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# Loan loss provisioning and income smoothing in US banks pre and post the financial crisis ☆

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ABSTRACT

Prior research shows that banks have strong incentives to use loan loss provisions to smooth income. Using a sample of 878 US bank holding companies over the period 2001–2009, I find strong evidence of income smoothing behavior. Additionally, bank holding companies accelerate loan loss provisions to smooth income when (1) banks hit the regulatory minimum target, (2) are in non-recessionary periods, and (3) are more profitable. I also find that bank internally set regulatory capital ratios are relatively more significant than regulatory-set ratios to trigger income smoothing behaviour using loan loss provisions. Comparing the pre-crisis boom of 2002–2006 with the crisis period of 2007–2009, I find that banks use loan loss provisions more extensively during the crisis period to smooth income upward. Collectively, the results of this paper are relevant to current concerns of accounting standard setters and bank regulators on the current model of loan loss provisioning.



## 1. Introduction

Accounting standard setters have emphasized the measurement and transparency of loan loss provisions and the extent of discretion embedded in the estimation and timing of the provisions. From the regulatory perspective, the focus has been on whether the loan loss provisions are adequate to cover expected credit losses over the life of the loan. Lately, the validity of the current rules to account for loan losses is one of the most prevalent concerns. Since the banking crisis started in late 2007, the heat of the debate has been fueled with the massive losses hitting banks' loan portfolios. The G20 leaders at their April 2009 summit called on for strengthening the banking regulation. They recommended that accounting standard setters work with bank regulators to improve provisioning standards. Motivated by the exacerbating debate on loan loss provisioning amidst the financial crisis of 2007, I investigate whether loan loss provisions of US bank holding companies are affected by income smoothing incentives during the period 2001–2009. Furthermore, I examine whether income smoothing behavior through loan loss provisions has changed, if any, from the boom period in the 2000s to the period of financial crisis of 2007–2009.

First, I predict and find strong empirical support for income smoothing using loan loss provisions. Earnings are significantly associated with loan loss provisions after controlling for the regulatory capital management incentive pertaining to financial institutions. Moreover, I find that bank holding companies tend to engage increasingly in income smoothing when profitable and when threatened by hitting the regulatory minimum capital requirements. According to further tests, bank internally set regulatory capital targets are more significant than the regulatory-set capital ratios to trigger income smoothing. I also find that banks tend to delay provisioning for loan losses they are in a recessionary period. Finally, I predict and find that during the boom period, banks use loan loss provisions to smooth income downwards. On the other hand, loans loss provisions are extensively used to smooth income upward during the financial crisis period.

This paper contributes to the evidence on bank loan loss provisioning in a number of ways. First, I provide supporting evidence on the procyclicality inherent in the current loan loss provisioning model which is relevant to the debate pushing the International Accounting Standards Board (IASB) to change the rules of loan loss provisioning. Loan loss provisions cover expected loan losses, while regulatory capital is a buffer against unexpected losses. While procyclicality is the tendency of banks to increase (shrink) lending in periods of economic growth (downturn), the current backward-looking model of loan loss provisions under the US Generally Accepted

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Accounting Principles (GAAP) and the International Financial Reporting Standards (IFRS) reinforces the tendency of banks to increase (decrease) loan loss provisions during recessionary (expansionary) periods. In recessionary periods, capital is tight and it is difficult for undercapitalized banks to raise external equity. Therefore, the losses hitting the regulatory capital base in periods of economic downturn magnify the costs of violating regulatory capital targets. Consequently, banks respond by shrinking lending and providing more for loan losses, which aggravates procyclicality. Hence, bank regulators have been urging accounting standard setters to consider changes in the accounting for loan loss provisions (Clark, 2010). Second, I use the regulatory capital ratio as a control to proxy for the regulatory capital management incentive pertaining to banks, uncontrolled for in prior literature. I decompose the regulatory capital ratio into two components: capital, the numerator that is affected by accounting equity, and risk-weighted assets, the denominator that has accounting and asset riskiness elements. Such a breakdown sheds light on the effects of regulatory capital versus risk-weighted assets on loan loss provisions and the relative use of each to manage provisions. Third, I examine the relative significance of the bank-specific internally set capital ratio versus the regulatory capital ratio set by Basel and the Federal Deposit Insurance Corporation (FDIC) in relation to accounting for loan losses to smooth income. Finally, this paper provides evidence on banks' regulatory capital management income smoothing patterns prior to and during the financial crisis of late 2007.

The paper is organized as follows: Section 2 provides background for the study. Hypotheses development is discussed in Section 3. I describe the research design in Section 4. Then, Section 5 introduces the sample and data. I discuss the empirical results in Section 6 and conclude in Section 7.

## 2. Background

### 2.1. Accounting discretion in provisioning for loan losses

According to US GAAP, recognition of loan loss provisions is governed by Statement of Financial Accounting Standards (SFAS) No. 5, *Accounting for Contingencies* (1975), and SFAS No. 114, *Accounting by Creditors for Impairment of a Loan* (1993). Charging and disclosing an accrual to income for the estimated credit loss from a loss contingency is required when it is probable that an asset had been impaired or a liability had been incurred at the date of the financial statements and when the amount of loss can be reasonably estimated. According to the Financial Accounting Standards Board (FASB) codification,[1] topic No. 275 *Risks and Uncertainties* discusses the nature of estimates inherent in the accounting process. It also acknowledges that making reliable assumptions of future events is difficult in periods of economic stability and gets even more difficult in periods of slowdowns. Therefore, the current model used in the US is an incurred loss model where credit losses pertaining to events that are expected to occur in future accounting periods are not included in provisions until incurred.

Although SFAS No. 5, SFAS No. 114, and FASB codification provide detailed rules to the recognition and measurement of loan loss provisions, there is a degree of management discretion inherent the provisioning process. There is a room for judgment when it comes to the decision of whether the estimated loss is "probable" and "can be reasonably estimated". Moreover, the imprecise wording in the FASB standards and interpretations induces discretion in accounting for loan loss provisions. Being a large accrual for banks, loan loss provisions have a significant impact on earnings and regulatory capital.[2] The Securities and Exchange Commission (SEC) stressed the importance of adequate documentation in procedures for reviewing loan portfolios and for determining amounts of allowances for loan losses in the balance sheet and loan loss provisions in the income statement in the Financial Reporting Release No. 28 (1986). *Procedural Discipline in Determining the Allowance and Provision for Loan Losses to be Reported*. In 2001, the SEC issued Staff Accounting Bulletin (SAB) No. 102, *Selected Loan Loss Allowance Methodology and Documentation Issues*, responding to the inadequate documentation of procedures for measuring both general and specific loan loss provisions. Even after the issuance of SAB No. 102, there is a degree of discretion embedded in the provisioning process that banks should estimate loan losses for groups of loans through the application of loss rates to the aggregate loan balances of each group. Such loss rates reflect the bank's historical loan loss experience for each group of loans, adjusted for relevant environmental factors over a specific period. Accordingly, the provisioning process involves factors that magnify the discretion inherent in the provisioning process. The first factor is deciding how loans are grouped and assessed for collectability based on loan type, past due status, and degree of risk. Second, managers engage in determining loss rates and other measures that are considered when establishing appropriate time frames over which to evaluate the loss experience. Finally, there are qualitative factors (e.g. industry, geographical, economic, and political factors) that managers use to assess loss rates (SEC Staff Accounting Bulletin No. 102, 2001).

### 2.2. The regulatory environment

Tier 1 capital is an equity-like measure of capital. It consists of core capital representing common book equity, less certain disallowed reserves and intangible assets, plus minority interest and other items. Tier 2 capital is a junior debt-like measure of capital. It includes subordinated debt, plus cumulative perpetual preferred stock and certain reserves not included in tier 1 capital, allowance for loan losses up to a limit, and other items includable in tier 2 capital. Tier 3 capital consists mainly of short-term subordinated debt. It is usually a very small amount, if not zero. Total risk-based capital is the sum of tier 1, tier 2 and tier 3 capital after some adjustments. Banks have to maintain a minimum ratio of 4% tier 1 capital and 8% total risk-based capital to be considered adequately capitalized.

According to the FDIC, allowance for loan losses is already subtracted from tier 1 capital. Since tier 1 capital calculation starts with book equity, the allowance for loan losses is already taken out on an after-tax basis. Then, when calculating tier 2 capital, some of the allowance for loan losses is added to tier 2 (supplementary) capital on a pre-tax basis up to the limit of 1.25% of gross risk-weighted assets. The effect is an increase to total risk-based capital by the tax rate times the allowance for loan losses. Any deduction from the numerator is mirrored in the risk-weighted assets, the denominator. Therefore, since allowance for loan losses is only includable in tier 2 capital up to 1.25% of gross risk-weighted assets, the excess allowance is not included from the numerator. The balance of allowance for loan losses in excess of 1.25% of gross risk-weighted assets is deducted from the denominator to arrive at the risk-weighted assets base and offset the adjustments on the numerator's side. When testing the effect of loan loss provisions on earnings, I need to control for the effect on regulatory capital that happens by construction. For each component of the regulatory capital ratio, appropriate adjustment is needed to the capital and the risk-weighted asset bases respectively.[3]

[1] For complete FASB codification: http://aaahq.org.

[2] Table 1 shows descriptive statistics of the magnitude of loan loss provisions as a proportion of net income before loan loss provisions. Mean loan loss provisions form 27.5% of net income before loan loss provisions for sample bank holding companies.

[3] In 2004, banks have been allowed to use the Internal Rating Based (IRB) approach under which they use their own internal measures for key drivers of credit risk as primary inputs to the capital ratio calculation. This approach has been reducing the regulatory capital requirements for banks. Therefore, I believe that this event has not been working in favor of the main hypotheses, as it does not add a regulatory constraint on BHCs' regulatory capital.

### 2.3. Procyclicality concerns

According to US GAAP, the "incurred loss model" is used to recognize allowance for loan and lease losses. The incurred loss model is claimed to be backward looking as it rests on ex-post data (Handorf & Zhu, 2006). This backward-looking feature made the US Comptroller of the Currency, John Dugan, express concern that the current accounting standards compromise the timeliness of recognizing loan loss provisions (Dugan, 2009). Current accounting standards are seen as sustaining the backward-looking approach of the incurred loss model. With the sudden losses hitting banks during the financial crisis, loan loss provisions soared rapidly, thus hitting capital cushions. During a recession, undercapitalized banks face a squeeze in the equity base that might not be easily restored by raising external funding.[4] The pressure of capital reduction coupled with the costs of violating regulatory capital targets may lead banks to tighten lending practices to counteract the shrinking capital base by reducing the risk-weighted assets base. Moreover, delaying the provisioning process artificially inflates the regulatory capital base without the need to issue capital on a timely basis. Banks thus enter a downward spiral, which aggravates the procyclicality concerns.

## 3. Hypotheses development

This section begins with a discussion of managers' incentive to use loan loss provisions for income smoothing. Then, I discuss the procyclicality in the current provisioning rules to develop the hypothesis on the pre-crisis post-crisis periods.

### 3.1. Income smoothing hypotheses

Shrieves and Dahl (2003) attribute income positive association with loan loss provisions to the use of bank management discretion in determining the magnitude and the timing of those provisions. Prior research has provided mixed evidence on the use of loan loss provisions to smooth income. On one hand, Collins, Shackelford, and Wahlen (1995), Liu and Ryan (1995), Kanagaretnam, Lobo, and Mathieu (2003), and Kanagaretnam, Lobo, and Yang (2004) document the use of loan loss provisions for income smoothing purposes. On the other hand, Beatty, Chamberlain, and Magliolo (1995) and Ahmed, Takeda, and Thomas (1999) find no support for such hypothesis. I reinvestigate whether loan loss provisions are used to smooth income in a more recent period spanning the financial crisis of late 2007. Due to the unique nature of banks, I refine the tests by controlling for regulatory tier 1 capital level and risk-weighted assets representing the regulatory capital incentive to manage provisions (Ahmed et al., 1999; Beatty et al., 1995). The first hypothesis is:

**$H_{1a}$.** Earnings is positively associated with subsequent year loan loss provisions.

Bikker and Metzemakers (2005) provide evidence on procyclicality of loan loss provisions to smooth income. Liu and Ryan (2006) show that banks accelerate charge-offs during inflationary times. Accordingly, I conjecture that BHCs tend to delay provisioning to smooth income during recessionary periods and accelerate provisions in inflationary periods. The following hypothesis expresses this conjecture:

**$H_{1b}$.** The association, if any, between earnings and subsequent year loan loss provisions is negative in recessionary periods.

According to Liu and Ryan (2006), more profitable banks managed income downwards during the 1990 boom. Hence, I predict that more profitable BHCs accelerate provisioning to smooth income downward.

**$H_{1c}$.** The association, if any, between earnings and subsequent year loan loss provisions is positive for more profitable bank holding companies.

The inclusion of bank earnings as part of equity, and hence of regulatory capital, provides a unique empirical setting. I argue that capital-constrained banks are more motivated to manipulate income, which is includible in tier 1 capital by construction, as a way of managing regulatory capital relative to non-constrained banks. Therefore, the hypothesis is expressed as:

**$H_{1d}$.** The association, if any, between the change in earnings and loan loss provisions differs for banks below the target capital ratio relative to those above the target capital ratio.

I use two alternative triggers of capital constraint. Following Ahmed et al. (1999), banks face high costs of approaching or violating the regulatory minimum capital ratio set by the FDIC. Therefore, the first measure is the regulatory minimum tier 1 capital ratio of 4% for a bank to be considered adequately capitalized. The second measure is a bank-specific internally set tier 1 capital ratio. The use of the second measure is consistent with prior evidence that bank-specific targets are binding (Collins et al., 1995).

### 3.2. Pre-crisis boom and crisis period hypothesis

According to Bikker and Metzemakers (2005) and Beatty and Liao (2009), the provisioning behavior of banks is largely procyclical. In addition, provisioning has been used to obscure income smoothing during the boom of the 1990s (Liu & Ryan, 2006). I predict that the regulatory capital and income smoothing behavior of banks differs during the pre-crisis boom period of 2002–2006 compared to the crisis period of 2007–2009. In line with the squeezed profits and massive losses hitting bank portfolios amidst the financial crisis, I conjecture that banks delay loan loss provisions to smooth income upward.

**$H_{2}$.** The association between earnings and subsequent year loan loss provisions is less pronounced during financial crisis period than during the pre-crisis boom.

## 4. Research design

The following multivariate regression model is used to investigate hypothesis $H_{1a}$ of income smoothing:

$$LLP_{it+1} = \beta_1 + \beta_2 NIA_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it} \quad (1)$$

where $LLP_{it+1}$ = loan loss provisions to average assets, for firm $i$ at year $t+1$ and $NIA_{it}$ = the ratio of net income before extraordinary items, taxes and loan loss provisions to average assets.

I predict a positive sign for the coefficient of $NIA_{it}$. I include both $CAP_{it}$ and $RWA_{it}$ to test for the income smoothing incentive incremental to the incentive to manage regulatory capital. The first variable is the level of tier 1 capital, adjusted for the allowance for loan losses, and deflated by total assets for firm $i$ at year $t$ ($CAP_{it}$). The second variable is the level of risk-weighted assets, adjusted for the allowance for loan losses, to total assets ($RWA_{it}$). This variable accounts for the other component of the regulatory capital measure. It pertains to whether the bank should, as opposed to can afford to, recognize loan loss provisions. $RWA_{it}$ is a composite measure of the accounting

[4] In July, 2010, the Committee of European Banking Supervisors (CEBS) has released the results of EU banks stress test. In a recession scenario, due to massive losses hitting the loans portfolio, banks fail to maintain a 6% tier 1 capital ratio to be considered adequately capitalized.

numbers pertaining to asset positions and the degree of risk based on management choice to invest in alternative positions. The agency problem suggests that managers are less willing to undertake risks than are shareholders. This is due to the higher costs managers face when violating capital requirements and in the event of bankruptcy (Lee, 2002). Prior literature documented the conflict between shareholders and managers over bank risk-taking behavior (Gropp & Köhler, 2010). I expect that the level of risk-weighted assets is positively associated with loan loss provisions. If loan loss provisions increase consequent to a prior period increase in tier 1 capital, this implies that the bank can afford to make the provision without incurring regulatory capital costs. On the other hand, if loan loss provisions increase consequent to a prior period increase in risk-weighted assets, this suggests that the bank has to account for the provision to meet the inherent default risk. One can note that the product of $CAP_{it}$ and the reciprocal of $RWA_{it}$ produce the tier 1 regulatory capital ratio. Thus, in a further test, I use one explanatory variable of tier 1 capital ratio ($CAPR_{it}$) in lieu of $CAP_{it}$ and $RWA_{it}$. It is calculated as tier 1 capital divided by risk-weighted assets.

Consistent with prior literature that attempted to isolate the discretionary component of loan loss provisions by controlling for other elements that are believed to be non-discretionary,[5] I use three control variables as indicators of the non-discretionary component of loan loss provisions. The first variable is the change in the standard deviation of bank annualized daily equity returns ($\Delta STDEQ_{it+1}$) which is a generic measure of risk to proxy for the stock market's estimate of the risk inherent in the bank loan portfolios. A potential drawback of this measure is that equity returns volatility is a risk measure of all the bank's activities not just its loan portfolio. The other two variables are the change in loans ($\Delta L_{it+1}$) to proxy for real growth in the magnitude of loans and the change in 100% risk-weighted loans ($\Delta RL_{it+1}$). The change specification used in the latter variable is a proxy for the marginal riskiness of the loans' portfolio to disentangle the quality of loans undertaken from the crude change in loans' magnitude. Including such variable rules out the alternative explanation that banks adjust loan loss provisions only to account for the degree of riskiness of the loan portfolio. In unreported sensitivity tests, I use alternative proxies for the non-discretionary component of loan loss provisions. Following Moyer (1990), Beatty et al. (1995), and Ahmed et al. (1999), I use the change in nonperforming loans to total assets ($\Delta NPL_{it+1}$) to proxy for the expected change in default risk on loan portfolios. I also use the change in the ratio of individual loans to commercial and industrial loans ($\Delta ICL_{it+1}$) adapted from Rivard, Bland, and Morris (2003) to proxy for the composition of bank loan portfolio and the inherent risk in investment decisions. Motivated by evidence of Beatty et al. (1995) that the decision to trade securities is associated with other discretionary decisions including loan loss provisions, I use the change in loans to securities ($\Delta LS_{it+1}$) as an alternative proxy for different degrees of riskiness inherent in the bank's investment portfolio. Additionally, in another sensitivity check, I control for the possibility that the results are driven by the degree of risk of the bank loan portfolio. Consequently, I develop an alternative risk measure in addition to the risk-weighted assets $RWA_{it}$.

The risk-weighted assets measure might be claimed to be noisy as it measures the degree of riskiness not only of loans but also of all balance sheet assets and off-balance sheet items. Therefore, I employ a measure of the risk-weighted loans to total assets $RWL_{it}$. This measure is composed of the sum of the 0%, 20%, 50%, and 100% loans to total assets.[6] Beatty and Liao (2009) provide evidence that bank size is significantly positively associated with bank lending practices. I include bank size ($SIZE_{it}$) expressed as the natural log of total assets to ensure that the results do not merely capture the size effect and the inherent default risk element. I refine the test in prior studies by controlling for income as an incentive for banks to manage their loan loss provisions (Liu & Ryan, 1995). I control for the regulatory capital management using ($CAP_{it}$) on loan loss provisioning by including the change of net income before extraordinary activities, taxes and loan loss provisions to assets. Explanatory stock variables are adjusted for the allowance for loan losses and deflated by total assets. On the other hand, flow variables are deflated by average assets. I use lead values of the dependent variable and contemporaneous values of the independent variables to avoid potential endogeneity problems.

The coefficients on $CAP_{it}$, $RWA_{it}$, $SIZE_{it}$, $\Delta STDEQ_{it+1}$ and $\Delta RL_{it+1}$ are all expected to be positive. More specifically, an increase in tier 1 capital implies affordability of the available capital cushion to make more loan loss provisions. For the latter variables, an increase in risk-weighted assets, size, the standard deviation of equity returns, and risky loans growth implies an increase in default risk. Hence, the necessity to make loan loss provisions to account for the risk inherent in these measures. I predict $\Delta L_{it+1}$ to have a negative coefficient. Banks tend to increase loans in periods of a rising economy and shrink loans at times of recession (Beatty & Liao, 2009). Contrarily, banks provide relatively more for loan losses during bad times than good times (Laeven & Majnoni, 2003). Therefore, I expect loan growth to be negatively associated with the tendency to provide for loan losses. The existence of such negative association provides preliminary evidence on procyclicality of loan loss provisions.

In line with Liu and Ryan (2006), I test whether BHCs are motivated to smooth income through loan loss provisions when they are (1) going through a recession and (2) more profitable. Therefore, I include $REC_{it}$ as a dummy that equals 1 if the year is a recessionary period and zero otherwise. I also include $NID_{it}$ a dummy variable that equals 1 if the BHC has an above-median net income before extraordinary items, taxes and loan loss provisions to total assets and zero otherwise. Both dummy variables are interacted with $NIA_{it}$. I expect BHCs to accelerate loan loss provisioning to smooth income if they are (1) in a non-recessionary period and (2) more profitable. The regression models to test for hypotheses $H_{3b}$ and $H_{3c}$, respectively, are:

$$LLP_{it+1} = \beta_1 + \beta_2 NIA_{it} + \beta_3 REC_{it} + \beta_4 NIA_{it} \times REC_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it} \quad (2)$$

$$LLP_{it+1} = \beta_1 + \beta_2 NIA_{it} + \beta_3 NID_{it} + \beta_4 NIA_{it} \times NID_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it} \quad (3)$$

To further test whether earnings management is intensified by whether banks are capital-constrained, I include a dummy variable $T_{it}$ that equals 1 if the bank falls below the regulatory capital target and zero otherwise. If banks fall below the target set by the FDIC, they face considerable costs of violations. Therefore, $T1_{it}$ measures whether banks smooth income to mitigate the cost of violating regulatory minimum target.

Additional tests reveal that tier 1 capital ratios of sample bank holding companies far exceed the regulatory minimum of 4%. Hence, the use of an alternative measure of bank-specific target becomes justifiable. I use a second trigger generated by the bank-specific mean tier 1 capital ratio to proxy for internal regulatory capital targets. For that purpose, I use the dummy $T2_{it}$ that equals 1 if the bank falls below the bank-specific tier 1 capital ratio mean and zero otherwise. $T2_{it}$ represents a bank-generated threshold, below which banks are

[5] It should be noted that there has been some concern about the control variables not entirely excluding the effect of direct application of accounting standards rather than management discretion.

[6] Results of the main empirical tests are sustained when using alternative measures of the non-discretionary component in loan loss provisions. Moreover, unreported results show significant association between the risk-weighted loans variable ($RWL_{it}$) and loan loss provisions.

viewed as poorly capitalized, as opposed to the regulatory threshold, $T1_{it}$. The regression model to test for $H_{3d}$ is expressed as:

$$LLP_{it+1} = \beta_1 + \beta_2 \Delta NI_{it+1} + \beta_3 T_{it} + \beta_4 \Delta NI_{it+1} \times T_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it} \quad (4)$$

where $\Delta NI_{it+1}$ = change of net income before extraordinary items, taxes and loan loss provisions to total assets.

The coefficients of the interaction term ($\Delta NI_{it+1} \times T1_{it}$) and ($\Delta NI_{it+1} \times T2_{it}$) are of particular interest. Getting significantly positive association between loan loss provisions and these terms provide evidence that banks' income smoothing behavior differs significantly for poorly capitalized banks.

Models (1) and (3) are used to test the $H_2$ for the pre-crisis and the financial crisis subsamples. Throughout all tests, I use a fixed-effects model to account for bank-specific and year-specific differences to ensure that the reported significance levels are not driven by cross-sectional or time-series dependence in residuals.

## 5. Sample and data

The sample consists of U.S. bank holding companies (BHCs) for the period 2001–2009. The data are collected from BHCs' regulatory reports FR Y-9C filed with the U.S. Federal Reserve Bank. Bank holding companies are required to file annual and quarterly consolidated balance sheets and income statements along with other information pertaining to the banks' regulatory capital. They are identified in these reports based on a federal code called the "RSSD ID." A unique feature of the dataset is that it ties in the regulatory data in the FR Y-9C reports and the financial statement data pertaining to equity and asset values. The final dataset contains regulatory numbers that articulate to the accounting equity and asset values. Additionally, I have aligned FR Y-9C reports across years. I have matched the variables reported in the regulatory filings by name and adapted the codes to match across the sampling period.

Market data pertaining to equity returns are obtained from the Center for Research in Security Prices (CRSP). I use annualized daily equity returns to get the standard deviation of equity returns used in the empirical tests. Bank holding companies are identified in CRSP according to either the "permco" or the "permno" codes. These codes represent ID numbers assigned to firms in the CRSP database. In order to obtain a comprehensive dataset, I have matched BHCs by permco, permno, and RSSD ID to merge accounting, regulatory and market data.

To be included in the sample, a bank holding company must satisfy the following criteria: (1) have available accounting data in FR Y-9C reports filed with the Federal Reserve, (2) possess available regulatory data in FR Y-9C reports filed with the Federal Reserve, and (3) have return data available on the CRSP tape. Therefore, I delete observations with any of these values missing. I also trim observations on the top and bottom 1% to eliminate outliers. With respect to defining recessionary periods, I rely on the National Bureau of Economic Research (NBER) classification. The NBER classifies the fiscal years 2001, 2007, 2008 and 2009 as recessionary periods. This classification is used rather than using a longer period with multiple business cycles to test for procyclicality of loan loss provisions. This specification seems necessary to take into account a fundamental change in the discretion and documentation requirements of loan loss provisions defined by SEC SAB No 102 in 2001. Moreover, the recessionary period covers the financial crisis of late 2007. Thus, the results obtained are relevant to the procyclicality concerns and debates on provisioning rules during the recent financial crisis. I do not restrict the sample to BHCs having annual data over the entire sampling period to mitigate the effect of results being potentially driven by survivorship bias. The final sample consists of 878 bank holding companies and 4,689 bank-year observations.

## 6. Results

In this section, I first provide descriptive statistics of the sample. Then, I introduce evidence of regulatory capital management using loan loss provisions. Third, I present results of the procyclicality hypothesis. Finally, I discuss results pertaining to the income smoothing hypotheses.

### 6.1. Descriptive statistics

The loan loss provision is a large accrual that can be used to affect the earnings and regulatory capital figures as shown by Table 1. In panel A, mean (median) loan loss provisions for the sample BHCs represent 27.55% (11.15%) of net income before loan loss provisions. It can be noted that $LLPNI_{it}$ reaches its highest levels at times of recession, consistent with the regulators' claim of the procyclicality in the current incurred loss model. The mean (median) ratio of loan loss provisions to net income before loan loss provisions for recessionary years of 2001, 2007, 2008, and 2009 is 22.03% (14.68%), 20.91% (32.02%) and 288.16% (44.91%) respectively. The largest $LLPNI_{it}$ is achieved in 2009 due to huge losses achieved in the period. Panels B and C provide descriptives of loan loss provisions and net income

**Table 1**
Descriptive statistics of loan loss provisions to net income before extraordinary items, taxes, and loan loss provisions across years 2001–2009 and overall sample.

| Panel A | | | |
|---|---|---|---|
| LLPNI | Mean | Median | Std Dev |
| 2001 | 0.2203 | 0.1468 | 0.3176 |
| 2002 | 0.1988 | 0.1289 | 0.3371 |
| 2003 | 0.1792 | 0.1109 | 0.5311 |
| 2004 | 0.1369 | 0.0949 | 16.8527 |
| 2005 | 0.1117 | 0.0833 | 0.2850 |
| 2006 | 0.1143 | 0.0854 | 0.1387 |
| 2007 | 0.2400 | 0.1063 | 1.0017 |
| 2008 | 0.2091 | 0.3202 | 6.9021 |
| 2009 | 2.8816 | 0.4491 | 51.1144 |
| Total | 0.2755 | 0.1115 | 15.6810 |

| Panel B | | | |
|---|---|---|---|
| LLP | Mean ($000) | Median ($000) | Std Dev |
| 2001 | 309,179 | 6,968 | 872,128 |
| 2002 | 186,157 | 4,009 | 894,162 |
| 2003 | 139,796 | 3,392 | 683,598 |
| 2004 | 128,616 | 3,400 | 694,861 |
| 2005 | 88,958 | 3,332 | 501,158 |
| 2006 | 106,156 | 3,032 | 582,143 |
| 2007 | 238,759 | 6,352 | 1,101,989 |
| 2008 | 725,750 | 23,095 | 3,592,204 |
| 2009 | 1,233,967 | 44,123 | 6,137,244 |
| Total | 313,990 | 5,977 | 2,391,214 |

| Panel C | | | |
|---|---|---|---|
| NI | Mean ($000) | Median ($000) | Std Dev |
| 2001 | 393,917 | 18,705 | 958,642 |
| 2002 | 643,718 | 29,162 | 2,557,651 |
| 2003 | 716,090 | 30,252 | 2,823,134 |
| 2004 | 905,898 | 47,367 | 3,801,700 |
| 2005 | 767,179 | 49,184 | 3,195,505 |
| 2006 | 1,020,578 | 48,552 | 4,454,186 |
| 2007 | 460,299 | 38,662 | 4,362,839 |
| 2008 | 401,447 | 33,369 | 4,132,881 |
| 2009 | 399,003 | 33,073 | 7,595,052 |
| Total | 860,252 | 42,018 | 4,062,045 |

LLPNI = loan loss provisions divided by net income before extraordinary items, taxes and loan loss provisions, LLP = total loan loss provisions, NI = net income before extraordinary items, taxes and loan loss provisions.

before extraordinary items, taxes and loan loss provisions respectively. I expect and find that $LLP_{it}$ reaches its highest levels during the financial crisis period while $NI_{it}$ reaches its lowest levels during this period.

Table 2 provides key descriptive statistics for annual sample data. Loan loss provisions represent 0.41% of total assets. Mean tier 1 capital to total assets is 9.4%, while the mean risk-weighted assets ratio to total assets is 72.4%. As revealed by median figures, regulatory capital is right skewed while risk-weighted assets are left skewed. This result is in line with the Basel objective to motivate banks to keep a capital cushion above the minimum required while discouraging banks from taking unnecessarily risky investments according to the regulatory measure of risk embedded in the risk-weighted assets. Untabulated results show a mean tier 1 capital to total risk-weighted assets ratio of 13%. This ratio far exceeds the regulatory minimum ratio of 4% for banks to be adequately capitalized. This result is consistent with prior evidence that banks keep their regulatory capital far above the minimum required (Berger, DeYoung, Flannery, Lee, & Öztekin, 2008). The mean results for bank leverage and return on assets are 8.98% and 1.59% respectively.

The minimum loan loss provision to average assets for the sample banks is −3.77%. Negative loan loss provisions can arise because of recoveries and/or write-backs of previously recorded provisions to bring down the balance of allowance for loan losses. The negative low points of tier 1 capital and equity to asset ratios are due to being adjusted for the negative amount of loan loss provisions. Results of the loan composition variables reveal that banks have increased their loan portfolio (7.86% $\Delta L_{it+1}$), invested in more risky loans (6.63% $\Delta RL_{it+1}$), reduced their holdings of individual loans relative to commercial loans (−40% $\Delta ICL_{it+1}$), recognized more nonperforming loans (0.38% $\Delta NPL_{it+1}$), and slightly invested in more securities compared to loans (1.96% $\Delta SL_{it+1}$).

Table 3 displays the Pearson correlation coefficients between sample data. The correlations between the dependent variable $LLP_{it+1}$ and all independent variables are significant under conventional levels. I find a positive correlation between loan loss provisions and each of the components of tier 1 capital ratio. Furthermore, there is a positive correlation between each of the generic risk measures, as expressed by the standard deviation of equity returns ($\Delta STDEQ_{it+1}$), and the return on assets ($NIA_{it}$) and loan loss provisions. These findings are consistent with prior literature (Ahmed et al., 1999).

Prior evidence reports positive correlation between loan growth and tier 1 capital ratio (Beatty & Liao, 2009; Kishan & Opiela, 2006). However, results of decomposing the ratio show a positive correlation between loan growth and the risk-weighted assets component. On the other hand, loan growth is negatively correlated with the tier 1 capital component. Untabulated correlation results reveal a negative correlation between loan growth and the recession dummy of −21.1%. The negative correlation coefficient is consistent with prior evidence on procyclical lending practices in recessionary periods (Beatty & Liao, 2009). Furthermore, there is a positive correlation between loan loss provisions and the recession dummy of 35.4%. Under procyclicality claims, banks tend to provision more for loan losses in recessionary times.

Positive correlation results between loan loss provisions and the change in nonperforming loans are consistent with prior evidence (Ahmed et al., 1999). Likewise, the negative correlation between loan loss provisions and the change in securities to loans is supported by the results of Beatty et al. (1995) that banks trade-off the use of discretionary accruals and security trading.

### 6.2. Evidence of income smoothing

For the main inferences, I use a year fixed-effects model clustering by firm.[7] If bank holding companies use loan loss provisions to smooth income, I expect a significant positive coefficient of $NIA_{it}$. Column (i) of Table 4 provides test results of the income smoothing hypothesis. The signs of explanatory variable coefficients are positive as expected. The coefficient of the loan growth variable ($\Delta L_{it+1}$) has the expected negative coefficient. Furthermore, the significant positive association between 100% risk-weighted loans ($\Delta RL_{it+1}$) and loan loss provisions is as expected.

periods, as evident by the coefficient −0.180 in column (ii), and when BHCs are more profitable, as evident by the coefficient 0.726 in column (iii). The coefficients of the interaction terms $NIA_{it} \times REC_{it}$ and $NIA_{it} \times NID_{it}$ are significant at conventional levels. Therefore, column (ii) results of testing hypothesis $H_{3b}$ support the regulators' claim that delaying the provisioning process gives rise to procyclical behavior. In the sample BHCs, the procyclical behavior is attributed to income smoothing incentives. Columns (iv) and (v) provide results of whether capital-constrained bank holding companies change loan loss provisions as a response to earnings change. The variables I focus on in these two tests are $\Delta NI_{it+1} \times TD1_{it,}$ having a coefficient of 0.18, and $\Delta NI_{it+1} \times TD2_{it}$, having a coefficient of 0.35, respectively. As expected, the coefficients of both variables are positive and significant. An interesting finding is that the coefficient on the interaction term $\Delta NI_{it+1} \times TD2_{it}$ is statistically and economically more significant than that on the interaction term $\Delta NI_{it+1} \times TD1_{it}$, where $TD1_{it}$ is the regulatory-set minimum capital ratio of 4% and $TD2_{it}$ represents a bank-specific mean regulatory capital ratio. Therefore, a BHC is more inclined to use loan loss provisions to smooth income if it falls below its internally set regulatory capital ratio than if it falls below the regulatory-set 4% ratio. For a bank holding company that falls below the regulatory-set 4% capital ratio, a 1% increase in net income entails an increase of $0.18 in loan loss provisions. If the same bank

**Table 2**
Descriptive statistics of sample BHCs for the period 2001–2009.

| Variable | Mean | Median | Std Dev | Min | Max |
|---|---|---|---|---|---|
| $LLP_{it+1}$ | 0.0041 | 0.0018 | 0.0089 | −0.0088 | 0.1573 |
| $NIA_{it}$ | 0.0159 | 0.0157 | 0.0143 | −0.1025 | 0.3605 |
| $CAP_{it}$ | 0.0941 | 0.0889 | 0.0349 | −0.0377 | 0.8388 |
| $RWA_{it}$ | 0.7240 | 0.7358 | 0.1226 | 0 | 1.1197 |
| $SIZE_{it}$ | 13.2690 | 12.9650 | 1.2988 | 10.9553 | 21.5229 |
| $\Delta STDEQ_{it+1}$ | 0.1175 | −0.0036 | 0.4879 | −0.2611 | 2.4691 |
| $\Delta NI_{it+1}$ | 0.0005 | 0.0007 | 0.0089 | −0.2336 | 0.1434 |
| $\Delta L_{it+1}$ | 0.0786 | 0.0579 | 0.1335 | 0.7613 | 3.7113 |
| $\Delta RL_{it+1}$ | 0.0663 | 0.0482 | 0.1163 | −0.9612 | 3.1462 |
| $\Delta NPL_{it+1}$ | 0.0038 | 0.0008 | 0.01780 | −0.1504 | 0.4567 |
| $\Delta ICL_{it+1}$ | −0.4000 | −0.0072 | 27.7144 | −2161 | 136.2803 |
| $\Delta SL_{it+1}$ | 0.0196 | 0.0044 | 0.1568 | −3.4015 | 5.7564 |

$LLP_{it+1}$ = loan loss provisions to average assets, for firm $i$ at year $t+1$.
$NIA_{it}$ = the ratio of earnings before extraordinary items, taxes and loan loss provisions to average assets.
$CAP_{it}$ = the ratio of tier 1 capital, adjusted for allowance for loan losses, to total assets.
$RWA_{it}$ = the ratio of risk-weighted assets, adjusted for allowance for loan losses, to total assets.
$\Delta NI_{it+1}$ = change of net income before extraordinary activities, taxes and loan loss provisions to assets.
$SIZE_{it}$ = natural log of total assets.
$\Delta STDEQ_{it+1}$ = change in the standard deviation of annualized daily equity returns.
$\Delta L_{it+1}$ = change in loans outstanding to total assets.
$\Delta RL_{it+1}$ = change in the ratio of 100% risk-weighted loans to total assets.
$\Delta NPL_{it+1}$ = change in the ratio of nonperforming loans to total assets.
$\Delta ICL_{it+1}$ = change in the ratio of loans to individuals to commercial and industrial loans.
$\Delta SL_{it+1}$ = change in the ratio of securities to loans.

[7] I adjust the standard errors for correlation across firms. The years studied are too few to justify clustering by year. Therefore, I do not suspect that residuals are correlated across time. The main inferences are obtained for a year fixed-effects model when test statistics are based on standard errors that are clustered by firm. This specification controls for heteroscedasticity and intertemporal firm-specific dependence in regression residuals. Unreported alternative tests involve: 1) year fixed-effects two-way clustering model, 2) both year and firm fixed effects clustering by firm, and 3) year and firm fixed effects two-way clustering model. All alternative specifications lead to similar inferences.

**Table 3**
Pearson correlation analysis (*p*-values in parentheses) for the period 2001–2009.

| Variables | $CAP_{it}$ | $RWA_{it}$ | $SIZE_{it}$ | $\Delta STDEQ_{it+1}$ | $NIA_{it}$ | $\Delta NI_{it+1}$ | $\Delta L_{it+1}$ | $\Delta RL_{it+1}$ | $\Delta NPL_{it+!}$ | $\Delta ICL_{it+!}$ | $\Delta SL_{it+1}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $LLP_{it+1}$ | 0.283 (<0.0001) | 0.197 (<0.0001) | 0.149 (<0.0001) | 0.220 (<0.0001) | 0.266 (<0.0001) | −0.158 (<0.0001) | −0.112 (<0.0001) | 0.043 (0.003) | 0.360 (<0.0001) | −0.105 (<0.0001) | −0.058 (<0.0001) |
| $CAP_{it}$ | | −0.046 (<0.0001) | −0.119 (<0.0001) | 0.003 (0.832) | 0.469 (<0.0001) | −0.086 (<0.0001) | −0.021 (0.097) | −0.084 (<0.0001) | 0.006 (0.638) | −0.105 (<0.0001) | −0.058 (<0.0001) |
| $RWA_{it}$ | | | 0.073 (<0.0001) | 0.172 (<0.0001) | 0.046 (0.002) | 0.024 (0.059) | 0.178 (<0.0001) | 0.309 (<0.0001) | 0.185 (<0.0001) | −0.0001 (0.996) | −0.115 (<0.0001) |
| $SIZE_{it}$ | | | | 0.190 (<0.0001) | 0.005 (0.712) | −0.040 (0.001) | −0.078 (<0.0001) | −0.011 (0.382) | −0.088 (<0.0001) | 0.004 (0.771) | 0.031 (0.012) |
| $\Delta STDEQ_{it+1}$ | | | | | −0.127 (<0.0001) | −0.123 (<0.0001) | 0.095 (<0.0001) | 0.038 (0.009) | 0.390 (0.0010) | 0.009 (0.526) | −0.040 (0.006) |
| $NIA_{it}$ | | | | | | 0.393 (<0.0001) | 0.110 (<0.0001) | 0.562 (0.0010) | −0.041 (0.262) | −0.076 (<0.0001) | 0.030 (0.035) |
| $\Delta NI_{it+!}$ | | | | | | | 0.251 (<0.0001) | 0.165 (<0.0001) | −0.020 (0.108) | 0.186 (<0.0001) | 0.038 (0.009) |
| $\Delta L_{it+1}$ | | | | | | | | 0.295 (<0.0001) | 0.240 (<0.0001) | 0.008 (0.560) | 0.028 (0.050) |
| $\Delta RL_{it+1}$ | | | | | | | | | 0.205 (<0.0001) | 0.111 (<0.0001) | 0.053 (<0.0001) |
| $\Delta NPL_{it+1}$ | | | | | | | | | | 0.048 (0.001) | −0.019 (0.187) |
| $\Delta ICL_{it+!}$ | | | | | | | | | | | −0.107 (<0.0001) |

$LLP_{it+1}$ = loan loss provisions to average assets, for firm *i* at year *t+1*. $CAP_{it}$ = the ratio of tier 1 capital, adjusted for allowance for loan losses, to total assets. $RWA_{it}$ = the ratio of risk-weighted assets, adjusted for allowance for loan losses, to total assets. $SIZE_{it}$ = natural log of total assets. $\Delta STDEQ_{it+1}$ = change in the standard deviation of annualized daily equity returns. $NIA_{it}$ = the ratio of earnings before extraordinary items, taxes and loan loss provisions to average assets. $\Delta NI_{it+1}$ = change of net income before extraordinary activities, taxes and loan loss provisions to assets. $\Delta L_{it+1}$ = change in loans outstanding to total assets. $\Delta RL_{it+1}$ = change in 100% risk-weighted loans to total assets. $\Delta NPL_{it+1}$ = change in nonperforming loans to total assets. $\Delta ICL_{it+1}$ = change in the ratio of loans to individuals to commercial and industrial loans. $\Delta SL_{it+1}$ = change in the ratio of securities to loans.

holding company falls below its own regulatory capital ratio, a 1% increase in net income triggers an increment of $0.35 in loan loss provisions. The coefficients in columns (iv) and (v) of Table 4 demonstrate the effect of using different definitions of the regulatory capital ratio on income smoothing results. Moreover, the incremental results have implications to bank regulators on the adequacy of required regulatory

**Table 4**
Analysis of the effect of earnings on loan loss provisions.

Models (i), (ii) and (iii): $LLP_{it+1} = \beta_1 + \beta_2 NIA_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it}$

Models (iv) and (v): $LLP_{it+1} = \beta_1 + \beta_2 \Delta NI_{it+1} + \beta_3 T_{it} + \beta_4 \Delta NI_{it+1} \times T_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it}$

where two specifications of $T_{it}$ are used. $T1_{it}$ and $T2_{it}$ are used to indicate a regulatory-set or a bank-specific minimum capital ratio

| Variables | Pred. | (i) | | (ii) | | (iii) | | (iv) | | (v) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Coef. | *t* stats | Coef. | *t* stats | Coef. | *t* stats | Coef. | *t* stats | Coef. | *t* stats |
| Intercept | +/− | −0.027 | −7.28*** | −0.181 | −5.35*** | −0.013 | −4.15*** | −0.029 | −6.06*** | −0.0297 | −5.81*** |
| $NIA_{it}$ | + | 0.075 | 5.47*** | 0.164 | 5.63*** | 0.411 | 2.73*** | | | | |
| $\Delta NI_{it+1}$ | − | | | | | | | −0.131 | −4.78*** | −0.3498 | −4.13*** |
| $T1_{it}$ | + | | | | | | | 0.008 | 3.21*** | | |
| $\Delta NI_{it+1} \times T1_{it}$ | + | | | | | | | 0.180 | 1.90* | | |
| $T2_{it}$ | + | | | | | | | | | 0.0004 | 1.78* |
| $\Delta NI_{it+1} \times T2_{it}$ | + | | | | | | | | | 0.3516 | 6.34*** |
| $REC_{it}$ | + | | | 0.013 | 2.89*** | | | | | | |
| $NIA_{it} \times REC_{it}$ | − | | | −0.180 | −5.47*** | | | | | | |
| $NID_{it}$ | − | | | | | −0.012 | −2.45** | | | | |
| $NIA_{it} \times NID_{it}$ | + | | | | | 0.726 | 2.01** | | | | |
| $CAP_{it}$ | + | 0.080 | 5.59*** | 0.060 | 5.12*** | 0.035 | 5.91*** | 0.100 | 5.86*** | 0.1997 | 5.16*** |
| $RWA_{it}$ | + | 0.014 | 6.12*** | 0.009 | 5.15*** | 0.015 | 5.61*** | 0.014 | 4.42*** | 0.0139 | 4.54*** |
| $SIZE_{it}$ | + | 0.001 | 5.81*** | 0.0004 | 4.86*** | 0.001 | 6.87*** | 0.001 | 5.43*** | 0.0011 | 6.15*** |
| $\Delta STDEQ_{it+1}$ | + | 0.004 | 5.01*** | 0.005 | 5.37*** | 0.003 | 5.05*** | 0.003 | 6.06*** | 0.0026 | 6.22*** |
| $\Delta L_{it+1}$ | − | −0.016 | −6.27*** | −0.010 | −5.26*** | −0.013 | −4.18*** | −0.013 | −5.21*** | −0.0124 | −5.43*** |
| $\Delta RL_{it+1}$ | + | 0.005 | 3.59*** | 0.004 | 3.85*** | 0.004 | 3.16*** | 0.007 | 3.69*** | 0.0068 | 3.92*** |
| Year fixed effects | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Adjusted $R^2$ | | 24.53% | | 37.13% | | 42.45% | | 24.89% | | 27.09% | |
| *n* | | 4,689 | | 4,689 | | 4,689 | | 4,689 | | 4,689 | |

***, **, and * represent 1%, 5% and 10% significance, respectively. Significance is one-tailed unless the sign of the coefficient is indeterminate.
Standard errors are adjusted for correlation across firms and years.
$LLP_{it+1}$ = loan loss provisions to average assets, for firm *i* at year *t+1*. $NIA_{it}$ = the ratio of net income before extraordinary items, taxes and loan loss provisions to average assets. $\Delta NI_{it+1}$ = change of net income before extraordinary items, taxes and loan loss provisions to assets. $T1_{it}$ = dummy variable that equals 1 if tier 1 capital to risk-weighted assets ratio is less than the regulatory-set ratio of 4% and zero otherwise. $T2_{it}$ = dummy variable that equals 1 if tier 1 capital to risk-weighted assets ratio is less than the bank-specific mean and zero otherwise. $REC_{it}$ = dummy variable that takes the value of 1 if the year is 2001, 2007, 2008, or 2009 (recessionary period) and zero otherwise. $NID_{it}$ = dummy variable that equals 1 if the BHC has an above-median net income before extraordinary items, taxes and loan loss provisions to assets and zero otherwise. $CAP_{it}$ = the ratio of tier 1 capital, adjusted for allowance for loan losses, to total assets. $RWA_{it}$ = the ratio of risk-weighted assets, adjusted for allowance for loan losses, to total assets. $SIZE_{it}$ = natural log of total assets. $\Delta STDEQ_{it+1}$ = change in the standard deviation of annualized daily equity returns. $\Delta L_{it+1}$ = change in loans outstanding to total assets. $\Delta RL_{it+1}$ = change in 100% risk-weighted loans to total assets.

**Table 5**
Analysis of the management of loan loss provisions during pre-crisis period and financial crisis period.

Model (i): $LLP_{it+1} = \beta_1 + \beta_2 CAP_{it} + \beta_3 RWA_{it} + \beta_4 NIA_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it}$

Model (ii): $LLP_{it+1} = \beta_1 + \beta_2 CAP_{it} + \beta_3 RWA_{it} + \beta_4 NIA_{it} + \beta_5 NID_{it} + \beta_6 NIA_{it} \times NID_{it} + \sum_{j=1}^{n} \beta_j Controls_{jit+1} + \varepsilon_{it\,it}$

| Indep. var. | Pred. | (i) Pre-crisis (2002–2006) | | (i) Crisis (2007–2009) | | (ii) Pre-crisis (2002–2006) | | (ii) Crisis (2007–2009) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Coef. | *t* stats | Coef. | *t* stats | Coef. | *t* stats | Coef. | *t* stats |
| Intercept | +/− | −0.059 | −8.42*** | −0.002 | −1.86* | −0.052 | −8.11*** | −0.003 | −1.85* |
| $NIA_{it}$ | +/− | 0.084 | 1.90* | −0.268 | −4.56*** | 0.058 | 3.37** | −0. 326 | −3.92*** |
| $NID_{it}$ | − | | | | | −0.011 | −10.56** | −0.008 | −11.84*** |
| $NIA_{it} \times NID_{it}$ | + | | | | | 0.584 | 5.77** | 0.409 | 9.81*** |
| $CAP_{it}$ | + | 0.080 | 4.65*** | 0.110 | 2.97*** | 0.005 | 4.61*** | 0. 138 | 3.80*** |
| $RWA_{it}$ | + | 0.014 | 4.56*** | 0.001 | 1.98** | 0.032 | 9.38*** | 0.003 | 4.22*** |
| $SIZE_{it}$ | + | 0.002 | 7.57*** | 0.001 | 1.98** | 0.002 | 6.98*** | 0.001 | 2.43** |
| $\Delta STDEQ_{it+1}$ | + | 0.003 | 4.22*** | 0.002 | 4.53*** | 0.002 | 3.89*** | 0.004 | 6.90*** |
| $\Delta L_{it+1}$ | − | −0.029 | −2.84*** | −0.003 | −2.36** | −0.021 | −9.18*** | −0.001 | −2.08** |
| $\Delta RL_{it+1}$ | + | 0.001 | 2.79*** | 0.001 | 4.59*** | 0.002 | 3.06*** | 0.004 | 2.69*** |
| Year fixed effects | | Yes | | Yes | | Yes | | Yes | |
| Adjusted $R^2$ | | 44.59% | | 54.75% | | 46.78% | | 55.62% | |
| *n* | | 2,005[1] | | 2,314 | | 2,005[1] | | 2,314 | |

***, **, and * represent 1%, 5% and 10% significance, respectively.
Significance is one-tailed unless the sign of the coefficient is indeterminate.
Standard errors are adjusted for correlation across firms and years.
$LLP_{it+1}$ = loan loss provisions to average assets, for firm i at year $t+1$, $CAP_t$ = the ratio of tier 1 capital, adjusted for allowance for loan losses, to total assets. $RWA_{it}$ = the ratio of risk-weighted assets, adjusted for allowance for loan losses, to total assets. $NID_{it}$ = dummy variable that equals 1 if the BHC has an above-median net income before extraordinary items, taxes and loan loss provisions to assets and zero otherwise. $SIZE_{it}$ = natural log of total assets. $NIA_{it}$ = the ratio of net income before extraordinary items, taxes and loan loss provisions to average assets. $\Delta STDEQ_{it+1}$ = change in the standard deviation of annualized daily equity returns. $\Delta L_{it+1}$ = change in loans outstanding to total assets. $\Delta RL_{it+1}$ = change in 100% risk-weighted loans to total assets.
[1] The total number of observations is reduced after dropping 370 observations pertaining to the recessionary year of 2001 to better reflect the pre-crisis boom period of 2002–2006.

capital ratios. This finding is beyond the scope of this paper and thus prompts further analysis.

To check the robustness of results to different regulatory capital triggers, I use an alternative capital ratio set by the FDIC of 6% for banks to be considered well capitalized. Unreported findings show no significant evidence that banks falling below such target are pressured to engage in income smoothing. This result is expected as the 6% trigger is not as binding and costly as the more stringent 4% target.

### *6.3. Evidence of provisioning behavior during pre-crisis boom and crisis period*

Column (i) in Table 5 shows that BHCs accelerate subsequent year provisions during the pre-crisis boom, as evident by the positive coefficient of $NIA_{it}$ 0.058. However, during the financial crisis period, BHCs tend to delay subsequent year loan loss provisions as shown by the negative coefficient of the interaction term, $NIA_{it} \times CRISIS_{it}$, −0.192. Collectively, the empirical results show that (i) accelerating loan loss provisions, for income smoothing purposes, is less pronounced during the crisis period of 2007–2009 than during the pre-crisis boom of 2002–2006 and (ii) the association between regulatory capital and loan loss provisioning is more pronounced during the financial crisis period than during the pre-crisis boom.

## 7. Conclusion

In the midst of the topical debate between bank regulators and accounting standard setting bodies, this paper examines evidence on the incentives to use the discretionary element inherent in loan loss provisions for capital management and income smoothing purposes.

Augmented by a slowing economy in the aftermath of the financial crisis in late 2007, bank regulators have shown great concern that the use of backward-looking loan loss provisions amplifies procyclicality of bank regulatory capital. Although forward looking judgmental factors are highly viewed by bank regulators, accounting standard setters and auditors are rather circumscribed to use too much judgment based on future events. The accounting standard setters' are concerned with transparency in documenting loan loss estimates to mitigate earnings and capital management concerns. However, the current model accounting for loan loss provisions is under great pressure and scrutiny to adapt to tough conditions dictated by the financial crisis.

Overall, this study documents evidence that: (i) loan loss provisions are significantly affected by income smoothing incentives, (ii) the effect of income smoothing on bank loan loss provisions is amplified when (1) banks hit the regulatory minimum target, and (2) are more profitable, (iii) banks have income smoothing incentives to delay the provisioning process during recessionary periods giving rise to procyclicality concerns, (iv) bank internally set capital targets are more significant triggers of capital management and income smoothing than the regulatory-set minimum ratios, and (vi) during the pre-crisis boom period, banks tend to accelerate provisioning to smooth income downward. On the other hand, during the financial crisis period, this association is less pronounced. Further research is needed to investigate whether banks behavior with respect to the use of provisioning for regulatory capital management and income smoothing is a matter of efficiency or opportunism.

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