANEL A</th>
<th>TOP 50 BANKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>AVECHO</strong></td>
<td>1.144</td>
<td>1.257 ***</td>
</tr>
<tr>
<td></td>
<td>(1.50)</td>
<td>(3.08)</td>
</tr>
<tr>
<td><strong>NAL</strong></td>
<td>0.466 ***</td>
<td>0.683 ***</td>
</tr>
<tr>
<td></td>
<td>(3.95)</td>
<td>(8.84)</td>
</tr>
<tr>
<td><strong>FREAL</strong></td>
<td>-0.004</td>
<td>-0.012</td>
</tr>
<tr>
<td></td>
<td>(-0.45)</td>
<td>(0.00)</td>
</tr>
<tr>
<td><strong>SIZE</strong></td>
<td>0.002</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(1.18)</td>
<td>(0.68)</td>
</tr>
<tr>
<td><strong>DURRANO</strong></td>
<td>-0.003</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(-1.40)</td>
<td>(1.04)</td>
</tr>
<tr>
<td><strong>CSRET</strong></td>
<td>0.028*</td>
<td>0.031*</td>
</tr>
<tr>
<td></td>
<td>(1.67)</td>
<td>(1.81)</td>
</tr>
<tr>
<td><strong>Intercept</strong></td>
<td>-0.021</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(-0.69)</td>
<td>(0.43)</td>
</tr>
</tbody>
</table>

N = 407, 341, 485, 670, 302, 284
adj-\text{R-sq} = 0.487, 0.582, 0.539, 0.776, 0.566, 0.832

<table>
<thead>
<tr>
<th></th>
<th>PANEL B</th>
<th>BANKS WITH TOTAL ASSETS &lt; $500 MILLION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>AVECHO</strong></td>
<td>1.200***</td>
<td>1.190***</td>
</tr>
<tr>
<td></td>
<td>(11.37)</td>
<td>(4.41)</td>
</tr>
<tr>
<td><strong>NAL</strong></td>
<td>0.229***</td>
<td>0.222***</td>
</tr>
<tr>
<td></td>
<td>(10.40)</td>
<td>(6.85)</td>
</tr>
<tr>
<td><strong>FREAL</strong></td>
<td>-0.002</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(-1.40)</td>
<td>(2.21)</td>
</tr>
<tr>
<td><strong>SIZE</strong></td>
<td>-0.001</td>
<td>-0.000</td>
</tr>
<tr>
<td></td>
<td>(-1.59)</td>
<td>(-0.52)</td>
</tr>
<tr>
<td><strong>DURRANO</strong></td>
<td>0.000</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.49)</td>
<td>(-1.25)</td>
</tr>
<tr>
<td><strong>CSRET</strong></td>
<td>0.008</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(0.59)</td>
<td>(0.65)</td>
</tr>
<tr>
<td><strong>Intercept</strong></td>
<td>0.021***</td>
<td>0.016**</td>
</tr>
<tr>
<td></td>
<td>(4.65)</td>
<td>(2.28)</td>
</tr>
</tbody>
</table>

N = 454, 577, 706, 15,000, 1,350, 702
adj-\text{R-sq} = 0.452, 0.163, 0.272, 0.290, 0.188, 0.419

\(1 \text{ statistic in parentheses (standard errors adjusted for two-way clustering – firm and year)}\)
\(\ast \ p<0.1, \ ** \ p<0.05, \ *** \ p<0.01\)

\text{Chow statistic computed after adjusting for firm level clustering}

\(\text{ALLOW: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BRICK3123 / BRICK2122.}\
\text{AVECHO: The average of CHO for the current and past three quarters. CHO. Change offs for the quarter divided by the average loans outstanding for the quarter. Yearly change offs are available as data item BRICK646V.}\
\text{NAL: The change in the unemployment rate from the beginning of the quarter to the end. FREAL: Fraction of loans outstanding that are secured by real estate. Computed as BRICK3141 / BRICK3122. NAL: Non-accrual loans at the end of the quarter divided by total loans outstanding at the end of the quarter. SIZE: The natural logarithm of Total Assets. SMALL BANKS: Private Banks with ending Total Assets less than $500 million. TOP 50 BANKS: The top 50 banks in each quarter ranked by end of period. Total Assets. Total Assets: The end of quarter total assets of the bank holding company in millions. Available as data item BRICK2170.}\)
### Table 4
Determinants of Allowance: Strong and Weak Banks

\[
ALLOW = \alpha + \beta_1 AVECHO + \beta_2 NAL + \beta_3 FREAL + \beta_4 SIZE + \beta_5 CSRET + \beta_6 DUNRATE + \varepsilon
\]

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A</strong></td>
<td><strong>STRONG BANKS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVECHO</td>
<td>1.410 ***</td>
<td>1.680 ***</td>
<td>2.677 ***</td>
<td>2.660 ***</td>
<td>3.835 ***</td>
<td>3.132 ***</td>
</tr>
<tr>
<td>(7.92)</td>
<td>(14.05)</td>
<td>(5.35)</td>
<td>(2.62)</td>
<td>(4.02)</td>
<td>(11.24)</td>
<td>(7.89)</td>
</tr>
<tr>
<td>NAL</td>
<td>0.300 ***</td>
<td>0.266 ***</td>
<td>0.270 ***</td>
<td>0.070 ***</td>
<td>0.025</td>
<td>0.060 ***</td>
</tr>
<tr>
<td>(14.05)</td>
<td>(2.62)</td>
<td>(4.02)</td>
<td>(1.36)</td>
<td>(3.62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREAL</td>
<td>-0.004 **</td>
<td>0.000 ***</td>
<td>0.001</td>
<td>-0.002</td>
<td>0.002 **</td>
<td>0.002 ***</td>
</tr>
<tr>
<td>(-1.50)</td>
<td>(0.02)</td>
<td>(1.60)</td>
<td>(2.09)</td>
<td>(1.65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.001 ***</td>
<td>0.000 ***</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.001 ***</td>
<td>0.000</td>
</tr>
<tr>
<td>(2.94)</td>
<td>(2.34)</td>
<td>(-1.48)</td>
<td>(-2.52)</td>
<td>(-5.06)</td>
<td>(1.00)</td>
<td></td>
</tr>
<tr>
<td>DUNRATE</td>
<td>-0.001</td>
<td>0.002 ***</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.002</td>
<td></td>
</tr>
<tr>
<td>(-0.78)</td>
<td>(2.70)</td>
<td>(0.00)</td>
<td>(-1.45)</td>
<td>(-1.27)</td>
<td>(0.00)</td>
<td></td>
</tr>
<tr>
<td>CSRET</td>
<td>0.024 **</td>
<td>0.013 ***</td>
<td>0.001</td>
<td>0.000</td>
<td>-0.004</td>
<td>0.006</td>
</tr>
<tr>
<td>(2.19)</td>
<td>(3.71)</td>
<td>(0.24)</td>
<td>(0.00)</td>
<td>(0.78)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.008 ***</td>
<td>0.009 ***</td>
<td>0.012 ***</td>
<td>0.016 ***</td>
<td>0.017 ***</td>
<td>0.014 ***</td>
</tr>
<tr>
<td>(4.60)</td>
<td>(8.49)</td>
<td>(8.80)</td>
<td>(15.46)</td>
<td>(5.39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>4550</td>
<td>3913</td>
<td>6799</td>
<td>11108</td>
<td>3466</td>
<td>2611</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.267</td>
<td>0.209</td>
<td>0.415</td>
<td>0.682</td>
<td>0.848</td>
<td>0.829</td>
</tr>
</tbody>
</table>

|                | 1         | 2         | 3         | 4         | 5         | 6         |
| **Panel B**    | **WEAK BANKS** |          |           |           |           |           |
| AVECHO         | 1.330 *** | 1.166 *** | 0.840 *** | 1.215 *** | 0.769 *** | 0.933 *** |
| (12.77)        | (4.08)    | (5.69)    | (6.17)    | (3.11)    | (5.93)    |           |
| NAL            | 0.254 *** | 0.261 *** | 0.227 *** | 0.163 *** | 0.153 *** | 0.145 *** |
| (15.64)        | (8.44)    | (10.87)   | (9.87)    | (7.00)    | (18.78)   |           |
| FREAL          | -0.002    | -0.002 ** | -0.003 ***| -0.004 ***| -0.04 *** | -0.003 ***|
| (-1.17)        | (-2.19)   | (-3.08)   | (-2.65)   | (-5.24)   | (-2.80)   |           |
| SIZE           | 0.001 *** | 0.001 *** | 0.000 *** | 0.000     | 0.000     | 0.000     |
| (3.07)         | (7.09)    | (3.21)    | (3.25)    | (3.00)    | (3.20)    |           |
| DUNRATE        | 0.001     | 0.002 **  | -0.001    | -0.001 ** | 0.000     | 0.000     |
| (1.68)         | (2.24)    | (-1.59)   | (-2.33)   | (0.00)    | (-4.10)   |           |
| CSRET          | -0.004    | 0.015 *** | -0.013 ***| -0.007 ***| 0.012     | 0.001     |
| (-0.20)        | (4.65)    | (-3.18)   | (-2.33)   | (0.00)    | (1.09)    |           |
| Intercept      | -0.004 *  | 0.005 **  | 0.006 *** | 0.011 *** | 0.012 *** | 0.011 *** |
| (-1.71)        | (1.39)    | (6.16)    | (6.90)    | (12.25)   | (1.76)    |           |
| N              | 5614      | 5216      | 8682      | 14311     | 3969      | 3696      |
| adj. R-sq      | 0.530     | 0.263     | 0.256     | 0.347     | 0.397     | 0.498     |

t statistics in parentheses (standard errors adjusted for two-way clustering – firm and year)

**p<0.1, **p<0.05, ***p<0.01

Chow statistic computed after adjusting for firm level clustering

ALLOW: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3132 / BHCK2122.

AVECHO: The average of CH 6 for the current and past three quarters. CH 6: Charge offs for the quarter divided by the average loans outstanding for the quarter.

NAL: The change of CH 6 for the current and past three quarters. CH 6: Charge offs for the quarter divided by the average loans outstanding for the quarter.

FREAL: Fraction of loans outstanding that are secured by real estate. Computed as BHCK1449 / BHCK2122.

SIZE: The natural logarithm of Total Assets.

N: Total Assets: The end of quarter total assets of the bank holding company in millions. Available as data item BHCK170. WEAK BANKS: Banks in the lower half of each quarter’s distribution of ERP.
### Table 5

**Prediction of Future Charge-offs - Strong and Weak Banks**

_AVECHO_{t+4} = \alpha + \beta_1\text{ALLOW}_t + \beta_2\text{FREAL}_t + \beta_3\text{SIZE}_t + \varepsilon_

#### PANEL A

**STRONG BANKS**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVECHO_{t+4}</td>
<td>ALLOW</td>
<td>FREAL</td>
<td>SIZE</td>
<td>Intercept</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.028 ***</td>
<td>0.050 ***</td>
<td>0.160 ***</td>
<td>0.225 ***</td>
<td>0.220 ***</td>
<td>0.288 ***</td>
</tr>
<tr>
<td></td>
<td>(4.68)</td>
<td>(3.06)</td>
<td>(2.89)</td>
<td>(5.25)</td>
<td>(17.69)</td>
<td>(16.15)</td>
</tr>
<tr>
<td></td>
<td>-0.002 ***</td>
<td>-0.003 ***</td>
<td>-0.002 ***</td>
<td>-0.001 ***</td>
<td>-0.001 ***</td>
<td>-0.000</td>
</tr>
<tr>
<td></td>
<td>(-5.78)</td>
<td>(-6.25)</td>
<td>(-6.91)</td>
<td>(-5.19)</td>
<td>(-3.11)</td>
<td>(-0.68)</td>
</tr>
<tr>
<td></td>
<td>0.000 ***</td>
<td>0.000 ***</td>
<td>0.000 **</td>
<td>0.000 ***</td>
<td>0.000 ***</td>
<td>0.000 ***</td>
</tr>
<tr>
<td></td>
<td>(5.77)</td>
<td>(7.02)</td>
<td>(2.08)</td>
<td>(4.06)</td>
<td>(4.27)</td>
<td>(3.59)</td>
</tr>
<tr>
<td></td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.001 **</td>
<td>-0.003 ***</td>
<td>-0.003 ***</td>
<td>-0.004 ***</td>
</tr>
<tr>
<td></td>
<td>(-0.99)</td>
<td>(-1.47)</td>
<td>(-2.24)</td>
<td>(-5.41)</td>
<td>(-5.78)</td>
<td>(-5.15)</td>
</tr>
<tr>
<td>N</td>
<td>4,660</td>
<td>6,868</td>
<td>6,799</td>
<td>11,108</td>
<td>3,466</td>
<td>2,611</td>
</tr>
<tr>
<td>adj.R-sq</td>
<td>0.201</td>
<td>0.262</td>
<td>0.353</td>
<td>0.623</td>
<td>0.781</td>
<td>0.710</td>
</tr>
</tbody>
</table>

#### PANEL B

**WEAK BANKS**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVECHO_{t+4}</td>
<td>ALLOW</td>
<td>FREAL</td>
<td>SIZE</td>
<td>Intercept</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.117 ***</td>
<td>0.064 ***</td>
<td>0.081 ***</td>
<td>0.123 ***</td>
<td>0.059 ***</td>
<td>0.405 ***</td>
</tr>
<tr>
<td></td>
<td>(12.43)</td>
<td>(4.96)</td>
<td>(7.92)</td>
<td>(5.90)</td>
<td>(2.92)</td>
<td>(11.40)</td>
</tr>
<tr>
<td></td>
<td>-0.000</td>
<td>-0.002 ***</td>
<td>-0.002 ***</td>
<td>-0.001 ***</td>
<td>-0.001 ***</td>
<td>0.000 ***</td>
</tr>
<tr>
<td></td>
<td>(-1.10)</td>
<td>(-7.08)</td>
<td>(-7.81)</td>
<td>(-4.82)</td>
<td>(-4.92)</td>
<td>(7.96)</td>
</tr>
<tr>
<td></td>
<td>-0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000 **</td>
<td>0.000 ***</td>
<td>0.000 ***</td>
</tr>
<tr>
<td></td>
<td>(-0.97)</td>
<td>(0.14)</td>
<td>(0.81)</td>
<td>(2.41)</td>
<td>(2.77)</td>
<td>(3.53)</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.001 ***</td>
<td>0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.008 ***</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(3.67)</td>
<td>(1.05)</td>
<td>(-1.57)</td>
<td>(-1.10)</td>
<td>(-5.74)</td>
</tr>
<tr>
<td>N</td>
<td>5,614</td>
<td>7,709</td>
<td>8,682</td>
<td>14,311</td>
<td>3,969</td>
<td>3,696</td>
</tr>
<tr>
<td>adj.R-sq</td>
<td>0.325</td>
<td>0.181</td>
<td>0.152</td>
<td>0.275</td>
<td>0.134</td>
<td>0.439</td>
</tr>
</tbody>
</table>

_t_ statistics in parentheses (standard errors adjusted for two-way clustering – firm and year)

* _p<0.1, ** _p<0.05, *** _p<0.01

Chow statistic computed after adjusting for firm level clustering

_ALLOW_: Allowance at the end of the year scaled by total loans outstanding at the end of the year. Computed as BHCK3123 / BHCK2122.

_AVECHO_{t+4}_: Average of CHO for the four subsequent quarters. CHO: Charge-offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK4635. FREAL: Fraction of loans outstanding that are secured by real estate. Computed as BHCK1410 / BHCK2122. POST: An indicator variable that takes a value of one for the years 2001-2008 and a value of zero for the years 1992-1997. Size: The natural logarithm of Total Assets. STRONG BANKS: Banks in the upper half of each quarter's distribution of _EBP_. _Total Assets_: The end of quarter total assets of the bank holding company in millions. Available as data item BHCK2170. WEAK BANKS: Banks in the lower half of each quarter’s distribution of _EBP_.

Chow Statistic 69.24  15.63  8.11  13.71  92.58  29.37
p>Chi-sq 0.0000  0.0000  0.0003  0.0000  0.0000  0.0000
### Table 6: Association of Provisions with Short Window Returns

\[
RET = \alpha + \beta_1 \text{EBP} + \beta_2 \text{PROV} + \beta_3 \text{DEBP} + \beta_4 \Delta \text{PROV} + \beta_5 \Delta \text{DEBP} + \beta_6 \text{FREAL} + \beta_7 \text{SIZE} + \epsilon
\]

**Panel A: Strong Banks**

<table>
<thead>
<tr>
<th></th>
<th>1 RET</th>
<th>2 RET</th>
<th>3 RET</th>
<th>4 RET</th>
<th>5 RET</th>
<th>6 RET</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBP</td>
<td>0.443</td>
<td>-0.157</td>
<td>-0.554</td>
<td>-0.527</td>
<td>-0.173</td>
<td>-0.509</td>
</tr>
<tr>
<td></td>
<td>(0.51)</td>
<td>(-0.73)</td>
<td>(-1.36)</td>
<td>(-2.91)</td>
<td>(-0.20)</td>
<td>(-0.27)</td>
</tr>
<tr>
<td>PROV</td>
<td>0.221</td>
<td>-0.215</td>
<td>0.113</td>
<td>-0.629</td>
<td>5.293</td>
<td>0.236</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(-0.05)</td>
<td>(0.17)</td>
<td>(-0.18)</td>
<td>(2.87)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>DEBP</td>
<td>0.613</td>
<td>0.293</td>
<td>-0.233</td>
<td>0.968</td>
<td>0.598</td>
<td>1.785</td>
</tr>
<tr>
<td></td>
<td>(1.34)</td>
<td>(1.39)</td>
<td>(-0.63)</td>
<td>(3.79)</td>
<td>(1.86)</td>
<td>(0.88)</td>
</tr>
<tr>
<td>DPROV</td>
<td>-0.309 *</td>
<td>-3.352</td>
<td>-3.389 *</td>
<td>-1.252 *</td>
<td>-11.308 ***</td>
<td>-6.193 **</td>
</tr>
<tr>
<td></td>
<td>(-1.80)</td>
<td>(-5.54)</td>
<td>(-1.73)</td>
<td>(-1.75)</td>
<td>(-6.18)</td>
<td>(-2.50)</td>
</tr>
<tr>
<td>FREAL</td>
<td>0.009</td>
<td>-0.002</td>
<td>0.002</td>
<td>-0.003</td>
<td>-0.010 *</td>
<td>-0.014</td>
</tr>
<tr>
<td></td>
<td>(0.82)</td>
<td>(-0.48)</td>
<td>(0.14)</td>
<td>(-0.24)</td>
<td>(-1.76)</td>
<td>(-0.48)</td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.11</td>
<td>0.013</td>
<td>0.013</td>
<td>0.013</td>
<td>0.013</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(-1.03)</td>
<td>(-0.56)</td>
<td>(1.25)</td>
<td>(-0.78)</td>
<td>(0.48)</td>
<td>(0.83)</td>
</tr>
<tr>
<td>DURATE</td>
<td>0.011</td>
<td>0.039 **</td>
<td>0.004</td>
<td>0.006</td>
<td>-0.025</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.64)</td>
<td>(2.42)</td>
<td>(0.33)</td>
<td>(0.82)</td>
<td>(0.97)</td>
<td>(-0.06)</td>
</tr>
<tr>
<td>CRET</td>
<td>-0.012</td>
<td>0.066</td>
<td>0.024</td>
<td>-0.499</td>
<td>0.429</td>
<td>-0.497</td>
</tr>
<tr>
<td></td>
<td>(-0.02)</td>
<td>(0.37)</td>
<td>(0.22)</td>
<td>(-7.59)</td>
<td>(5.22)</td>
<td>(-0.81)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.022</td>
<td>0.020</td>
<td>0.015</td>
<td>0.022</td>
<td>0.010</td>
<td>-0.053</td>
</tr>
<tr>
<td></td>
<td>(0.49)</td>
<td>(2.09)</td>
<td>(0.92)</td>
<td>(-1.43)</td>
<td>(0.38)</td>
<td>(-0.94)</td>
</tr>
</tbody>
</table>

N = 502, adj. R-sq = 0.059

**Panel B: Weak Banks**

<table>
<thead>
<tr>
<th></th>
<th>1 nct</th>
<th>2 nct</th>
<th>3 nct</th>
<th>4 nct</th>
<th>5 nct</th>
<th>6 nct</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBP</td>
<td>-0.824</td>
<td>-0.303</td>
<td>-0.816 **</td>
<td>-0.214 *</td>
<td>0.480</td>
<td>-0.113</td>
</tr>
<tr>
<td></td>
<td>(-0.45)</td>
<td>(-0.98)</td>
<td>(-2.07)</td>
<td>(-1.76)</td>
<td>(1.20)</td>
<td>(-0.25)</td>
</tr>
<tr>
<td>PROV</td>
<td>-6.490</td>
<td>-3.802</td>
<td>2.442 ***</td>
<td>0.147</td>
<td>1.683</td>
<td>-3.813 ***</td>
</tr>
<tr>
<td></td>
<td>(-0.62)</td>
<td>(-0.00)</td>
<td>(2.76)</td>
<td>(0.09)</td>
<td>(0.39)</td>
<td>(-2.72)</td>
</tr>
<tr>
<td>DEBP</td>
<td>0.223</td>
<td>0.922</td>
<td>-0.292</td>
<td>1.265 ***</td>
<td>0.017</td>
<td>2.333 ***</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(-1.46)</td>
<td>(3.05)</td>
<td>(0.09)</td>
<td>(0.44)</td>
</tr>
<tr>
<td>DPROV</td>
<td>-3.808 ***</td>
<td>-3.195 **</td>
<td>-1.897 ***</td>
<td>-1.741 **</td>
<td>-0.743</td>
<td>-1.717 **</td>
</tr>
<tr>
<td></td>
<td>(-3.64)</td>
<td>(-2.24)</td>
<td>(-5.13)</td>
<td>(-2.32)</td>
<td>(-0.09)</td>
<td>(-0.65)</td>
</tr>
<tr>
<td>FREAL</td>
<td>0.001</td>
<td>0.006</td>
<td>0.009</td>
<td>-0.013</td>
<td>0.150 ***</td>
<td>0.039</td>
</tr>
<tr>
<td></td>
<td>(-0.03)</td>
<td>(0.56)</td>
<td>(1.12)</td>
<td>(-0.84)</td>
<td>(4.92)</td>
<td>(0.43)</td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.002</td>
<td>0.002</td>
<td>0.001</td>
<td>-0.001</td>
<td>-0.002</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(-0.51)</td>
<td>(1.21)</td>
<td>(0.32)</td>
<td>(-0.69)</td>
<td>(-0.64)</td>
<td>(0.64)</td>
</tr>
<tr>
<td>DURATE</td>
<td>0.19</td>
<td>0.015</td>
<td>-0.016</td>
<td>-0.040</td>
<td>-0.009</td>
<td>0.042</td>
</tr>
<tr>
<td></td>
<td>(1.00)</td>
<td>(0.39)</td>
<td>(-0.95)</td>
<td>(-0.30)</td>
<td>(-0.32)</td>
<td>(1.06)</td>
</tr>
<tr>
<td>CSRET</td>
<td>-0.202</td>
<td>0.502</td>
<td>0.173</td>
<td>-0.485 **</td>
<td>0.085 ***</td>
<td>0.377</td>
</tr>
<tr>
<td></td>
<td>(-0.39)</td>
<td>(0.94)</td>
<td>(0.70)</td>
<td>(-2.50)</td>
<td>(6.45)</td>
<td>(0.30)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.044</td>
<td>-0.019</td>
<td>-0.515</td>
<td>1.098</td>
<td>0.282</td>
<td>-0.510</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(-0.90)</td>
<td>(-1.52)</td>
<td>(1.10)</td>
<td>(0.28)</td>
<td>(-0.51)</td>
</tr>
</tbody>
</table>

n = 196, adj. R-sq = 0.543

1. Statistics in parentheses (standard errors adjusted for two-way clustering – firm and year)
2. \( * p < 0.1 \), \( ** p < 0.05 \), \( *** p < 0.01 \)
3. Chow statistic computed after adjusting for firm level clustering
### Table 7: Determinants of Allowance and Provisions

**Panel A: Allowance**

\[
ALLOW = a + \beta_1 AVECHO + \beta_2 NAL + \beta_3 POST + \beta_4 POST * AVECHO + \beta_5 POST * NAL + \beta_6 SIZE + \beta_7 CSRET + \beta_8 DUNRATE + \varepsilon.
\]

<table>
<thead>
<tr>
<th>Unadjusted Charge-Offs</th>
<th>Adjusted Charge-Offs</th>
<th>Provision Model 1</th>
<th>Provision Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOW (Eq. 1A)</td>
<td>ALLOW (Eq. 1A)</td>
<td>PROV (Eq. 1B)</td>
<td>PROV (Eq. 1B)</td>
</tr>
<tr>
<td>AVECHO</td>
<td>1.513 ***</td>
<td>0.576 ***</td>
<td>ALLOWLAG</td>
</tr>
<tr>
<td></td>
<td>(14.20)</td>
<td>(-2.45)</td>
<td>-0.028 **</td>
</tr>
<tr>
<td>NAL</td>
<td>0.248 ***</td>
<td>0.332 ***</td>
<td>CHO</td>
</tr>
<tr>
<td></td>
<td>(14.70)</td>
<td>(14.81)</td>
<td>0.666 ***</td>
</tr>
<tr>
<td>POST</td>
<td>-0.002 ***</td>
<td>-0.001 *</td>
<td>DNAL</td>
</tr>
<tr>
<td></td>
<td>(-2.65)</td>
<td>(-1.71)</td>
<td>0.554 ***</td>
</tr>
<tr>
<td>POST*AVECHO</td>
<td>1.107 ***</td>
<td>2.265 ***</td>
<td>POST</td>
</tr>
<tr>
<td></td>
<td>(2.75)</td>
<td>(3.82)</td>
<td>0.000</td>
</tr>
<tr>
<td>POST*NAL</td>
<td>-0.187 ***</td>
<td>-0.260 ***</td>
<td>POST*CHO</td>
</tr>
<tr>
<td></td>
<td>(-6.88)</td>
<td>(-7.66)</td>
<td>0.221 ***</td>
</tr>
<tr>
<td>IND</td>
<td>-0.001</td>
<td>0.003</td>
<td>POST*DNAL</td>
</tr>
<tr>
<td></td>
<td>(-0.79)</td>
<td>(1.83)</td>
<td>0.020</td>
</tr>
<tr>
<td>COM</td>
<td>0.006 ***</td>
<td>0.008 ***</td>
<td>IND</td>
</tr>
<tr>
<td></td>
<td>(4.03)</td>
<td>(4.84)</td>
<td>0.000</td>
</tr>
<tr>
<td>POST*IND</td>
<td>0.000</td>
<td>-0.001</td>
<td>COM</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(-0.67)</td>
<td>0.001 ***</td>
</tr>
<tr>
<td>POST*COM</td>
<td>-0.002</td>
<td>-0.004 **</td>
<td>POST*IND</td>
</tr>
<tr>
<td></td>
<td>(-1.61)</td>
<td>(-2.33)</td>
<td>0.000</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000</td>
<td>0.000</td>
<td>POST*COM</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(1.27)</td>
<td>-0.001 ***</td>
</tr>
<tr>
<td>DUNRATE</td>
<td>-0.001</td>
<td>-0.001</td>
<td>SIZE</td>
</tr>
<tr>
<td></td>
<td>(-1.53)</td>
<td>(-1.61)</td>
<td>0.000</td>
</tr>
<tr>
<td>CSRET</td>
<td>0.013 ***</td>
<td>0.014 ***</td>
<td>DUNRATE</td>
</tr>
<tr>
<td></td>
<td>(3.69)</td>
<td>(3.53)</td>
<td>0.000 **</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.009 ***</td>
<td>0.008 ***</td>
<td>CSRET</td>
</tr>
<tr>
<td></td>
<td>(4.43)</td>
<td>(3.48)</td>
<td>-0.003 ***</td>
</tr>
</tbody>
</table>

**Panel B: Loss Provisions (Adjusted Charge-Offs)**

\[
PROV = a + \beta_1 CHO + \beta_2 NAL + \beta_3 POST + \beta_4 POST * CHO + \beta_5 POST * DNAL + \beta_6 FREAL + \beta_7 SIZE + \beta_8 CSRET + \beta_9 DUNRATE + \beta_{10} ALLOWLAG + \varepsilon.
\]

<table>
<thead>
<tr>
<th>Unadjusted Charge-Offs</th>
<th>Adjusted Charge-Offs</th>
<th>Provision Model 1</th>
<th>Provision Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOW (Eq. 1A)</td>
<td>ALLOW (Eq. 1A)</td>
<td>PROV (Eq. 1B)</td>
<td>PROV (Eq. 1B)</td>
</tr>
<tr>
<td>CHO</td>
<td>0.666 ***</td>
<td>CHO</td>
<td>0.628 ***</td>
</tr>
<tr>
<td></td>
<td>(25.17)</td>
<td>(33.73)</td>
<td></td>
</tr>
<tr>
<td>DNAL</td>
<td>0.554 ***</td>
<td>DNAL</td>
<td>0.058 ***</td>
</tr>
<tr>
<td></td>
<td>(5.39)</td>
<td>(6.12)</td>
<td></td>
</tr>
<tr>
<td>POST</td>
<td>0.000</td>
<td>POST</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(-0.29)</td>
<td>(0.53)</td>
<td></td>
</tr>
<tr>
<td>POST*CHO</td>
<td>0.221 ***</td>
<td>POST*CHO</td>
<td>0.211 ***</td>
</tr>
<tr>
<td></td>
<td>(3.65)</td>
<td>(3.78)</td>
<td></td>
</tr>
<tr>
<td>POST*DNAL</td>
<td>0.020</td>
<td>POST*DNAL</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>(1.57)</td>
<td>(1.23)</td>
<td></td>
</tr>
<tr>
<td>IND</td>
<td>0.000</td>
<td>IND</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.74)</td>
<td>(1.14)</td>
<td></td>
</tr>
<tr>
<td>POST*IND</td>
<td>0.000</td>
<td>POST*IND</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(-0.51)</td>
<td></td>
</tr>
<tr>
<td>POST*COM</td>
<td>-0.001 ***</td>
<td>POST*COM</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(-2.08)</td>
<td>(-1.57)</td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000</td>
<td>SIZE</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(-0.21)</td>
<td>(-0.91)</td>
<td></td>
</tr>
<tr>
<td>DUNRATE</td>
<td>-0.001</td>
<td>DUNRATE</td>
<td>0.000 ***</td>
</tr>
<tr>
<td></td>
<td>(-1.61)</td>
<td>(2.72)</td>
<td></td>
</tr>
<tr>
<td>CSRET</td>
<td>-0.003 ***</td>
<td>CSRET</td>
<td>-0.003 ***</td>
</tr>
<tr>
<td></td>
<td>(-3.38)</td>
<td>(-4.27)</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.001 ***</td>
<td>Intercept</td>
<td>0.000 *</td>
</tr>
<tr>
<td></td>
<td>(2.83)</td>
<td>(1.67)</td>
<td></td>
</tr>
</tbody>
</table>

N: 58,454
adj. R-sq: 0.592

**Notes:**
- t statistics in parentheses (standard errors adjusted for two-way clustering
- \* p < 0.1, ** p < 0.05, *** p < 0.01
- ALLOW: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3123 / BHCK2122.
- ALLOWLAG: Allowance at the beginning of the quarter.
- AVECHO: The average of CHO or CHO (Adj.) for the current and past three quarters.
- CHO: Charge offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK4635. CHO (Adj.): CHO adjusted by next quarter’s recoveries and scaled by the average loans outstanding for the quarter. Year-to-date recoveries are available as data item BHCK4605. COM: Commercial Loans as a fraction of Total Loans. Computed as BHCK1766 / BHCK 2122.
- CSRET: The return on the Case-Shiller Real estate Index divided by the quarter. FREAL: Fraction of loans outstanding that are secured by real estate. Computed as BHCK1410 / BHCK1212.
- DNAL: Individual Non-Mortgage Loans as a fraction of Total Loans. NAL: Non-accrual loans at the end of the quarter divided by total loans outstanding at the end of the quarter.
- POST: An indicator variable that takes on a value of one for the years 2001-2008 and a value of zero for the years 1992-1997.
- PROV: Loan Loss Provisions for the quarter. Year-to-date provisions are available as data item BHCK 4230.
### Determinants of Allowance - By Individual Loans

#### Table 8

**ALLOW = \( \alpha + \beta_1 \text{AVECHO} + \beta_2 \text{NAL} + \beta_3 \text{IND} + \beta_4 \text{COM} + \beta_5 \text{SIZE} + \beta_6 \text{CSRET} + \beta_7 \text{DUNRATE} + \beta_8 \text{CASH} + \beta_9 \text{INTERCEPT} \)**

#### Panel A: High Concentration of Individual Loans

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{AVECHO} )</td>
<td>1.590 ***</td>
<td>1.323 ***</td>
<td>2.278 ***</td>
<td>2.514 ***</td>
<td>3.757 ***</td>
<td>3.000 ***</td>
</tr>
<tr>
<td></td>
<td>(1.050)</td>
<td>(1.010)</td>
<td>(4.72)</td>
<td>(1.127)</td>
<td>(9.59)</td>
<td>(5.409)</td>
</tr>
<tr>
<td>( \text{NAL} )</td>
<td>0.255 ***</td>
<td>0.183 ***</td>
<td>0.063</td>
<td>0.077 ***</td>
<td>-0.030</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(8.83)</td>
<td>(5.11)</td>
<td>(1.21)</td>
<td>(4.68)</td>
<td>(-1.05)</td>
<td>(3.43)</td>
</tr>
<tr>
<td>( \text{IND} )</td>
<td>-0.007 ***</td>
<td>-0.001</td>
<td>-0.004</td>
<td>0.000</td>
<td>-0.005 **</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(3.49)</td>
<td>(-0.18)</td>
<td>(-1.61)</td>
<td>(-0.07)</td>
<td>(2.35)</td>
<td>(0.48)</td>
</tr>
<tr>
<td>( \text{COMM} )</td>
<td>-0.001</td>
<td>0.002</td>
<td>0.000</td>
<td>0.001</td>
<td>0.005</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(-0.07)</td>
<td>(1.17)</td>
<td>(0.14)</td>
<td>(0.73)</td>
<td>(2.65)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>( \text{SIZE} )</td>
<td>0.001 ***</td>
<td>0.001 ***</td>
<td>0.000 **</td>
<td>0.000</td>
<td>-0.001 ***</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(6.62)</td>
<td>(7.95)</td>
<td>(2.25)</td>
<td>(0.12)</td>
<td>(-0.83)</td>
<td>(-0.25)</td>
</tr>
<tr>
<td>( \text{DUNRATE} )</td>
<td>0.001</td>
<td>0.002</td>
<td>0.000</td>
<td>-0.001</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.99)</td>
<td>(5.48)</td>
<td>(0.00)</td>
<td>(-2.18)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>( \text{CSRET} )</td>
<td>0.007 **</td>
<td>0.013 **</td>
<td>0.003</td>
<td>0.000</td>
<td>0.008</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(7.47)</td>
<td>(7.94)</td>
<td>(9.90)</td>
<td>(0.10)</td>
<td>(1.90)</td>
<td>(0.94)</td>
</tr>
<tr>
<td>( \text{INTERCEPT} )</td>
<td>0.004 ***</td>
<td>0.002 **</td>
<td>0.008 ***</td>
<td>0.010 ***</td>
<td>0.017 ***</td>
<td>0.011 **</td>
</tr>
<tr>
<td></td>
<td>(2.90)</td>
<td>(2.39)</td>
<td>(5.05)</td>
<td>(6.86)</td>
<td>(13.65)</td>
<td>(2.19)</td>
</tr>
<tr>
<td>( \text{N} )</td>
<td>5,080</td>
<td>4,563</td>
<td>7,757</td>
<td>12,705</td>
<td>3,715</td>
<td>3,150</td>
</tr>
<tr>
<td>( \text{adj. R-sq} )</td>
<td>0.316</td>
<td>0.262</td>
<td>0.454</td>
<td>0.643</td>
<td>0.810</td>
<td>0.788</td>
</tr>
</tbody>
</table>

#### Panel B: Low Concentration of Individual Loans

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{AVECHO} )</td>
<td>1.283 ***</td>
<td>1.812 ***</td>
<td>0.638 **</td>
<td>1.232 ***</td>
<td>1.568 ***</td>
<td>0.628 ***</td>
</tr>
<tr>
<td></td>
<td>(7.47)</td>
<td>(4.92)</td>
<td>(2.68)</td>
<td>(10.38)</td>
<td>(3.50)</td>
<td>(4.47)</td>
</tr>
<tr>
<td>( \text{NAL} )</td>
<td>0.247 ***</td>
<td>0.230 ***</td>
<td>0.292 ***</td>
<td>0.141 ***</td>
<td>0.128 ***</td>
<td>0.156 ***</td>
</tr>
<tr>
<td></td>
<td>(12.61)</td>
<td>(5.84)</td>
<td>(3.79)</td>
<td>(7.24)</td>
<td>(4.40)</td>
<td>(14.13)</td>
</tr>
<tr>
<td>( \text{IND} )</td>
<td>0.005</td>
<td>-0.007</td>
<td>-0.004</td>
<td>-0.002</td>
<td>-0.005</td>
<td>0.018</td>
</tr>
<tr>
<td></td>
<td>(0.70)</td>
<td>(-1.33)</td>
<td>(-0.85)</td>
<td>(-0.39)</td>
<td>(-0.44)</td>
<td>(1.32)</td>
</tr>
<tr>
<td>( \text{COMM} )</td>
<td>0.004 ***</td>
<td>0.007 **</td>
<td>0.008 ***</td>
<td>0.008 ***</td>
<td>0.007 ***</td>
<td>0.006 ***</td>
</tr>
<tr>
<td></td>
<td>(2.75)</td>
<td>(2.32)</td>
<td>(4.64)</td>
<td>(5.92)</td>
<td>(5.21)</td>
<td>(5.14)</td>
</tr>
<tr>
<td>( \text{SIZE} )</td>
<td>0.001 ***</td>
<td>0.000 ***</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000 ***</td>
<td>0.000 *</td>
</tr>
<tr>
<td></td>
<td>(5.67)</td>
<td>(3.19)</td>
<td>(0.07)</td>
<td>(-0.43)</td>
<td>(-3.69)</td>
<td>(-1.65)</td>
</tr>
<tr>
<td>( \text{DUNRATE} )</td>
<td>0.000</td>
<td>0.002</td>
<td>-0.001</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.001 ***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(1.71)</td>
<td>(-1.33)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(-3.39)</td>
</tr>
<tr>
<td>( \text{CSRET} )</td>
<td>-0.014</td>
<td>0.013</td>
<td>-0.014 **</td>
<td>-0.003 ***</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(-2.80)</td>
<td>(0.00)</td>
<td>(-2.13)</td>
<td>(-7.39)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>( \text{INTERCEPT} )</td>
<td>-0.007 **</td>
<td>0.006 ***</td>
<td>0.011 ***</td>
<td>0.011 ***</td>
<td>0.015 ***</td>
<td>0.013 ***</td>
</tr>
<tr>
<td></td>
<td>(-2.17)</td>
<td>(2.72)</td>
<td>(7.58)</td>
<td>(8.13)</td>
<td>(9.91)</td>
<td>(4.92)</td>
</tr>
<tr>
<td>( \text{N} )</td>
<td>5,084</td>
<td>4,568</td>
<td>7,744</td>
<td>12,714</td>
<td>3,720</td>
<td>3,157</td>
</tr>
<tr>
<td>( \text{adj. R-sq} )</td>
<td>0.522</td>
<td>0.236</td>
<td>0.232</td>
<td>0.302</td>
<td>0.237</td>
<td>0.509</td>
</tr>
</tbody>
</table>

1. Statistics in parentheses (standard errors adjusted for two-way clustering - firm and year)
2. \( * p<0.1, ** p<0.05, *** p<0.01 \)

Chow statistic computed after adjusting for firm level clustering.

**ALLOW**: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as \( \text{BRKCH3123} \) / \( \text{BRKCH2122} \).

**AVECHO**: The average of CH1 for the current and past quarters. CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \). CH1: Change in the quarter divided by the average loans outstanding for the quarter. Year-to-date change in CH1 are available as data item \( \text{BRKCH1555} \).
Table 9  
Prediction of Future Charge-offs - HIGH AND LOW INDIVIDUAL LOANS  
\[ \text{AVECH}_{t+4} = \alpha + \beta_1 \text{ALLOW}_t + \beta_2 \text{IND}_t + \beta_3 \text{COM}_t + \beta_4 \text{SIZE}_t + \epsilon \]

<table>
<thead>
<tr>
<th>PANEL A</th>
<th>Banks with High Concentrations of Individual Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>AVECH_t+4</td>
</tr>
<tr>
<td>ALLOW</td>
<td>0.053 ***</td>
</tr>
<tr>
<td></td>
<td>(7.62)</td>
</tr>
<tr>
<td>IND_P</td>
<td>0.004 ***</td>
</tr>
<tr>
<td></td>
<td>(6.49)</td>
</tr>
<tr>
<td>COM/MP</td>
<td>0.001 **</td>
</tr>
<tr>
<td></td>
<td>(2.48)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000 ***</td>
</tr>
<tr>
<td></td>
<td>(4.44)</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.002 ***</td>
</tr>
<tr>
<td></td>
<td>(-0.01)</td>
</tr>
<tr>
<td>N</td>
<td>5,080</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.266</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PANEL B</th>
<th>Banks with Low Concentrations of Individual Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>AVECH_t+4</td>
</tr>
<tr>
<td>ALLOW</td>
<td>0.112 ***</td>
</tr>
<tr>
<td></td>
<td>(9.55)</td>
</tr>
<tr>
<td>IND_P</td>
<td>-0.005 **</td>
</tr>
<tr>
<td></td>
<td>(-1.58)</td>
</tr>
<tr>
<td>COM_MP</td>
<td>0.001 ***</td>
</tr>
<tr>
<td></td>
<td>(3.63)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000 **</td>
</tr>
<tr>
<td></td>
<td>(-2.59)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(1.37)</td>
</tr>
<tr>
<td>N</td>
<td>5,084</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.330</td>
</tr>
</tbody>
</table>

\* t statistics in parentheses (standard errors adjusted for two-way clustering – firm and year)  
\* p<0.1, ** p<0.05, *** p<0.01

Chow Statistic  
Chow statistic computed after adjusting for firm level clustering

ALLOW: Allowance at the end of the year scaled by total loans outstanding at the end of the year. Computed as BHCK1213 / BHCK2122.

AVECH\_t+4: Average of CH\_O for the four subsequent quarters. CH\_O: Charge offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK6635. COM\_P: Commercial Loans as a fraction of Total Loans. Computed as BHCK1166 / BHCK 2122 HIGHIND BANKS: Banks in the upper half of each quarter's distribution of IND. IND\_P: Individual Non-Mortgage Loans as a fraction of Total Loans. Computed as BHCK1975 / BHCK 2122 LOWIND BANKS: Banks in the lower half of each quarter's distribution of IND.

SIZE: The natural logarithm of Total Assets. Total Assets: The end of quarter total assets of the bank holding company in millions. Available as data item BHCK2170.
### Table 10 - Determinants of Allowance - Loan Composition

**ALLOW = α + β_1 \text{AVECHO} + β_2 \text{NAL} + β_3 \text{FREAL} + β_4 \text{SIZE} + β_5 \text{CSRET} + β_6 \text{DURATE} + ε.**

<table>
<thead>
<tr>
<th></th>
<th>Panel A</th>
<th>High Concentration of Real Estate Loans</th>
<th></th>
<th>Panel B</th>
<th>Low Concentration of Real Estate Loans</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>AVECHO</td>
<td>1.337 ***</td>
<td>2.065 ***</td>
<td>0.463</td>
<td>1.116 ***</td>
<td>1.574 ***</td>
<td>0.694 ***</td>
</tr>
<tr>
<td></td>
<td>(9.36)</td>
<td>(2.72)</td>
<td>(0.97)</td>
<td>(8.35)</td>
<td>(3.57)</td>
<td>(6.46)</td>
</tr>
<tr>
<td>NAL</td>
<td>0.230 ***</td>
<td>0.221 ***</td>
<td>0.291 ***</td>
<td>0.126 ***</td>
<td>0.135 ***</td>
<td>0.146 ***</td>
</tr>
<tr>
<td></td>
<td>(13.50)</td>
<td>(8.28)</td>
<td>(2.92)</td>
<td>(10.23)</td>
<td>(5.28)</td>
<td>(28.28)</td>
</tr>
<tr>
<td>FREAL</td>
<td>-0.005 ***</td>
<td>-0.003 ***</td>
<td>-0.006 ***</td>
<td>-0.007 ***</td>
<td>-0.008 ***</td>
<td>-0.008 ***</td>
</tr>
<tr>
<td></td>
<td>(2.75)</td>
<td>(1.00)</td>
<td>(2.70)</td>
<td>(3.97)</td>
<td>(4.12)</td>
<td>(5.17)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.001 ***</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000 ***</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(4.70)</td>
<td>(1.38)</td>
<td>(0.14)</td>
<td>(0.30)</td>
<td>(4.01)</td>
<td>(1.24)</td>
</tr>
<tr>
<td>DURATE</td>
<td>0.000</td>
<td>0.002 **</td>
<td>0.000</td>
<td>-0.001 ***</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.87)</td>
<td>(1.97)</td>
<td>(1.01)</td>
<td>(-4.03)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>CSRET</td>
<td>0.011</td>
<td>0.007 ***</td>
<td>-0.009</td>
<td>-0.005 ***</td>
<td>0.004</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(1.05)</td>
<td>(3.24)</td>
<td>(1.37)</td>
<td>(6.94)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.004</td>
<td>0.011 ***</td>
<td>0.016 ***</td>
<td>0.017 ***</td>
<td>0.034 ***</td>
<td>0.021 ***</td>
</tr>
<tr>
<td></td>
<td>(1.45)</td>
<td>(3.46)</td>
<td>(5.31)</td>
<td>(6.10)</td>
<td>(9.01)</td>
<td>(6.68)</td>
</tr>
<tr>
<td>N</td>
<td>5080</td>
<td>4563</td>
<td>7737</td>
<td>12706</td>
<td>3715</td>
<td>3150</td>
</tr>
<tr>
<td>Adj.R-sq</td>
<td>0.646</td>
<td>0.208</td>
<td>0.147</td>
<td>0.256</td>
<td>0.257</td>
<td>0.485</td>
</tr>
</tbody>
</table>

### Chow Statistic

\[
\text{Chow Statistic} = 8.05, \quad \text{p-value} = 0.0045
\]

**Notes:**
- t statistics in parentheses (standard errors adjusted for two-way clustering - firm and year)
- *p < 0.1, **p < 0.05, ***p < 0.01
- Chow statistic computed after adjusting for firm level clustering
- ALLOW: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3123 / BHCK3122.
- AVECHO: The average of CH0 for the current and past three quarters. \( CH0 \): Charge-offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK4635. CSRET: The return on the Case-Shiller Real Estate Index over the quarter.
- DURATE: The change in the unemployment rate from the beginning of the quarter to the end. FREAL: Fraction of loans outstanding that are secured by real estate. Computed as BHCK1410 / BHCK2122. BHCREAL BANKS: Banks in the upper half of each quarter’s distribution of FREAL.
- LOWCREAL BANKS: Banks in the lower half of each quarter’s distribution of FREAL.
- N: Non-accrual loans at the end of the quarter divided by total loans outstanding at the end of the quarter. SIZE: The natural logarithm of Total Assets. Total Assets: The end of quarter total assets of the bank holding company in millions. Available as data item BHCK2170.
### Table 11

**Prediction of Future Charge-offs - HIGH AND LOW REAL ESTATE LOANS**

\[ AVECHO_{t+4} = \alpha + \beta_1 ALLOW_t + \beta_2 FREAL_t + \beta_3 SIZE_t + \epsilon \]

#### PANEL A  
**High Concentrations of Real Estate Loans**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOW</td>
<td>0.107</td>
<td>0.040</td>
<td>0.019</td>
<td>0.082</td>
<td>0.057</td>
<td>0.377</td>
</tr>
<tr>
<td></td>
<td>(8.37)</td>
<td>(3.24)</td>
<td>(5.19)</td>
<td>(4.50)</td>
<td>(3.46)</td>
<td>(6.97)</td>
</tr>
<tr>
<td>FREAL</td>
<td>0.000</td>
<td>-0.001</td>
<td>-0.002</td>
<td>-0.002</td>
<td>0.000</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(-0.08)</td>
<td>(-4.77)</td>
<td>(-12.28)</td>
<td>(-2.36)</td>
<td>(-0.35)</td>
<td>(4.16)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(2.65)</td>
<td>(4.05)</td>
<td>(3.08)</td>
<td>(2.73)</td>
<td>(3.90)</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.001</td>
<td>0.000</td>
<td>0.001</td>
<td>0.000</td>
<td>-0.001</td>
<td>-0.010</td>
</tr>
<tr>
<td></td>
<td>(-1.00)</td>
<td>(1.35)</td>
<td>(6.14)</td>
<td>(0.63)</td>
<td>(-0.50)</td>
<td>(-5.45)</td>
</tr>
<tr>
<td>N</td>
<td>5,080</td>
<td>6,786</td>
<td>7,737</td>
<td>12,706</td>
<td>3,715</td>
<td>3,150</td>
</tr>
<tr>
<td>adj.R-sq</td>
<td>0.314</td>
<td>0.139</td>
<td>0.075</td>
<td>0.192</td>
<td>0.086</td>
<td>0.362</td>
</tr>
</tbody>
</table>

#### PANEL B  
**Low Concentrations of Real Estate Loans**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOW</td>
<td>0.079</td>
<td>0.074</td>
<td>0.197</td>
<td>0.218</td>
<td>0.219</td>
<td>0.310</td>
</tr>
<tr>
<td></td>
<td>(6.98)</td>
<td>(4.62)</td>
<td>(4.62)</td>
<td>(5.59)</td>
<td>(16.91)</td>
<td>(15.07)</td>
</tr>
<tr>
<td>FREAL</td>
<td>-0.002</td>
<td>-0.004</td>
<td>-0.002</td>
<td>-0.002</td>
<td>-0.001</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(-0.46)</td>
<td>(-5.09)</td>
<td>(-4.00)</td>
<td>(-3.60)</td>
<td>(-2.20)</td>
<td>(1.03)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.97)</td>
<td>(2.54)</td>
<td>(0.36)</td>
<td>(2.36)</td>
<td>(3.43)</td>
<td>(6.62)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.000</td>
<td>0.001</td>
<td>-0.001</td>
<td>-0.002</td>
<td>-0.003</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>(0.71)</td>
<td>(2.66)</td>
<td>(-0.92)</td>
<td>(-4.97)</td>
<td>(-4.93)</td>
<td>(-8.01)</td>
</tr>
<tr>
<td>N</td>
<td>6,084</td>
<td>6,701</td>
<td>7,744</td>
<td>12,713</td>
<td>3,720</td>
<td>3,167</td>
</tr>
<tr>
<td>adj.R-sq</td>
<td>0.218</td>
<td>0.200</td>
<td>0.345</td>
<td>0.561</td>
<td>0.766</td>
<td>0.656</td>
</tr>
</tbody>
</table>

*Statistics in parentheses (standard errors adjusted for two-way clustering – firm and year)
* * p<0.1, ** p<0.05, *** p<0.01

Chow statistic computed after adjusting for firm level clustering

**ALLOW**: Allowance at the end of the year scaled by total loans outstanding at the end of the year. Computed as BHCK3123 / BHCK2122.

**AVECHO**: Average of CHO for the four subsequent quarters. **CH** Charge-offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK4635. **FREAL**: Fraction of loans outstanding that are secured by real estate. Computed as BHCK1410 / BHCK2122. **HIGHREAL BANKS**: Banks in the upper half of each quarter’s distribution of FREAL. **LOWREAL BANKS**: Banks in the lower half of each quarter’s distribution of FREAL. **SIZE**: The natural logarithm of Total Assets. **Total Assets**: The end of quarter total assets of the bank holding company in millions. Available as data item BHCK2170.
### Table 12
Determinants of Allowance - Strong and Weak Banks

**ALLOW = α + β₁AVECHO + β₂NAL + β₃FREAL + β₄SIZE + β₅CSRET + β₆DINRATE + r**

PANEL A: STRONG BANKS

<table>
<thead>
<tr>
<th></th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
</tr>
<tr>
<td>AVECHO</td>
<td>1.798 ***</td>
<td>1.473 ***</td>
<td>2.508 ***</td>
<td>2.590 ***</td>
<td>3.784 ***</td>
<td>2.833 ***</td>
</tr>
<tr>
<td></td>
<td>(12.11)</td>
<td>(10.48)</td>
<td>(6.43)</td>
<td>(18.76)</td>
<td>(10.81)</td>
<td>(6.35)</td>
</tr>
<tr>
<td>NAL</td>
<td>0.223 ***</td>
<td>0.207 ***</td>
<td>0.216 **</td>
<td>0.094 ***</td>
<td>0.026</td>
<td>0.024</td>
</tr>
<tr>
<td></td>
<td>(6.76)</td>
<td>(3.79)</td>
<td>(2.49)</td>
<td>(4.75)</td>
<td>(0.91)</td>
<td>(1.04)</td>
</tr>
<tr>
<td>FREAL</td>
<td>-0.003 *</td>
<td>-0.001</td>
<td>0.000</td>
<td>-0.002 *</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(-1.68)</td>
<td>(-0.65)</td>
<td>(0.13)</td>
<td>(-1.66)</td>
<td>(3.17)</td>
<td>(-0.67)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.001 ***</td>
<td>0.001 ***</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(2.76)</td>
<td>(3.59)</td>
<td>(1.49)</td>
<td>(0.10)</td>
<td>(-0.60)</td>
<td>(-0.97)</td>
</tr>
<tr>
<td>DURATE</td>
<td>0.000</td>
<td>0.002</td>
<td>0.000</td>
<td>-0.001 **</td>
<td>0.000</td>
<td>-0.001 ***</td>
</tr>
<tr>
<td></td>
<td>(-0.12)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(-2.00)</td>
<td>(0.00)</td>
<td>(-4.38)</td>
</tr>
<tr>
<td>CSRET</td>
<td>0.026 ***</td>
<td>0.013</td>
<td>-0.005 ***</td>
<td>0.001</td>
<td>0.007</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(2.68)</td>
<td>(1.23)</td>
<td>(-3.61)</td>
<td>(0.14)</td>
<td>(0.00)</td>
<td>(0.88)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.007 **</td>
<td>0.007 ***</td>
<td>0.008 ***</td>
<td>0.012 ***</td>
<td>0.016 ***</td>
<td>0.014 ***</td>
</tr>
<tr>
<td></td>
<td>(2.20)</td>
<td>(3.23)</td>
<td>(4.32)</td>
<td>(8.37)</td>
<td>(7.72)</td>
<td>(2.85)</td>
</tr>
<tr>
<td>N</td>
<td>6,080</td>
<td>9,663</td>
<td>7,727</td>
<td>12,706</td>
<td>3,716</td>
<td>3,160</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.381</td>
<td>0.183</td>
<td>0.367</td>
<td>0.633</td>
<td>0.825</td>
<td>0.745</td>
</tr>
</tbody>
</table>

PANEL B: WEAK BANKS

<table>
<thead>
<tr>
<th></th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
<th>ALLOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
<td>ALLOW</td>
</tr>
<tr>
<td>AVECHO</td>
<td>1.015 ***</td>
<td>1.100 ***</td>
<td>0.940 ***</td>
<td>1.220 ***</td>
<td>0.040 ***</td>
<td>1.121 ***</td>
</tr>
<tr>
<td></td>
<td>(6.65)</td>
<td>(5.00)</td>
<td>(6.14)</td>
<td>(4.23)</td>
<td>(4.00)</td>
<td>(6.48)</td>
</tr>
<tr>
<td>NAL</td>
<td>0.250 ***</td>
<td>0.258 ***</td>
<td>0.238 ***</td>
<td>0.163 ***</td>
<td>0.158 ***</td>
<td>0.150 ***</td>
</tr>
<tr>
<td></td>
<td>(8.51)</td>
<td>(12.07)</td>
<td>(8.69)</td>
<td>(9.22)</td>
<td>(7.39)</td>
<td>(19.75)</td>
</tr>
<tr>
<td>FREAL</td>
<td>-0.003 *</td>
<td>-0.001</td>
<td>-0.002</td>
<td>-0.002 ***</td>
<td>-0.002 **</td>
<td>-0.002 **</td>
</tr>
<tr>
<td></td>
<td>(-1.73)</td>
<td>(-1.23)</td>
<td>(-2.34)</td>
<td>(-3.26)</td>
<td>(-2.29)</td>
<td>(-2.45)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.001 ***</td>
<td>0.001 ***</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(8.47)</td>
<td>(8.96)</td>
<td>(4.10)</td>
<td>(0.66)</td>
<td>(-3.70)</td>
<td>(-0.05)</td>
</tr>
<tr>
<td>DURATE</td>
<td>0.001</td>
<td>0.002 *</td>
<td>0.000</td>
<td>0.000 ***</td>
<td>0.000</td>
<td>-0.001 ***</td>
</tr>
<tr>
<td></td>
<td>(2.39)</td>
<td>(1.70)</td>
<td>(-0.87)</td>
<td>(-4.00)</td>
<td>(0.00)</td>
<td>(-2.22)</td>
</tr>
<tr>
<td>CSRET</td>
<td>-0.013</td>
<td>0.011 **</td>
<td>-0.006 **</td>
<td>-0.003</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(-0.74)</td>
<td>(2.39)</td>
<td>(-2.46)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(9.15)</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.003</td>
<td>0.001</td>
<td>0.008 ***</td>
<td>0.011 ***</td>
<td>0.017 ***</td>
<td>0.011 **</td>
</tr>
<tr>
<td></td>
<td>(-1.26)</td>
<td>(0.38)</td>
<td>(5.58)</td>
<td>(6.03)</td>
<td>(11.02)</td>
<td>(2.42)</td>
</tr>
<tr>
<td>N</td>
<td>5,064</td>
<td>4,568</td>
<td>7,744</td>
<td>12,713</td>
<td>3,720</td>
<td>3,157</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.505</td>
<td>0.305</td>
<td>0.260</td>
<td>0.368</td>
<td>0.188</td>
<td>0.505</td>
</tr>
</tbody>
</table>

1 statistics in parentheses (standard errors adjusted for two-way clustering - firm and year)
* p<0.1, ** p<0.05, *** p<0.01

Chow statistic computed after adjusting for firm level clustering
ALLOW: Allowance at the end of the quarter scaled by total loans outstanding at the end of the quarter. Computed as BHCK3123 / BHCR2122. AVECHO: The average of CHO for the current and past three quarters. CAPRATIO: The end of quarter Total Equity scaled by Total Assets. CHO: Charge-offs for the quarter divided by the average loans outstanding for the quarter. Year-to-date charge-offs are available as data item BHCK4635. CSRET: The return on the Case-Shiller Real Estate Index over the quarter. DURATE: The change in the unemployment rate from the beginning of the quarter to the end. FREAL: Fraction of loans outstanding that are secured by real estate. Computed as BHCK1419 / IDXSC1222. NAL: Non-accrual loans at the end of the quarter divided by total loans outstanding at the end of the quarter. SIZE: The natural logarithm of Total Assets. STRONG BANKS: Banks in the upper half of each quarter’s distribution of CAPRATIO. Total Assets: The end of quarter total assets of the bank holding company in millions. Available as data item BHCK2170. WEAK BANKS: Banks in the lower half of each quarter’s distribution of CAPRATIO.