
# Cyclicality of Loan Loss Provisioning in the U.S. Banking Industry: Evidence from the Period 1993–2007

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## Abstract

This paper studies the loan loss provisioning practices of U.S. banks over the 1993–2007 period using a large panel dataset. Our findings suggest that loan loss provisioning was pro-cyclical over the study period. We also show that banks, in general, increased loan loss provisions as their earnings rose. However, income smoothing was not practiced uniformly across the industry, and banks of different sizes and profitability levels tended to differ with respect to their loan loss provisioning and income smoothing behavior.

*Keywords:* Cyclicality, provision for loan losses, income smoothing, commercial banks, thrifts

## Introduction

This paper investigates the loan loss provisioning behavior in the U.S. banking industry starting from the period of the 1990s boom through the onset of the financial crisis of 2008. Studies on earnings management practices of U.S. banks in general provide evidence that banks smooth their earnings by using provision for loan losses, a non-cash expense recorded periodically by banks in order to maintain adequate loan loss reverses. The high degree of discretion provided by generally accepted accounting principles (GAAP) to bank managers in determining loan loss provisions and the significant impact of this large expense on reported net income play a major role in making earnings management more common in the banking industry.

There are conflicting views on the implications of banks smoothing their income over the business cycle. Securities regulators tend to take the view that income smoothing reduces the quality of earnings by misleadingly shifting earnings between periods. On the other hand, bank regulators are inclined to see income smoothing as a counter-cyclical form of loan loss provisioning, since building up surplus loan loss reserves during expansion years enables banking institutions to absorb more unexpected losses and not to scale back lending during economic downturns. As a result, this counter-cyclical nature of income smoothing lessens the intensity of business cycles and output volatility. In a 2009 speech, John C. Dugan, then the Comptroller of the Currency, argued that the banking industry's loan loss provisioning practices were highly pro-cyclical throughout the expansion years of early- and mid-2000s; therefore, the industry entered the financial crisis of 2008 with acutely low levels of reserves. Dugan also cited the "incurred loss" approach of loan loss provisioning favored by the Securities and Exchange Commission (SEC) as one of the leading factors that caused this pro-cyclical behavior, which arguably ultimately prolonged and worsened the effects of the ensuing downturn.

In this paper, we examine the loan loss provisioning practices of U.S. banks over the period from 1993 through 2007, covering two expansions and one contraction of the economy. Our approach is three-fold. First, we test whether loan loss provisioning was pro-cyclical over the study period. Second, we test whether possible smoothing of earnings by banks, in general, had a mitigating effect on pro-cyclicality of loan loss provisioning. Lastly, we test whether banks of different sizes and profitability levels pursued different income smoothing strategies using loan loss provisions. Utilizing a large panel dataset, we find a negative relation between loan loss provisions and GDP growth, suggesting pro-cyclical loan loss provisioning. We also find that banking institutions, in general, increased loan loss provisions as their earnings increased. However, income smoothing was not practiced uniformly across the industry since the size and profitability of banks impacted their loan loss provisioning and income smoothing practices during the 1993–2007 period.

The paper is organized into four sections. Section 2 provides a description of the related literature and proposes our hypothesis; Section 3 describes our dataset, research design, and presents empirical results; and Section 4 summarizes and concludes the paper.

## Literature Review and Hypothesis Development

### Income Smoothing and Cyclicality of Loan Loss Provisioning

According to Healy and Wahlen, "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (1999, p. 368). Earnings management is a rather common practice in various industries. It may take a number of different forms and managers may have several different motivations to manage their firms' reported earnings. In this regard, Healy and Wahlen (1999) provide an extensive review of earnings management literature, including managerial incentives for managing earnings.

Most of the studies on earnings management practices in the banking industry provide evidence that banks do manage their earnings. One may ask why earnings management in general, and income smoothing in particular, are typically more prevalent in the banking industry than in other industries. Greenawalt and Sinkey Jr. (1988) respond to this question by suggesting that the banking industry is more susceptible to window-dressing of reported earnings because of the broad managerial discretion over loan loss provisioning, which some managers may use for reasons other than improving the quality of financial reporting.

In the banking industry, earnings management is typically conducted through loan loss provisions, a large, non-cash expense that has a significant impact on both the balance sheet and the income statement. Ahmed et al. (1999) report that the median ratio of provision for loan losses to earnings before provisions and taxes is 19% in a sample of banking institutions they analyzed. Earnings management in the banking industry often takes the form of income smoothing, a practice Fudenberg and Tirole describes as "the process of manipulating the time profile of earnings or earnings reports to make the reported income stream less variable, while not increasing reported earnings over the long run" (1995, p. 75). In accordance with their potential objectives, managers may smooth income downward by overestimating provisions or smooth it upward by underestimating provisions. Additionally, when it comes to the driving force behind income smoothing, Greenawalt and Sinkey Jr. (1988) explain that bank managers may be motivated by a number of factors, including altering the risk perception of their institutions; complying with regulatory capital constraints and accounting standards; adhering to a stated dividend policy; and meeting performance targets tied to management compensation packages and bonus plans.

Income smoothing, in a sense, is a counter-cyclical form of loan loss provisioning since building up large loan loss reserves during boom years checks the rapid rise in bank credit and dampens the overheating of the economy. In addition, equipped with surplus reserves, banks are better-positioned to absorb loan losses and continue lending during bad years, which, in effect, lessens the negative impact of the economic downturn. Consequently, because of its counter-cyclical nature, income smoothing diminishes the intensity of macroeconomic ups and downs. This counter-cyclical form of provisioning is understandably viewed favorably by bank regulators whose primary responsibility is ensuring the safety and soundness of the banking system. On the other hand, such an approach to loan loss provisioning is at odds with the SEC's perspective and implementation of financial reporting rules, which prioritize the proper functioning of the securities industry.

In a March 2009 speech titled "Loan Loss Provisioning and Pro-cyclicality" before the Institute of International Bankers, John C. Dugan, then the Comptroller of the Currency, argued that loan loss provisioning was highly pro-cyclical during periods before and after the 2008 financial crisis. According to Dugan (2009), the industrywide loan loss reserves were grossly inadequate at the onset the financial crisis, even though the banking industry as a whole experienced record levels of profitability during the years leading up to the crisis. Banks in general failed to strengthen their loan loss reserves for the downturn in the business cycle and the subsequent hike in credit defaults, despite the widespread acknowledgement that expansion years were drawing to a close. Dugan (2009) cites the "incurred loss" approach of loan loss provisioning as the fundamental factor causing pro-cyclicality, which ultimately magnified the effects of the already severe financial and economic crises. Under current accounting standards, banks are permitted to record reserves against a loan loss, only if the loss is probable and the loss amount can be reasonably estimated. As a result, in the pre-crisis period, banks were not able to incorporate enough forward-looking factors in determining the level of reserves, but instead had to rely on historical loan loss trends which inevitably became less and less relevant as the economic expansion continued.

Dugan's (2009) arguments are likely to reflect the general view among U.S. as well as international bank regulators who point out the long-term macroeconomic benefits of a counter-cyclical loan loss provisioning approach. His remarks also highlight the tension between bank regulators and securities regulators. Wall and Koch (2000) provide a detailed review of different regulatory approaches on bank loan-loss accounting. They point out that bank regulators tend to prefer more conservative and future-oriented loan loss provisioning procedures since such an approach is more compatible with their regulatory mandates of promoting the safety of the banking system. In this respect, bank regulators do not necessarily support the view that building up extra loan-loss reserves during good years in order to absorb increased unexpected losses during downturns constitutes earnings management, given that most bad loans are originated during good economic times. In contrast, a banking sector entering into a recessionary period with sufficient reserves is more likely to continue lending which, in effect, may prevent a credit crunch and enable a faster recovery. Securities regulators on the other hand, take the opposite view, arguing that accounting standards should primarily serve the needs of general-purpose users, such as securities investors.

A limited number of studies analyze the loan loss provisioning and earning management behavior of banks over the 1990s, a period that encompasses a full business cycle in the United States (i.e., the economic downturn of the early 1990s through the boom years of the second half of the 1990s). These studies mostly show that banks tended to smooth their earnings over the period and provide evidence regarding the cyclicality of banks' provisioning behavior. Handorf and Zhu (2006) find that, over the period from 1990 to 1999, U.S. banking institutions of different sizes had different loan loss provisioning practices throughout the business cycle. Average-sized banks (defined as institutions with assets between $200 million and $10 billion) generally overstated loan loss provisions during expansions and understated them in downturns, suggesting that their provisioning was either forward-looking (i.e., counter-cyclical) or they used provisioning to smooth earnings. On the contrary, small banks (those with total assets ranging from $25 million to $200 million) and large banks (those with assets of more than $10 billion) exhibited a backward-looking or pro-cyclical pattern in loan loss provisioning. Handorf and Zhu hypothesize that small banks may have been following a pro-cyclical approach in loan loss provisioning since they tend

to lack sophisticated credit risk management tools. On the other hand, large banks' provisioning may have been pro-cyclical because they tend to perceive themselves as "too big to fail" therefore, behave less prudently in their credit risk management; are less concerned about capital shortages during economic downturns; and have to more closely comply with the SEC's financial reporting rules promoting pro-cyclicality.

Bikker and Metzemakers (2005) observe the relationship between loan loss provisioning behavior and business cycles over the period from 1991 to 2001. They show that U.S. banks provisioned more when the GDP growth declined, suggesting that banks' provisioning behavior was pro-cyclical throughout the period. They also find a positive relationship between provisions and earnings, indicating earnings management by banks by using loan loss provisions. Thus, Bikker and Metzemakers (2005) conclude that pro-cyclicality of bank provisioning was mitigated through banks' income smoothing practices. Similarly, Laeven and Majnoni (2003) study the period of 1988-1999 and show that U.S. banks increased their loan loss provisions when the economic activity slowed down (indicating pro-cyclicality), yet provisioned more when earnings were high, suggesting the weakening impact of earnings management on the pro-cyclicality of loan loss provisioning. Liu and Ryan (2006) provide evidence that over the boom period of the 1990s profitable banks managed their income downward by overstating loan loss provisions. According to Liu and Ryan (2006), in an attempt to obscure their income smoothing activities, managers accelerated both loan charge-offs and recoveries of charged-off loans (subsequently recording further charge-offs). In a more recent study, Beatty and Liao (2011) examine the effect of delays in loan loss recognition on banks' lending behavior over the time period from 1993 to 2009, covering two U.S. business cycles. They find that banks with smaller loss recognition delays (indicating a less strict adherence to the "incurred loss" approach) reduced their lending less during economic downturns than banks with greater delays, suggesting the lending of the former was less pro-cyclical than the lending of the latter.

**Hypothesis Development**

In the United States, the 1990s saw the longest period of economic expansion in the post-Great-Depression era, when the average annual real gross domestic product (GDP) growth neared four percent over the period. The 120-month expansion was brought to an end in 2001 by the collapse of the dot-com bubble and the September 11th attacks, and was followed by a mild and short recession. Throughout the period from the end of the 2001 recession (which lasted from March through November 2001) until the onset of the 2008 financial crisis, the U.S. economy was also fairly robust, and the real GDP growth averaged about three percent annually over the five-year period from 2002 through 2006. Under favorable economic conditions of the 1990s and mid-2000s, the profitability of the banking institutions increased rapidly. Banks also steadily lowered their loan loss provisions, particularly in the latter expansion period which ultimately left the industry with significantly diminished reserves of provisions at the onset of the 2008 crisis. Figure 1 below shows year-end, aggregate pretax return on assets and loan loss provision to assets for all U.S. banking institutions, along with the annual real GDP growth from 1992 through 2007.

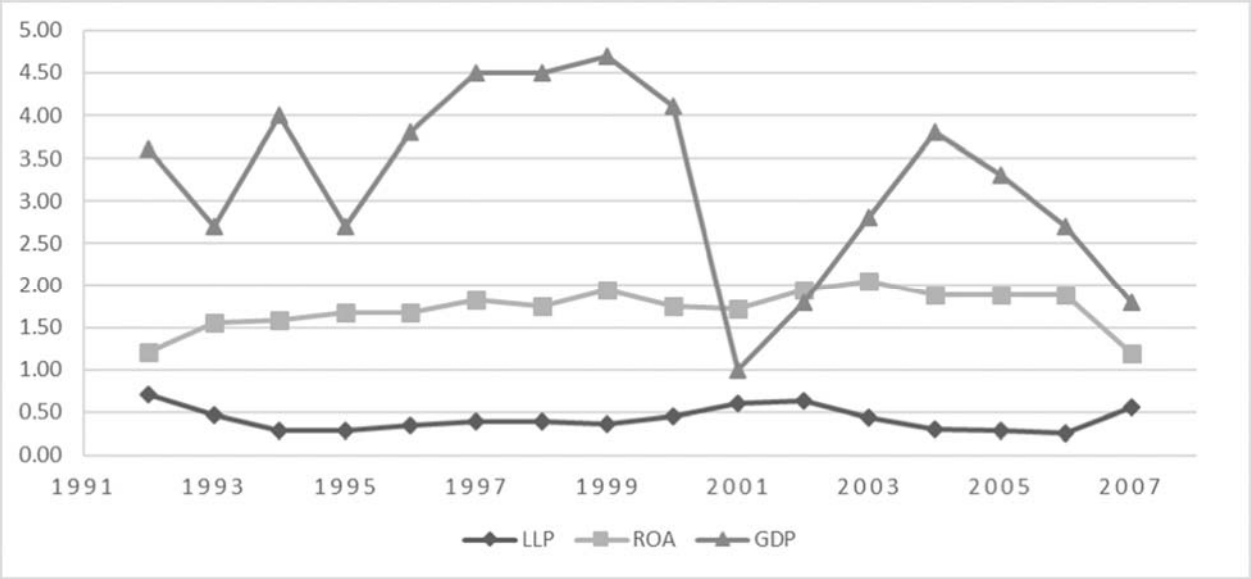


*Figure 1.* Aggregate pretax return on assets (ROA), loan loss provision to assets (LLP), and real GDP growth between 1992 and 2007.
Note: All numbers are in percentages. The Federal Deposit Insurance Corporation.

This paper studies the loan loss provisioning practices of U.S. banks over the period from the 1990s expansion through the onset of the financial crisis of 2008, covering two expansions and one contraction of the economy. Our approach is three-fold. First, we test whether loan loss provisioning was pro-cyclical over the study period. Second, we test whether possible earnings management behavior by banks, in general, had a counter-effect on the pro-cyclicality of loan loss provisioning, as the findings of Bikker and Metzemakers (2005), and Laeven and Majnoni (2003) suggest. Third, we test whether banks of different characteristics followed different loan loss provisioning approaches. We expect our findings to reflect the pro-cyclical nature of loan loss provisioning, particularly in the pre-2008 crisis period as argued by Dugan (2009). However, we do not expect provisioning practices to be uniform across the entire banking industry. Instead, we hypothesize that banks of different sizes and profitability levels differ in their loan loss provisioning practices, as argued by Handorf and Zhu (2006), Liu and Ryan (2006), and Dolar and Drickey (2017).

## Data, Methodology, and Results

### Dataset

We formed our sample of banks using the Reports of Condition and Income (Call Reports) from the period from 1992 to 2007. Call Reports provide demographic and financial information on all U.S. banking institutions (i.e., commercial banks and thrifts) insured by the Federal Deposit Insurance Corporation (FDIC). Our balanced panel dataset includes banks that had been active over the 15-year period from 1993 to 2007, inclusively. Our study period captures the years from the 1990s expansion, the 2001 recession, and the early 2000s expansion. After outliers are excluded, we are left with a total of 84,555 observations from 5,637 institutions in our sample. The predicted variable, percentage of provision for loan and lease losses to total loans and leases, is

winsorized at the top and bottom one-percentiles.

**Variables and A Priori Expectations**

Table 1 below describes our regression variables. Descriptive statistics are given in Table 2, also below. The data are annual as of December 31 and all continuous variables (except the GDP growth rate and the risk-based capital ratio) are scaled by total loans and leases. The dependent variable LLP is provision for loan and lease losses. We include GDPGRWTH, the annual real GDP growth rate, to test the hypothesis that loan loss provisioning was pro-cyclical (i.e., banks provision less when the GDP growth increases) throughout the study period. The other key explanatory variable EARNINGS, defined as net income before taxes and provision for loan and lease losses, is included to test possible income smoothing behavior (i.e., whether banks provision more when their earnings increase) in the banking industry.

| Variable | Description |
|---|---|
| LLP | Provision for loan and lease losses to total loans and leases (%) |
| GDPGRWTH | Annual real GDP growth rate (%) |
| EARNINGS | Net income before taxes and provision for loan and lease losses to total loans and leases (%) |
| COMBNK | Dummy variable for community banks |
| MIDBNK | Dummy variable for mid-size banks |
| LARBNK | Dummy variable for large banks |
| SLARBANK | Dummy variable for super-large banks |
| HIGHROA | Dummy variable for banks with above-median pre-tax return on assets |
| CHARGE | Net loan charge-offs to total loans and leases (%) |
| ALL | Lagged allowance for loan and lease losses to total loans and leases (%) |
| NONCURR | Lagged other real estate owned plus noncurrent loans and leases to total loans and leases (%) |
| ΔNONCURR | Change in NONCUR between the current and previous periods (% points) |
| SECGNLS | Realized securities gains and losses to total loans and leases (%) |
| CAPITAL | Tier-one capital plus tier-two capital to total risk-weighted assets (%) |

*Table 1.* Description of Variables

| | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| LLP | 0.2578 | 0.3375 | -0.4392 | 2.9842 |
| GDPGRWTH | 3.2067 | 1.0742 | 1 | 4.7 |
| EARNINGS | 2.7270 | 38.6323 | -11,200 | 119.72 |
| COMBNK | 0.9425 | 0.2328 | 0 | 1 |
| EARNINGS x COMBNK | 2.6536 | 2.7510 | -516 | 119.72 |
| MIDBNK | 0.0205 | 0.1417 | 0 | 1 |
| EARNINGS x MIDBNK | 0.0650 | 0.8532 | -176.17 | 34.370 |
| LARBNK | 0.0058 | 0.0761 | 0 | 1 |
| EARNINGS x LARBNK | 0.0175 | 0.2698 | -25.196 | 10.604 |
| SLARBANK | 0.0022 | 0.0470 | 0 | 1 |
| EARNINGS x SLARBANK | 0.0091 | 0.2677 | -4.1915 | 30.353 |
| HIGHROA | 0.5000 | 0.5000 | 0 | 1 |
| EARNINGS x HIGHROA | 1.8711 | 2.4909 | 0 | 119.72 |
| CHARGE | 0.1875 | 0.3360 | -3.2184 | 5.3639 |
| ALL | 1.3430 | 0.7617 | 0 | 36.552 |
| NONCURR | 1.2543 | 1.5998 | -2.3063 | 36.023 |
| ΔNONCURR | -0.0523 | 1.0969 | -20.547 | 17.504 |
| SECGNLS | 0.0515 | 0.6285 | -18.276 | 58.397 |
| CAPITAL | 18.734 | 13.455 | 0 | 1901.1 |
| EARNINGS x CAPITAL | 17.761 | 12,707 | -3,693,459 | 77,913 |
| N | 84,555 | | | |

*Table 2*. Descriptive Statistics

We hypothesize that banks of different sizes and profitability levels are likely to have different loan loss provisioning practices. In this regard, we group banking institutions into size (based primarily on total assets) and profitability categories. The size dummy variables COMBNK, MIDBNK, LARBNK, and SLARBANK denote, respectively, community banks, mid-size banks, large banks, and super-large banks. For community banks, we use the definition developed by the FDIC for research purposes. The FDIC developed a new research definition of the community bank in 2012, which uses extensive financial data beyond size as well as non-financial, demographic information. This definition first excludes any institution, regardless of the amount of their total assets, if they have: no loans or no core deposits; foreign assets greater than 10% of total assets; and more than 50% of assets in certain specialty banking areas (e.g. credit card or industrial loans). Of the remaining banking institutions, the ones with total assets less than $1 billion (in 2010 dollars) are designated as community banks. The FDIC also designates institutions with total assets more than $1 billion if they meet the following criteria: have loan to assets ratio and core deposits to assets ratio above 33% and 50%, respectively; operate more than one office but no more than the 75 offices (as of 2010); operate offices in no more than three states and two large metropolitan statistical areas; and do not operate any single office with deposits more than $5 billion (in 2010 dollars).

Mid-size banks are those with total assets between $1 billion to $10 billion. Large banks have total assets in the $10 billion to $50 billion range. Super-large banks are institutions with more than $50 billion in total assets. The consumer price index (CPI) deflator was used to convert banks' total assets into constant 2007 dollars. Each of these dummy variables take the value of 1 when the observed institution falls into the appropriate category and 0 otherwise. The omitted base group consists of banks with total assets of less than $1 billion, yet not classified as community banks by the FDIC. In order to test whether the size of a bank affects its loan loss provisioning behavior, we interact the size dummy variables with EARNINGS. The dummy variable

HIGHROA, which we adopted from Liu and Ryan (2006), takes the value of 1 for institutions with an above-median pretax return on assets and 0 otherwise. Interacting HIGHROA with EARNINGS enables us to test whether profitability has an impact on banks' provisioning practices.

We also include six control variables which are commonly used in similar studies including Dolar and Drickey (2017); Kanagaretnam, Lobo, & Yang (2004); Kanagaretnam, Lobo, & Mathieu (2003); Ahmed et al. (1999); Beatty and Harris (1999); Kim and Kross (1998); Beaver and Engel (1996); and Wahlen (1994). The first four of these variables (CHARGE, ALL, NONCURR, and ΔNONCURR) control for the nondiscretionary component of banks' loan loss provisions, that is determinants of provisioning over which bank managers are not able to exert significant discretion. CHARGE denotes net loan charge-offs. We expect a positive relationship between CHARGE and the dependent variable, assuming that a bank has to record more provisions as its net loan charge-offs increase, *ceteris paribus*. ALL is the lagged (i.e., beginning-of-year) allowance for loan and lease losses. The coefficient on ALL would be expected to be negative, on the assumption that a bank needs to record smaller loan loss provisions during the year, if it starts the year with a large reserve of provisions, *ceteris paribus*. NONCURR is defined as the lagged (i.e., beginning-of-year) other real estate owned plus noncurrent loans and leases. ΔNONCURR denotes the change in NONCURR between the current and previous periods (measured in percentage points). Holding other factors constant, the coefficients on NONCURR and ΔNONCURR should be positive, as a bank would be expected to increase its loan loss provisions if it holds a large amount of noncurrent loans and/or faces an increase in noncurrent loans.

The variables SECGNLS and CAPITAL denote realized securities gains and losses, and risk-based capital ratio, respectively. Banks may use securities gains and losses as an alternative method of income smoothing, by timing the realization of gains and losses on securities (Kanagaretnam et al. 2003). However, since securities gains and losses, and loan loss provisions can be used simultaneously or as alternatives to one another, the sign of the coefficient on SECGNLS is unclear, *a priori*. Prior research provides evidence that well-capitalized banks are subject to less regulatory oversight and scrutiny than their less well-capitalized counterparts (Kim and Kross 1998). Assuming that less strict regulatory supervision renders well-capitalized banks more likely to smooth their earnings through loan loss provisions, we expect a positive sign on the coefficient of the interaction variable EARNINGS x CAPITAL, *ceteris paribus* (we test this hypothesis in only one of our specifications shown in the next section). Finally, we enter dummy variables for years 1994 through 2007, inclusively to capture the year-specific fixed effects. The base year includes observations from 1993.

**Model Specifications**

We use three different specifications of an Arellano-Bond dynamic panel-data model with generalized method of moments (GMM) errors to study the loan loss provisioning practices of U.S. banks over the 15-year period from 1993 to 2007. We use the Arellano-Bond GMM estimators since it is likely that the variables CHARGE and ALL behave as a lag of the dependent variable, thus potentially create endogeneity. In the first specification, we test whether loan loss provisioning was pro-cyclical in the banking industry (by including GDPGRWTH), and whether banks, in general, managed their reported earnings (by including EARNINGS). The regression model is of the following general form: $Y = b_0 + b_1\text{GDPGRWTH} + b_2\text{EARNINGS} + b_3\text{CHARGE} + b_4\text{ALL} + b_5\text{NONCURR} + b_6\Delta\text{NONCURR} + b_7\text{SECGNLS} + b_8\text{CAPITAL} +$

$b_9$EARNINGS x CAPITAL + α + ε (1)

We use the next specification to test the possible effects of institution size on loan loss provisioning by interacting each of the size dummy variables (COMBNK, MIDBNK, LARBNK, and SLARBANK) and with EARNINGS. The specification takes the following general form: Y = $b_0$ + $b_1$EARNINGS + $b_2$Size Dummy + $b_3$EARNINGS x Size Dummy + $b_4$CHARGE + $b_5$ALL + $b_6$NONCURR + $b_7$ΔNONCURR + $b_8$SECGNLS + α + ε (2)

The last specification tests the possible effects of profitability on income smoothing behavior of banks by interacting HIGHROA with EARNINGS, and it takes the following form: Y = $b_0$ + $b_1$EARNINGS + $b_2$HIGHROA + $b_3$EARNINGS x HIGHROA + $b_4$CHARGE + $b_5$ALL + $b_6$NONCURR + $b_7$ΔNONCURR + $b_8$SECGNLS + α + ε (3)

In all of the above regressions, α is the bank-specific fixed effect which contains all factors that do not vary over time, and ε is the idiosyncratic error term. Also, all regressions include year dummy variables (not reported) to control for time-specific effects, with the year 1993 as the base.

**Regression Results**

The regression results generated by the estimated Arellano-Bond dynamic panel-data model are reported in Tables 3, 4, and 5 below. We also estimated above specifications using a fixed effects model with robust standard errors. We did not observe any appreciable changes in signs and statistical significance of the estimated coefficients, and the results were generally similar to those presented in Tables 3 through 5. All estimated regressions are statistically significant at the 1% level. Table 3 reports findings from the first specification where we test the pro-cyclicality of loan loss provisioning and the possible practice of income smoothing in the banking industry. The coefficients on GDPGRWTH are negative and statistically significant at the 1% level in both regressions (where GDPGRWTH is included by itself or with EARNINGS). The negative relation between loan loss provisions and the GDP growth suggests that banks did not build up extra loan-loss reserves as the economy expanded, but instead tended to reduce provisions. This finding is consistent with the hypothesis that loan loss provisioning was pro-cyclical during the 1993–2007 period this study covers. The coefficients on EARNINGS have the expected positive and significant signs (at the 1% level) in both regressions (where EARNINGS is included by itself or with GDPGRWTH), indicating that banking institutions, in general, increased loan loss provisions as their earnings rose. This finding lends support to the income smoothing hypothesis and gives an indication of income smoothing's counter-effect on the pro-cyclicality of loan loss provisioning.

| | Coef. | Z-stats | Coef. | Z-Stats | Coef. | Z-stats |
|---|---|---|---|---|---|---|
| GDPGRWTH | -0.00622 | -3.94*** | | | -0.00614 | -3.84*** |
| | 0.00158 | | | | 0.00160 | |
| EARNINGS | | | 0.00298 | 3.56*** | 0.00298 | 3.56*** |
| | | | 0.00084 | | 0.00084 | |
| CHARGE | 0.61491 | 25.9*** | 0.63531 | 26.8*** | 0.63531 | 26.8*** |
| | 0.02379 | | 0.02371 | | 0.02371 | |
| ALL | -0.05435 | -15.5*** | -0.05760 | -16.4*** | -0.05760 | -16.4*** |
| | 0.00351 | | 0.00352 | | 0.00352 | |
| NONCURR | 0.00939 | 4.23*** | 0.00837 | 3.78*** | 0.00837 | 3.78*** |
| | 0.00222 | | 0.00222 | | 0.00222 | |
| ΔNONCURR | 0.02517 | 19.1*** | 0.02466 | 18.7*** | 0.02466 | 18.7*** |
| | 0.00132 | | 0.00132 | | 0.00132 | |
| SECGNLS | 0.01090 | 4.42*** | 0.00823 | 3.23*** | 0.00823 | 3.23*** |
| | 0.00247 | | 0.00255 | | 0.00255 | |
| CAPITAL | | | 0.00044 | 2.63*** | 0.00044 | 2.63*** |
| | | | 0.00017 | | 0.00017 | |
| EARNINGS x CAPITAL | | | -0.00001 | -3.53*** | -0.00001 | -3.53*** |
| | | | 0.00000 | | 0.00000 | |
| Intercept | 0.18599 | 30.4*** | 0.14843 | 20.0*** | 0.17301 | 24.7*** |
| | 0.00613 | | 0.00741 | | 0.00701 | |
| Wald chi-square | 19,639*** | | 19,873*** | | 19,873*** | |
| N | 73,281 | | 73,281 | | 73,281 | |
| # of groups | 5,637 | | 5,637 | | 5,637 | |
| # of instruments | 290 | | 293 | | 293 | |

*Table 3.* Regression of loan loss provisions on reported earnings and GDP growth rate.
Note: Standard errors are reported in italics beneath the estimated coefficients. ***, **, and * denote 1%, 5% and 10% significance, respectively.

| | Coef. | Z-stats | Coef. | Z-stats | Coef. | Z-stats | Coef. | Z-stats |
|---|---|---|---|---|---|---|---|---|
| EARNINGS | 0.00002 | 1.07 | 0.00003 | 1.21 | 0.00003 | 1.21 | 0.00003 | 1.21 |
| | 0.00002 | | 0.00002 | | 0.00002 | | | |
| COMBNK | -0.00505 | -0.38 | | | | | 0.00002 | |
| | 0.01241 | | | | | | | |
| EARNINGS x COMBNK | 0.00831 | 8.57*** | | | | | | |
| | 0.00097 | | | | | | | |
| MIDBNK | | | -0.01189 | -0.75 | | | | |
| | | | 0.01593 | | | | | |
| EARNINGS x MIDBNK | | | 0.00017 | 0.13 | | | | |
| | | | 0.00131 | | | | | |
| LARBNK | | | | | -0.07498 | -1.88* | | |
| | | | | | 0.03979 | | | |
| EARNINGS x LARBNK | | | | | 0.00327 | 0.42 | | |
| | | | | | 0.00782 | | | |
| SLARBANK | | | | | | | 0.15037 | 2.17** |
| | | | | | | | 0.06946 | |
| EARNINGS x SLARBANK | | | | | | | -0.02781 | -2.56*** |
| | | | | | | | 0.01087 | |
| CHARGE | 0.61886 | 26.2*** | 0.61314 | 25.8*** | 0.61523 | 25.9*** | 0.61579 | 25.9*** |
| | 0.02364 | | 0.02381 | | 0.02379 | | 0.02379 | |
| ALL | -0.05851 | -16.6*** | -0.05437 | -15.5*** | -0.05436 | -15.5*** | -0.05444 | -15.5*** |
| | 0.00354 | | 0.00351 | | 0.00351 | | 0.00352 | |
| NONCURR | 0.00983 | 4.43*** | 0.00954 | 4.30*** | 0.00939 | 4.23*** | 0.00934 | 4.21*** |
| | 0.00222 | | 0.00222 | | 0.00222 | | 0.00222 | |
| ΔNONCURR | 0.02538 | 19.2*** | 0.02525 | 19.1*** | 0.02517 | 19.1*** | 0.02514 | 19.1*** |
| | 0.00132 | | 0.00132 | | 0.00132 | | 0.00132 | |
| SECGNLS | 0.00420 | 1.63 | 0.01088 | 4.41*** | 0.01090 | 4.42*** | 0.01102 | 4.46*** |
| | 0.00258 | | 0.00247 | | 0.00247 | | 0.00247 | |
| Intercept | 0.14594 | 10.5*** | 0.16110 | 27.4*** | 0.16123 | 27.5*** | 0.16108 | 27.4*** |
| | 0.01393 | | 0.00587 | | 0.00587 | | 0.00588 | |
| Wald chi-square | 19,965*** | | 19,639*** | | 19,646*** | | 19,653*** | |
| N | 73,281 | | 73,281 | | 73,281 | | 73,281 | |
| # of groups | 5,637 | | 5,637 | | 5,637 | | 5,637 | |
| # of instruments | 293 | | 293 | | 293 | | 293 | |

*Table 4.* Regression of loan loss provisions on reported earnings of banks of different sizes.
Note: Standard errors are reported in italics beneath the estimated coefficients. ***, **, and * denote 1%, 5% and 10% significance, respectively.

| | Coefficient | Z-stats |
|---|---|---|
| EARNINGS | 0.00003 | 1.27 |
| | 0.00002 | |
| HIGHROA | -0.09743 | -17.3*** |
| | 0.00564 | |
| EARNINGS x HIGHROA | 0.00699 | 6.21*** |
| | 0.00113 | |
| CHARGE | 0.57771 | 24.0*** |
| | 0.02405 | |
| ALL | -0.05450 | -15.4*** |
| | 0.00354 | |
| NONCURR | 0.00897 | 4.20*** |
| | 0.00213 | |
| ΔNONCURR | 0.02434 | 19.1*** |
| | 0.00127 | |
| SECGNLS | 0.01112 | 4.26*** |
| | 0.00261 | |
| Intercept | 0.20410 | 33.8*** |
| | 0.00604 | |
| | | |
| Wald chi-square | 22,276*** | |
| N | 73,281 | |
| # of Groups | 5,637 | |
| # of Instruments | 293 | |

*Table 5.* Regression of loan loss provisions on reported earnings of banks with above-median pre-tax return on assets.
Note: Standard errors are reported in italics beneath the estimated coefficients. ***, **, and * denote 1%, 5% and 10% significance, respectively.

The results from Tables 4 and 5 are consistent with our hypothesis that banks differ in their loan loss provisioning practices, and hence in their income smoothing behavior. Table 4 shows the results from four different specifications where we alternatively interact one of the size dummy variables (i.e., COMBNK, MIDBNK, LARBNK, and SLARBANK) with EARNINGS, in order to observe each size category's loan loss provisioning practice relative to the rest of the sample. The findings provide some evidence indicating the association between loan loss provisioning and institution size. The coefficients on EARNINGS x COMBNK, EARNINGS x MIDBNK, and EARNINGS x LARBNK are all positive, yet only the first interaction variable's coefficient is significant at the 1% level. These results imply that community banks increased their loan loss provisions in response to rising earnings; they therefore smoothed their earnings by following a counter-cyclical provisioning approach. One plausible explanation is that since small banks tend to receive less regulatory scrutiny (particularly from securities regulators) relative to their larger counterparts, they may be more emboldened to smooth their income. On the contrary, the coefficient on EARNINGS x SLARBNK is negative and statistically significant at the 1% level, suggesting that super-large banks exhibited a pro-cyclical pattern in loan-loss provisioning and did not practice income smoothing over the study period. According to Handorf and Zhu (2006), large

banks may exhibit pro- cyclical loan loss provisioning behavior because they tend to perceive themselves as "too big to fail" (therefore, they are generally less concerned about not having adequate reserves when the economy enters into a recession); be able to draw on a broader range of financial instruments when economic conditions deteriorate; and more closely adhere to the SEC rules.

Results from the last model are shown in Table 5. The positive and statistically significant (at the 1% level) coefficient on HIGHROA x NETINC suggests that loan loss provisions of more profitable banks (i.e., institutions with above-median return on assets) increased more quickly with increasing earnings than those of less profitable banks over the study period. Thus, more profitable banks seem to have adopted a more aggressive (and counter- cyclical) income smoothing strategy by using a portion of their earnings to build up larger loan loss-reserves. Because financial markets put a premium on stable and steady reported earnings, whether in the form of lower cost of borrowing (particularly from non-deposit sources) or higher firm value (especially of publicly traded institutions), profitable institutions tend to have strong incentives to smooth income downward in order to lessen volatility. It is also conceivable that since the banking industry enjoyed rapidly rising profits during most of our study period, reserving earnings for the future might have been a more pressing concern than managing earnings upward.

In all estimated regressions, the coefficients on variables CHARGE, ALL, NONCURR, and ΔNONCURR (which control for the nondiscretionary component of loan loss provisioning) have the expected signs and are statistically significant at the 1% level. These results indicate that nondiscretionary determinants of loan loss provisions play a significant role in the provisioning process. The coefficients on SECGNLS are positive and statistically significant at the 1% level in all but one of the regressions, indicating that banks tended to use realized securities gains and losses as a complementary means of income smoothing, rather than as a substitute. Lastly, contrary to our expectations, the variable EARNINGS x CAPITAL has negative coefficients that are statistically significant at 1% the level, suggesting that well- capitalized banks were less likely to smooth earnings. Since banks with higher levels of capital are able to weather downturns more easily, these institutions may have been less concerned about adopting a pro-cyclical loan-loss provisioning approach.

## Conclusion

There are conflicting views regarding the effects of income smoothing by banks over the business cycle. On one hand, securities regulators argue that income smoothing reduces the quality of earnings since it enables banks to shift earnings between periods and therefore, distorts the true financial picture. On the other hand, bank regulators tend to have a favorable view of income smoothing, which, in a sense, is a counter-cyclical form of loan loss provisioning. Building up surplus loan loss reserves during good years puts banks in a better position to absorb unexpected losses and continue lending during bad years, which, in effect, diminishes the intensity of business cycles.

This paper examines the loan loss provisioning practices of U.S. banks from 1993 to 2007, by using a panel dataset of over 84,500 observations collected from 5,637 institutions that had been active over the 15-year study period. First, we test the hypothesis that loan loss provisioning was pro-cyclical over the study period. We also test the income smoothing hypothesis for the

overall banking industry. Lastly, we test whether the size and profitability influence banks' loan loss provisioning approaches. We find evidence consistent with pro- cyclical nature of loan loss provisioning over our study period. We also find that banks, in general, smoothed their earnings, however income smoothing was not practiced uniformly across the industry; banks of different sizes and profitability levels tended to differ with respect to their loan loss provisioning and income smoothing behavior throughout the study period.

This study has significant policy and economic implications. Our research contributes to the literature that studies the loan loss provisioning behavior in the U.S. banking industry. We focus our attention on a rather atypical 15-year period over which the U.S. economy mostly enjoyed robust growth and experienced a few significant setbacks, and the banking industry saw seismic structural changes along with rising levels of profitability. Our paper looks at loan loss provisioning of banks both at the overall industry and institution levels. More specifically, we aim to explain loan loss provisioning behavior as a function of business cycles, income smoothing, as well as the interaction between the two factors. Our findings seem to validate the former Comptroller of the Currency Dugan's (2009) arguments regarding the pro-cyclical nature of loan loss provisioning before the 2008 financial crisis. We further analyze the relationship between banks' loan loss provisioning practices and their reported earnings in the context of institution size and profitability, and find that loan loss provisioning behavior is affected by both factors over the research period. In this regard, we particularly aim to fill one significant gap in the literature by analyzing differences in income smoothing practices of large and small banks. As a result, this study may provide policy makers with further insight into this important topic and offer avenues for further research.

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