

# MANAGERIAL DISCRETION OVER LOAN LOSS RESERVES DURING THE GLOBAL FINANCIAL CRISIS

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## ABSTRACT

*I analyze loan loss reserves during the Global Financial Crises in the late 2000s. I develop a regression model that separates the loan loss reserve account into discretionary and nondiscretionary components. The nondiscretionary (expected) component is based on current, past due, restructured, and non-accrual loans. The discretionary reserves component is the residual from the regression model. This component measures both managerial misinformation and managerial miscalculations since it is unrelated to the quality of the loan portfolio. I find that loan quality decreased during the financial crisis as shown by an increase in lower quality loans (restructured, past due, and non-accrual loans). Managers also set aside more loan loss reserves during the financial crisis. This paper demonstrates that all of the increase in the loan loss reserve account is attributable to the nondiscretionary component of loan loss reserves. The discretionary reserves component actually decreased during the financial crises consistent with managers using their discretion to window-dress their balance sheets and improve outside perception of the banking industry financial condition.*

**JEL:** G01, G21, G34, M41

**KEYWORDS:** Loan Loss Reserves, Financial Crisis, Earnings Manipulation

## INTRODUCTION

The purpose of this paper is to analyze the loan loss reserve account in banks to provide evidence on whether managers used their influence over financial reporting to improve the perception of banks' financial strength during the global financial crisis of 2007-2010. The paper develops a model to separate loan loss reserves into discretionary and nondiscretionary components. One of the expected findings of this study is that past due loans, restructured loans, nonaccrual loans, and loan loss reserves all increase during the financial crisis. The surprising part of the study is that discretionary reserves—reserves unrelated to loans, past due loans, and restructured loans actually decreased during the financial crisis. This finding is consistent with managers using their influence over financial reporting to improve the public's perception of bank performance.

Understanding managerial behavior is a critical part of the analysis and interpretation of financial statements, evaluating firm and manager performance, and is essential to developing standards and best practices. The earnings management and managerial discretion literature is vast and is growing exponentially. Understanding managerial behavior during critical events such as the financial crisis is also of critical important. The financial crisis began with defaults of subprime mortgage loans but academics continue to demonstrate that its impact spread to accounts throughout banks. This paper extends the literature in several ways. Most importantly, the paper demonstrates that expected loan loss reserves based on fundamental loan categories increases during the financial crisis but the unexpected loan loss reserves—those where management has exercised their discretion beyond using fundamental accounts actually decreased during the financial crisis. This suggests that managers used their discretion to increase the perception of financial stability during the financial crisis.

This paper develops a model of loan loss reserves. Previous papers have been primarily concerned about earnings management and consequently have focused on the income statement and the loan loss provision account. Since nearly all banks reported low or negative earnings during the financial crisis, investors,

creditors, and regulators look primarily to the balance sheet to assess financial condition (see Ohlson 1995). During the financial crisis, it is more advantageous for managers to use their discretion over the loan loss reserves account if their goal is to improve the public's perception of the financial strength of banks. The sample used in this paper is more extensive as compared to many other papers. Researchers have primarily focused on large banks such as those carried in the Compustat database. This study examines all U.S. banks with more than \$1 million dollars in assets. The results are generalizable to a broader sample of banks as compared to other studies. The next section of the paper provides a review of the financial crisis and managerial discretion literature with a focus on managerial discretion in banks. Section three describes the methodology of the paper, the data used for the analysis, and the sample selection process. The next section presents and discusses the empirical results. The last section summarizes and concludes the paper.

## LITERATURE REVIEW

This paper fits into the academic literature in several areas. The paper examines managerial discretion during the financial crisis of 2007-2010. It relates to the financial crisis literature, the earnings management literature, and specifically it relates to the managerial discretion literature in the banking industry. The financial crisis of 2007-2010 has produced an intriguing environment for academics to analyze. A vast literature on these events is accumulating to describe what led to the crisis, what actions exacerbated its impact, and what could have mitigated the crisis. Demyanyk and Van Hemert (2011) show a pattern of deterioration in subprime mortgages leading up to the crisis. Gorton and Metrick (2009) explain that the crisis began in the subprime mortgage market and spread into the asset sales and repo market. Ivashina and Scharfstein (2010) argue that lending contracted substantially during the crisis. Craioveanu and Mercado-Mendez (2014) show a significant difference in unused loan commitments and deposits for failed and non-failed banks during the financial crisis. Cornett, McNutt, Strahan, and Tehranian (2011) argue that banks with core deposits were able to continue lending during the crisis but that liquidity dried up for banks with illiquid assets. Acharya and Mora (2012) examine deposits and interest rates during the financial crisis. For a substantial review of financial crises in general and the crisis of the late 2000s, see Gorton (2009).

Early research examining managerial incentives to manipulate financial statement information focuses on using accruals to manage earnings. Healy (1985) is possibly the earliest study suggesting that managers use accruals to manage earnings. He provides evidence consistent with managers using accruals to optimize their bonus compensation. McNichols and Wilson (1988) find that managers use the allowance for doubtful accounts to smooth earnings. DeAngelo (1986) examines earnings management around management buyouts. Healy and Wahlen (1999) provide an early summary of this literature. These early papers set in motion an avalanche of research into earnings management, which has subsequently branched into management of other financial statement information. A recent search of earnings management on SSRN produced 2,674 articles including 27 with 5,000 or more downloads. This area continues to generate considerable interest among academic researchers. Burgstahler and Eames (2006) demonstrate that firms manage earnings to achieve small positive earnings surprises. McVay (2006) finds that managers meet analyst forecasts by shifting expenses from core expenses to special items. Efendi, Srivastava, and Swanson (2007) find evidence consistent with managers misstating financial statements to increase their stock option compensation. Bowen, Rajgopal, and Venkatachalam (2008) argue that shareholders benefit from earnings management when it provides them a glimpse of the future. Schrand and Zechman (2012) argue that executives who initially overstate earnings begin to use their managerial discretion to keep earnings on a smoother trajectory.

The banking industry provides an intriguing environment to study managerial discretion. Bank managers need to meet not only the expectations of investors but also the requirements of bank regulators. These dual targets for bank managers have led academics to focus on managerial discretion over both earnings

and capital management. This literature has examined managerial discretion through loan loss provisions, gains and losses in asset sales, deferred taxes, and the timing of adoption of different accounting standards. Schrand and Wong (2003) find that the valuation allowance for deferred tax assets is positively associated with bank capital. Beatty, Chamberlain, and Magliolo (1995) and Collins, Shackelford, and Wahlen (1995) find evidence consistent with managers using gains and losses on asset sales to smooth earnings. Ramesh and Revsine (2000) find that bank managers timed the adoption of SFAS 106 and SFAS 109 in order to manage earnings and reduce regulatory costs. Beatty, Ke, and Petroni (2002) demonstrate that firms use discretion in the loan loss provision account to avoid earnings decreases. Most managerial discretion studies in the banking industry have focused on the loan loss provision account. The loan loss provision is an income statement account that should estimate the amount of expense the bank incurs during a specific accounting period because of anticipated non-payment of loans. It is the largest accrual in the banking industry. Researchers have used the loan loss provision account to examine managerial discretion to smooth earnings and to signal the private information of managers to investors.

Researchers have been fairly consistent in finding that managers use their discretion over the loan loss provision account to smooth earnings. Kanagaretnam, Matheiu, and Lobo (2003) and Kanagaretnam, Yang, and Lobo (2004) both find that bank managers smooth earnings using loan loss provisions—especially if earnings are extreme. Perez, Salas, and Salas-Fumas (2008) find that Spanish banks smooth earnings with loan loss provisions. Handorf and Zhu (2006) argue that only middle-sized banks smooth earnings. Bouvatier, Lepetit, and Strobel (2014) show that European commercial banks with concentrated ownership use discretionary loan loss provisions to smooth income. Gebhardt and Novotny-Farkas (2011) explain that managers' ability to smooth income is reduced under the new international accounting standard IAS 39. Ahmed, Takeda, and Thomas (1999) is the only study that I found suggesting that their evidence is inconsistent with earnings smoothing.

The evidence that managers use their discretion over the loan loss provision account to signal their private information to investors is mixed. Ahmed, Takeda, and Thomas (1999) find that managers use loan loss provisions to manage capital ratios but not for signaling. Kanagaretnam, Yang, and Lobo (2004) show that bank managers use the loan loss provision account to both signal and to smooth earnings. Kanagaretnam, Yang, and Lobo (2005) find that managers in smaller banks and in banks with greater earnings variability are better able to signal their private information. Kanagaretnam, Krishnan, and Lobo (2009) show that managers' ability to signal depends on the industry expertise of their auditors.

## **DATA AND METHODOLOGY**

Examining loan loss reserves during the financial crisis provides a particularly rich research environment to examine managerial behavior with respect to financial statements. First, managers had strong incentives to improve the perception of their banks financial strength during the financial crisis. Bank managers' compensation is often related to earnings and so managers will want to reduce the loan loss reserve account in order to increase bank earnings and thus compensation. More importantly, bank managers have strong incentives to ensure their bank appears sufficiently financially stable to preserve their own jobs since bank regulators have the authority to close banks if they believe capital is inadequate. Finally, any evidence that loan loss reserves have decreased is a particularly strong finding of managerial discretion over this account as the natural direction of loan loss reserves during the economic downturn and financial crisis is in the opposite direction of the predicted managerial discretion

First, I examine the quality of bank loan portfolios before, during, and after the financial crisis. It may seem obvious that loan portfolio quality decreases during economic downturns and financial crises. Nevertheless, I want to establish that these accounts are moving in the predicted directions and especially that the account that I will dissect later in the paper, the loan loss reserves account, is behaving as

expected during the financial crisis. The following four regressions test if the credit quality of the loan portfolio decreases during the financial crisis.

$$\text{ResLoans}_{it} = \delta_0 + \delta_1 \text{EarlyCrisis}_{it} + \delta_2 \text{LateCrisis}_{it} + \delta_3 \text{PostCrisis}_{it} + \varepsilon_{it} \quad (1)$$

$$\text{Loans90}_{it} = \delta_0 + \delta_1 \text{EarlyCrisis}_{it} + \delta_2 \text{LateCrisis}_{it} + \delta_3 \text{PostCrisis}_{it} + \varepsilon_{it} \quad (2)$$

$$\text{NALoans}_{it} = \delta_0 + \delta_1 \text{EarlyCrisis}_{it} + \delta_2 \text{LateCrisis}_{it} + \delta_3 \text{PostCrisis}_{it} + \varepsilon_{it} \quad (3)$$

$$\text{Reserves}_{it} = \delta_0 + \delta_1 \text{EarlyCrisis}_{it} + \delta_2 \text{LateCrisis}_{it} + \delta_3 \text{PostCrisis}_{it} + \varepsilon_{it} \quad (4)$$

The dependent variables are all proxies for loan quality or credit risk. The credit risk of the loan portfolio is measured by restructured loans (ResLoans), loans that are past due by more than 90 days (Loans90), and by non-accrual loans (NALoans). Non-accrual loans are loans where management is no longer accruing the interest on the loan and including that as part of income. They are generally more than 90 days past due. Loan loss reserves (Reserves) is the account of primary interest in this study and should be an unbiased estimate of the amount from the current loan portfolio that managers do not expect to collect.

The independent variables in the regressions are dummy variables to enable a test of difference in means for different periods. These variables are divided into four time periods. First, the intercept term represents the period from 1992 quarter 4 through 2007 quarter 2. The financial crisis is divided into an early crisis period and late crisis period. The beginning of the financial crisis (EarlyCrisis) represents 2007 quarter 3 to 2008 quarter 4. Financial stocks started trending downward during this period but the reality and extent of the financial crisis may not have been obvious to managers during this period. The later stages of the crisis (LateCrisis) is represented by the period from 2009 quarter 1 through 2010 quarter 2. During this time, the stock values of financial firms bottomed out and it was obvious to managers and everyone else that the world was in a financial crisis. The period from 2010 quarter 3 through 2013 quarter 2 represents the period after the financial crisis (PostCrisis).

The purpose of these regressions is to show that the credit quality of the loan portfolio decreased during the financial crisis. Positive coefficients on the early and late crisis periods for each of the regressions will demonstrate deterioration of loan quality during the financial crisis. The most interesting and the primary hypothesis of the paper is that managers will use their discretion to lower the loan loss reserve account during the financial crisis. Since the loan loss reserve account is a contra-asset account decreasing it will increase assets without any change in liabilities and will fortify banks' balance sheets. Lowering loan loss reserves will also trigger a decrease in the loan loss provision account and increase bank earnings. Overall loan loss reserves should be increasing dramatically during the financial crisis so the prediction that a component of loan loss reserves will decrease is unexpected. The testing of this prediction will need to overcome the natural direction of loan loss reserves in order to provide evidence of this type of managerial behavior.

This paper develops a model of loan loss reserves. Prior bank studies have focused on the loan loss provision account. Beaver and Engel (1996), Kim and Kross (1998), Kanagaretnam, Mathieu, and Lobo (2004), Kilic, Lobo, Ranasinghe, and Sivaramakrishnan (2013) and others develop models of loan loss provisions in order to separate that account into a discretionary and a nondiscretionary component. Beatty and Liao (2013) provide an extensive review of the empirical literature in the banking industry and point out that academics have not settled on a preferred model for loan loss provisions. They analyze the ability of the models to predict bank restatements of financial information. They find that models without charge off variables perform better in predicting extreme manipulations. The loan loss reserve account and the loan loss provision account are strongly related. The loan loss provision account is an income statement account that measures loan losses anticipated from loans made in the current period and changes in anticipated losses from loans made in previous periods. The loan loss reserve account is a

balance sheet account and is an estimate of all anticipated loan losses based on the current loan portfolio. The loan loss reserve account is the sum of all previous loan loss provision amounts minus the sum of all chargeoffs of specific loans.

In this study, I focus on loan loss reserves instead of the loan loss provisions for two reasons. First, I am focusing on managers' attempts to improve the appearance of their overall financial position. Since all banks had poor earnings during the financial crisis investors and regulators are more likely to focus on the balance sheet to estimate financial stability. Second, the loan loss reserve account is generally a more fundamental account. Frequently, managers first determine the loan loss reserve account. The loan loss provision amount is calculated directly from the loan loss reserve account. It is an adjustment to correct the loan loss reserve account from its previous balance to the new balance estimated by managers. I examine managerial discretion over loan loss reserves during the financial crisis. I hypothesize that during the financial crisis, managers intentionally underestimated the loan loss reserve account in order to improve client perception about bank financial security. In order to analyze this hypothesis, the loan loss reserve account must be separated into two components--a proxy for managerial discretion and a proxy for loan loss reserves that represents the unbiased estimate of managers' expectations of future nonpayments. I use the following regression model to separate loan loss reserves into discretionary and nondiscretionary components. The fitted value from the regression is the proxy for the nondiscretionary component of loan loss reserves. The residual from the regression is the proxy for managerial discretion over the loan loss reserves account

$$Reserves_{it} = \alpha_0 + \alpha_1 Loans_{it} + \alpha_2 ResLoans_{it} + \alpha_3 Loans90_{it} + \alpha_4 NALoans_{it} + \varepsilon_{it} \quad (5)$$

The dependent variable represents the loan loss reserve that is referred to as the loan loss allowance account in some banks. The loan loss reserve account should be an unbiased estimate of the amount of the current loan portfolio that managers do not expect to collect. The independent variables measure the size and credit risk of the loan portfolio—the primary characteristics managers would monitor in order to determine an appropriate level for loan loss reserves. The size of the loan portfolio (Loans) is equal to the total amount of loans that are not past due by more than 89 days. The credit risk of the loan portfolio is estimated using restructured loans (ResLoans), loans that are past due by more than 90 days (Loans90), and by non-accrual loans (NALoans). Non-accrual loans are loans where management no longer recognizes income by accruing loan interest. The loan categories are mutually exclusive and the credit riskiness of the loan categories progresses in order from Loans to ResLoans to Loans90 and then finally to NALoans. In order to mitigate heteroskedasticity in the model, the dependent and independent variables are all deflated by total bank assets in the previous quarter.

Each of the independent variables should be positively correlated with loan loss reserves. Since the credit riskiness of the independent variables increases from Loans to ResLoans to Loan90 and to NALoans, the coefficients going from  $\alpha_1$  to  $\alpha_4$  should also increase. This is because bank managers expect that bank loans that have been restructured (generally because of nonpayment) are less likely to be collected than loans that are not yet past due and have not experienced any significant nonpayment events. Likewise, bank loans that are more than 90 days past due are less likely to be collected than restructured loans. When managers no longer recognize income from loans, the loans have moved into an even riskier category. The following two regressions are used to examine the primary hypothesis of the paper.

$$NDReserves_{it} = \delta_0 + \delta_1 EarlyCrisis_{it} + \delta_2 LateCrisis_{it} + \delta_3 PostCrisis_{it} + \varepsilon_{it} \quad (6)$$

$$DReserves_{it} = \delta_0 + \delta_1 EarlyCrisis_{it} + \delta_2 LateCrisis_{it} + \delta_3 PostCrisis_{it} + \varepsilon_{it} \quad (7)$$

The dependent variable for equation 6 is the fitted value from the regression in equation 5. It represents the component of loan loss reserves based on the size and credit quality of the loan portfolio. The dependent variable for equation 7 is the residual value from the regression in equation 5. It represents loan loss reserves that are independent of the size and quality of the loan portfolio and therefore proxies for managerial discretion. The independent variables represent the four periods of interest explained previously. The empirical analysis uses bank call report data for the quarters starting in the 4th quarter of 1992 and ending in the 2nd quarter in 2013. All national banks, state member banks, and insured nonmember banks are required to file quarterly call reports with the Federal Deposit Insurance Corporation (FDIC). Call reports contain income statement, balance sheet, and other bank pertinent data such as derivatives, deposits etc. This data is publicly available on the FDIC’s website. The following sample selection criteria is used in this study: 1) call report data is available for all of the variables used in the analysis, 2) assets of at least \$1 million, 3) the following variables in the study were truncated to be between 0 and 100% of lagged assets: loan loss reserves, loans, non-accrual loans, past due loans, and restructured loans. Requirements 2 and 3 are included to mitigate potential heteroskedasticity problems and to reduce the probability of including data reporting errors in the analysis. Requirements 2 and 3 do not materially affect the results of the study.

Call report data is available for 809,295 bank-quarter observations for the quarters in the study from 1992 to 2013. There are 791,250 bank-quarter observations with data for all of the variables available in the study. Forty-two bank-quarter observations were excluded because of size and 6,027 bank-quarter observation were excluded for unreasonable data where one or more of the variables (loan loss reserves, loans, past due loans, non-accrual loans, and restructured loans) were not between 0 and 100 percent of lagged assets. The final sample contains 785,181 bank-quarter observations.

**RESULTS**

Table 1 provides the regression results of equations 1-4. All of the credit quality variables increase dramatically during the late financial crisis and are essentially unchanged or increasing during the early financial crisis. Taken together the quality of the loan portfolio clearly decreased, as predicted, during the financial crisis.

Table 1: Results of Loan Quality Variables Regressed on Dummy Variables for the Different Periods

Dependent Variable	Restructured Loans	Loans 90 Days Past Due	Non-Accrual Loans	Loan Loss Reserves
Intercept (1992-2006)	0.0011 (128.1)***	0.0021 (318.1)***	0.0047 (279.7)***	0.0088 (1,002)***
EarlyCrisis (2007-2008)	-0.0002 (-5.5)***	-0.0001 (-5.8)***	0.0041 (68.2)***	0.0001 (2.7)***
Late Crisis (2009-2010)	0.0027 (93.4)***	0.0012 (5.6)***	0.0116 (214.5)***	0.0020 (70.7)***
PostCrisis (2011-2013)	0.0047 (203.9)***	-0.0005 (-27.1)***	0.0092 (188.0)***	0.0021 (80.6)***
N	785,181	785,181	785,181	785,181
Adjusted R-squared	0.062	0.001	0.096	0.015

*This table reports regression estimates based on the four regression models found in equations 1-4 in the text. The first results column shows the regression estimate  $s$  for the equation  $ResLoans_{it} = \delta_0 + \delta_1 EarlyCrisis_{it} + \delta_2 LateCrisis_{it} + \delta_3 PostCrisis_{it} + \epsilon_{it}$ . The other columns use the same independent variables but different dependent variables. The dependent variables  $ResLoans$  (Restructured Loans,  $Loans_{90}$  (Loans 90 or more days past due),  $NaLoans$  (Non-Accrual loans), and  $Reserves$  (loan loss reserves) are all related to the credit quality of the loan portfolio. The dependent variables are all deflated by lagged assets so that the coefficients can be read in terms of a proportion of assets. The independent variables are dummy variables equal to one if an observation occurs during the specific period and zero otherwise. For example, the intercept of 0.0011 on Restructured loans suggests that the mean of restructured loans is 0.11% of lagged assets during the period 1992 to 2006. The coefficients on the other dummy variables represent differences between the mean in those periods and the mean for 1992 to 2006. \*, \*\*, \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.*

The intercept coefficient for restructured loans is 0.0011. Restructured loans were on average 0.11% of bank assets during the pre-crisis period of 1992 through 2007 quarter 2. The coefficient on EarlyCrisis is – 0.0002, which indicates that the mean of restructured loans during the early crisis period from 2007

quarter 3 through 2008 is lower than the pre-crisis period. The actual mean is the sum of the intercept coefficient and the coefficient on EarlyCrisis, which is 0.0009. Therefore, the mean of restructured loans during the early crisis period is 0.09% of assets. All of the other coefficients are interpreted similarly—as differences from the intercept period of 1992 to 2007 quarter 2. The mean of restructured loans increases significantly during the late financial crisis and equals 0.38% of assets (the sum of 0.0011 and 0.0027) which is more than three times the mean before the financial crisis. The mean of restructured loans during the post financial crisis is actually even higher at 0.58% of assets.

The second results column of Table 1 examines the regression of loans that are 90 days or more past due on the different periods. The results of this regression are similar to those of restructured loans except that it is only during the late crisis that loans 90 days or more past due increases. The third results column could partially explain this finding. Non-accrual loans are higher during the early crisis period (0.88% of assets), increase even more during the late crisis (1.63% of assets), and then decrease slightly during the post crisis (1.39% of assets). The dramatic increase in non-accrual loans during the early crisis period could partially explain the slight decrease of loans 90 days past due during that same period. Non-accrual loans are loans where managers no longer recognize the accrued interest as earnings. Loans in the 90 days past due category are eventually downgraded as non-accrual loans when clients continue to miss payments. Then non-accrual loans are ultimately written off if clients continue to miss payments.

During the financial crisis banks may have downgraded the 90 days past due category more quickly resulting in a larger increase in the non-accrual category but a decrease in the 90 days past due category. This could explain why Loans90 did not decrease in the early crisis period. The most important result in table 1 is in column 4. The loan loss reserves account increases modestly during the early financial crisis and then increases more dramatically during the late financial crisis and continues to be higher after the financial crisis. The loan loss reserves average is about 1.09% percent of assets (.0088+.0021) during the late financial crisis. Table 2 provides the results of the regression model that is used to separate loan loss reserves into proxies for discretionary and nondiscretionary loan loss reserves. Loan loss reserves are regressed on loan categories that represent the credit quality of the loan portfolio.

Table 2: Model Used to Predict Discretionary and Nondiscretionary Components of Loan Loss Reserves

Dependent Variable	Loan Loss Reserves	Predicted Sign
Intercept	0.0036 (144.1)***	?
Loans	0.0061 (152.8)***	+
ResLoans	0.0658 (379.5)***	+
Loans90	0.1668 (125.3)***	+
NaLoans	0.2010 (64.4)***	+
N	785,181	
Adjusted R-squared	0.243	

Table 2 shows the regression estimates for the equation  $Reserves_{it} = \alpha_0 + \alpha_1 Loans_{it} + \alpha_2 ResLoans_{it} + \alpha_3 Loans90_{it} + \alpha_4 NaLoans_{it} + \varepsilon_{it}$ . The dependent variable loan loss reserves (Reserves) is regressed on independent variables that represent the size and credit quality of the loan portfolio. Loans are loans that are current or less than 90 days past due. Restructured loans (ResLoans) loans restructured in a troubled debt restructuring. The other two categories are loans that are 90 or more days past due (Loans90) and loans that managers are no longer accruing income (NaLoans). \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

As predicted the coefficients on the loan categories are all positive, all highly significant, and the coefficients increase as for categories of lower quality loans. The coefficient on Loans is .0061 indicating that managers expect that approximately 0.61% of current loans will result in nonpayment. The coefficient on restructured loans is .0658 indicating that managers estimate that approximately 6.58% of restructured loans will go uncollected. Non-accrual loans have the highest expected default rate of

20.1%. The adjusted R-squared is 0.243 suggesting that the regression captures a significant amount of the variation in loan loss reserves. The fitted value from this regression is the proxy for nondiscretionary loan loss reserves. Nondiscretionary loans is the component of loan loss reserves that is related to loans, restructured loans, loans 90 days or more past due, and non-accrual loans. The residual from this regression is the proxy for discretionary loan loss reserves. This component is unrelated to the loan categories and is therefore a proxy for managerial discretion. If managers are setting aside loan loss reserves based on criteria other than loan quality then they are exercising their discretion. Table 3 provides the results of analyzing the primary hypotheses of the paper. Column 1 shows a duplicate of the results from column 4 in Table 1. This duplication is intended to highlight the result that loan loss reserves are higher during the early, late, and post crisis periods. Column 2 shows the results of examining the levels of nondiscretionary loan loss reserves during the different periods. The nondiscretionary loan loss reserves are higher during the early, late, and post crisis periods as expected.

Table 3: Regressions of Loan Loss Reserves and the Discretionary and Nondiscretionary Components of Loan Loss Reserves on Dummy Variables for the Different Periods Examined

Dependent Variable	Loan Loss Reserves	Nondiscretionary L.L. Reserves	Discretionary L.L. Reserves
Intercept (1992-2006)	0.0088 (1,002)***	0.0087 (2,080)***	0.0001 (15.6)***
EarlyCrisis (2007-2008)	0.0001 (2.7)***	0.0012 (77.1)***	-0.0011 (-38.8)***
Late Crisis (2009-2010)	0.0020 (70.7)***	0.0027 (201.6)***	-0.0007 (-28.9)***
PostCrisis (2011-2013)	0.0021 (80.6)***	0.0020 (163.9)***	0.0001 (3.0)***
N	785,181	785,181	785,181
Adjusted R-squared	0.015	0.082	0.003

*In Table 3, loan loss reserves and its discretionary and nondiscretionary components are regressed on variables for the different periods. The last column shows the regression estimates for the equation  $DReserves_{it} = \delta_0 + \delta_1 EarlyCrisis_{it} + \delta_2 LateCrisis_{it} + \delta_3 PostCrisis_{it} + \epsilon_{it}$ . The dependent variable is discretionary loan loss reserves. The independent variables are dummy variables equal to one if an observation occurs during the specific period and zero otherwise. The dependent variables are all deflated by lagged assets so that the coefficients can be read in terms of a proportion of assets. For example, the intercept of 0.0088 for Loan Loss Reserves suggests that the mean of loan loss reserves is 0.88% of lagged assets during the period 1992 to 2006. The coefficients on the other dummy variables represent differences between the mean in those time periods and the mean for 1992 to 2006. \*, \*\*, \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.*

Finally, column 3 of table 3 demonstrates the headline result of the paper. For discretionary loan loss reserves the coefficients for both the early and late crisis periods are negative and highly significant. The coefficient on the early crisis period is -0.0011. This suggests that discretionary reserves during the early crisis period are on average -0.1% of assets (the sum of the intercept and early crisis coefficient). This compares to a positive 0.99% of assets for nondiscretionary reserves. During the late crisis, the discretionary reserves decline to -0.06% of assets. It is smaller and less significant than the early crisis period but still significant at better than the 1% level. However, it represents an even larger contrast with nondiscretionary reserves during this period. Nondiscretionary reserves increased to 1.07% of assets during the late crisis. This evidence is consistent with managers using their discretion to reduce the loan loss reserves account during the financial crisis. This is a particularly surprising finding since not only nondiscretionary reserves but also all of the variables that proxy for a deterioration of loan quality show a substantial increase during the financial crisis.

### CONCLUDING COMMENTS

This paper examines managerial behavior during the financial crisis. I develop a regression model that separates the loan loss reserve account into nondiscretionary (expected) and discretionary (unexpected) components. The expected component is used to proxy for fundamental reserves that represent the expected future loan chargeoffs based on the credit quality of the current loan portfolio. The unexpected component is used to proxy for managerial discretion over loan loss reserves. As expected, I find that loan loss reserves and other accounts that are inversely associated with loan quality all increased during



the financial crisis. Nondiscretionary loan loss reserves also increase during the financial crises. The surprising and significant result of the paper is that discretionary loan loss reserves decrease during the financial crisis and then bounce back after the financial crisis. All of the increase in the loan loss reserves account can be attributed to the nondiscretionary component of loan loss reserves. Taken together these findings are consistent with managers using their discretion to window-dress their balance sheets and improve outside perception of the financial security of banks during the financial crisis.

This study has several limitations. First, it does not distinguish between managerial discretion and managerial errors. Second, it does not discriminate between managerial discretion used to signal information to market participants as opposed to trying to mislead them about the financial strength of the bank. Third, the study does not address time-varying coefficients on the independent variables. Future research could tackle these limitations and improve our understanding of managerial behavior during the financial crisis. The most significant of these potential contributions would be to distinguish between misleading managerial discretion and signaling. Using the banking industry and the particular account of loan loss reserves provides an excellent environment to tackle this problem. Unlike most earnings management and accrual management studies there is no possible way to ex-post evaluate the occurrence of earnings management except by looking at extreme examples such as restatements, SEC enforcement actions, and media scandals. In the banking industry, loan chargeoffs provide an ex-post check on the accuracy of loan loss reserves. Disentangling whether managerial discretion during the financial crisis was a form of signaling or an attempt to mislead the public is a potentially valuable future research opportunity.

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