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Deposit Insurance and Credit Union Earnings Opacity

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Abstract

This paper examines the impact of deposit insurance on credit union earnings opacity. For identification, we utilize Section 136 of the U.S. Emergency Economic Stabilization Act, which increased the maximum level of deposit insurance coverage from $100,000 to $250,000. Some credit unions experienced significant increases in insured deposits, while others remained relatively unaffected. Using variation in insured deposits afforded by the differential impact of the change to deposit insurance arrangements and a difference-in-difference approach, we find that affected credit unions exercise more discretion over loan loss provisions, leading to an increase in earnings opacity. This effect is most evident for small and medium sized credit unions. Moreover, the effect of increased deposit insurance coverage on earnings opacity varies by the prevailing level of capitalization prior to the regulatory change. Specifically, we find that less well capitalized credit unions use discretionary loan loss provisions in order to increase capital to meet regulatory capital requirements. Overall, the results of our empirical analysis suggest that credit unions with more insured deposits engage in greater discretionary loan loss provisions at the expense of transparency.

JEL Classification: G21; G28; M41; M48; L31

Keywords: Deposit insurance, earnings opacity, credit unions, discretionary loan loss provisions, Emergency Economic Stabilization Act

1. Introduction

Deposit insurance is an essential part of safety net arrangements prevailing in banking industries around the globe. Well-designed deposit insurance schemes can prevent liquidity shortages, bank runs, and ensure financial stability. Poorly designed deposit insurance schemes can incentivise bank managers to make risky investments, and reduce the monitoring incentives of depositors. Prior evidence suggests that the design and coverage of deposit insurance schemes has an important role in driving the asset composition and quality at financial institutions (Eisenbeis and Kaufman, 2014; Anginer and Demirguc-Kunt, 2019). Consequently, the design and impact of deposit insurance on the behaviour of financial institutions has relevance for market discipline and the overall stability of the financial system.

In this study, we complement and augment prior research to investigate the impact of deposit insurance for the earnings opacity of US credit unions. The quality earnings can reduce information asymmetries and enable effective external monitoring of firm performance and risk by regulators, auditors, and other industry stakeholders (Bushman and Smith, 2001). As not for profit, member-based cooperative organisations, credit unions constitute an important part of the retail financial sector in the United States (Van Rijn, 2022). In 2020, there were 5,099 federally insured credit unions, serving approximately 124.3 million members, with total assets $1.85 trillion, total loans $1.16 trillion and total insured shares and deposits $1.47 trillion (NCUA, 2020). Traditionally (and in order to justify a long-standing exemption from federal income taxes), credit unions focussed on serving the financial needs of individuals on lower incomes. More recently, credit unions compete in many retail market segments with mainstream commercial banks in offering deposit, lending and payments services to a broad spectrum of consumers. Consequently, credit unions are subject to similar forms of prudential regulation (via the National Credit Union Association, NCUA) including deposit insurance (via the National Credit Union Share Insurance Fund, NCUSIF).

In general, it is not clear whether an increase in the maximum level of deposit insurance coverage will affect the earnings opacity of credit unions. On the one hand, an increase in deposit insurance could reduce the incentives for credit union depositors to monitor, and if necessary, exercise discipline on managers given that they are less likely to suffer losses in the event of a credit union failure. This is likely given that compared to uninsured counterparts, insured depositors have fewer incentives to monitor and discipline credit unions (Gomez-Biscarri et al., 2021). A decrease in depositor monitoring could incentivise managers of credit unions to use their discretion to pursue personal interests such as higher salaries, job security and reputation given the non-profit nature of credit unions (Parsons et al., 2012). Prior evidence (for commercial banks) suggests that deposit insurance coverage leads insured depositors to exercise less monitoring since they are unlikely to incur losses in the case of a bank failure (Martinez Peria and Schmukler, 2002; Berger and Turk-Ariss, 2015). Therefore, an increase in the maximum level of deposit

insurance coverage will lead credit unions with a higher proportion of insured deposits to increase earnings opacity.

On the other hand, when a credit union has a greater proportion of insured deposits, the risk to the credit union deposit insurance fund (NCUSIF) increases. To limit this risk, the credit union regulator (NCUA) is likely to supervise credit unions more strictly, including credit unions financial reporting quality. Prior evidence (for commercial banks) suggests that in addition to statutory factors, the insurance premium charged to each institution is determined by the balance of insured deposits as well as the risk the institution poses to the insurance fund (FDIC, 2015). Consequently, an increase in deposit insurance coverage may encourage credit unions with a higher proportion of insured deposits to produce more transparent financial statements and to decrease earnings opacity. In light of the competing arguments outlined above, the association between deposit insurance coverage and credit union earnings opacity is ultimately an empirical question.

We examine these aforementioned competing views of the impact of deposit insurance on credit union earnings opacity using a regulatory change in the coverage of insured deposits of US credit unions, which occurred at the height of the global financial crisis in October 2008. Under the terms of Section 136 of the Emergency Economic Stabilization Act (EESA), the limit of the deposit insurance coverage provided by the National Credit Union Share Insurance Fund (NCUSIF) increased from $100,000 to $250,000. Given the heterogeneity in balance sheet structures, the change in deposit insurance scheme arrangements did not affect all credit unions equally, with some experiencing a greater increase in insured deposits relative to others. As a result, it is possible to identify a group of affected and unaffected credit unions before (pre-treatment) and after (post-treatment) the introduction of a sudden change in the coverage of insured deposits. Our research design takes advantage of this aforementioned differential impact to investigate whether deposit insurance impacts earnings opacity.

Our dataset (which straddles the increase in deposit insurance coverage in October 2008) comprises quarterly financial statements of credit unions over the period from 2007Q1 to 2010Q4. Following prior literature, we calculate for each credit union, the difference in the ratio of insured deposits to assets before and after the change in deposit insurance coverage (Lambert et al., 2017; Johari et al., 2020; Nguyen et al., 2022). For some credit unions, this event significantly increased the amount of insured deposits, while for others it only had a minor effect. This allows us to construct a treated (affected) and a control (unaffected) group of credit unions based upon the relative exposure of a given credit union to the change in deposit insurance coverage enacted under the Emergency Economic Stabilization Act of 2008.

In order to assess the impact of the change in the maximum level of deposit insurance on earnings opacity, we use a difference-in-differences approach to compare the difference in the earnings opacity of affected credit unions before and after the policy change with the same difference in earnings opacity of

their unaffected counterparts. We utilize a propensity score matching approach in order to ensure that the treated and control groups of credit unions are similar before the regulatory change and our results do not reflect systematic differences between the two groups. Earnings opacity is proxied by discretionary loan loss provisions. In common with commercial banks, loan loss provisions constitute the main accrual facing credit unions. In line with previous literature, we derive the absolute value of residuals by estimating a model that enables us to disentangle discretionary and non-discretionary components of loan loss provisions. Our empirical analysis uses discretionary loan loss provisions as the outcome variable measure of earnings opacity.

The results of our empirical analysis suggest that credit unions affected by the increase in the maximum level of deposit insurance, increase discretionary loan loss provisions relative to unaffected counterparts. Our results are economically significant, and suggest that relative to unaffected counterparts, credit unions affected by the introduction of Section 136 of the Emergency Economic Stabilization Act are less transparent. This finding is in line with the notion that credit union depositors have less incentive to monitor managerial behaviour following an increase in deposit guarantee coverage. In an extension to our empirical analysis, we find that the increase in discretionary loan loss provisioning is evident for small and medium-sized credit unions. We also conduct an additional analysis to assess the underlying factors driving the increased use of discretionary loan loss provisions following the increase in deposit insurance coverage. Prior evidence suggests that credit unions utilize discretion over loan loss provisions to manage regulatory capital (Gomez-Biscarri et al., 2020). We test these propositions and find that undercapitalized credit unions use discretionary loan loss provisions in order to increase capital to meet minimum regulatory capital requirements.

In a series of additional tests, we assess the robustness of our main results. First, we find that our results are not confounded by other events (such as increases in the National Credit Union share Insurance Fund premium assessments) occurring around the time of the increase in the deposit insurance coverage. Second, we perform a placebo test by assuming falsely that the introduction of the increase in deposit insurance coverage was introduced in an earlier time period. If credit unions anticipated the increase in deposit insurance coverage, we would expect a change in credit union earnings opacity during this period. We also conduct an alternative of the parallel trend assumption by allowing the effect of the increase in deposit insurance coverage to vary over time. The results of these tests do not show any evidence of anticipatory effects via changes in credit union financial reporting quality. Finally, we examine the internal validity of our estimations by using alternative specifications for our outcome variable (discretionary loan loss provisions), alternative model specifications and standard errors. Our results confirm the causal interpretation of the baseline estimations.

We contribute to three strands of literature. First, we contribute to an emerging literature that examines the impact of deposit insurance regulation following the implementation of Section 136 of the Emergency Economic Stabilization Act on bank and credit union behaviour. Lambert et al. (2017) provide evidence which suggests that a change in deposit insurance regulation makes affected US commercial banks riskier compared to unaffected counterparts. Jin et al. (2018) find that Federal Deposit Insurance Corporation deposit insurance coverage of retail depositors had a positive impact on earnings quality for banks reliant on core deposit funding. Johari et al. (2020) offer evidence that US bank holding companies reduce dividends following an increase in insured deposits. Regarding the credit union industry, Nguyen et al. (2022) find that an increase in the maximum level of deposit insurance coverage leads to increased lending and portfolio risk. Complementing this literature, we show that affected credit unions increase discretionary loan loss provisions following an increase in the proportion of insured deposits. Therefore, credit unions afforded greater deposit insurance coverage become less transparent via an increase in earnings opacity. This result suggests that higher deposit insurance coverage reduces depositor's monitoring incentives and raises important implications for relevant policy design in stabilizing the financial system.

Second, we contribute to a small literature that examines the impact of deposit insurance on credit unions. In contrast to banking counterparts, Kane and Hendershott (1996) provide find no evidence for moral hazard at credit unions throughout the 1980s, suggesting that the structure of NCUSIF limited risk-taking incentives. These findings are complemented by Karels and McClatchey (1999) who also find limited evidence of moral hazard following the introduction of federal deposit insurance at credit unions in the 1970s. Van Dalsem (2017) finds that uninsured depositors play a crucial role in preventing credit union managers from taking excessive risks. These findings are also supported by Gomez-Biscarri et al. (2021) who find that depositors punish credit unions for bad performance, albeit the existence of a generous deposit insurance scheme mediates this discipline. Our results complement evidence presented in prior studies by showing that more generous coverage of member deposits leads to a decline in depositor discipline and a subsequent increase in earnings opacity.

Third, we contribute to the literature on earnings opacity of banks and not-for profit institutions. Prior evidence from the banking industry suggests that improvements in the regulatory environment have a positive impact in the quality of bank transparency (Altamuro and Beatty, 2010; Jiang et al., 2016; Delis et al., 2018; Chronopoulos et al., 2021). However, prior research also suggests that regulatory changes affect the quality of earnings adversely (Kim et al., 2019; Fan et al., 2020; Cornett et al., 2020). We enrich this literature by providing evidence of earnings management for not-for profit organisations. While previous studies that examine not-for profits have largely focused on misreporting to achieve certain performance benchmarks (zero fundraising expenses, zero profit constraints, increased compensation) (Jones and Roberts, 2006; Tinkelman, 2009; Hofmann and McSwain, 2013; Beisland et al., 2014), we

identify a setting in which a group of nonprofit financial cooperatives (credit unions) manage financial information (via an increase in discretionary loan loss provisions) in response to an increase in deposit insurance coverage. As a result, an increase in deposit insurance coverage leads to a decrease in depositors' discipline. This complements the recent insights of Brushwood et al (2021) who find that that credit unions manage earnings to avoid political scrutiny.

The rest of the paper is organized as follows. Section 2 describes the evolution of deposit insurance for US credit unions. Section 3 provides a review of the research evidence on earnings opacity credit unions. This section also reviews research that investigates how credit unions respond to deposit insurance. In section 4, we discuss the identification strategy, the empirical specification and the dataset used, while section 5 presents the results of our empirical analysis. Section 6 presents the results for a series of additional tests, while Section 7 concludes.

2. Background

Deposit insurance schemes are a core part of national financial system safety nets around the world. These schemes protect savers from financial institution insolvency by insuring depositor accounts up to a certain maximum. Deposit insurance may reduce the possibility of so-called runs to withdraw funds, which arise when depositors lose confidence in the ability of financial institutions to meet day to day obligations (Anginer and Demirgüç-Kunt, 2019).

In 1934, Congress passed the Federal Credit Union Act. This Act allowed credit unions to establish Federal Charters across United States as a means of providing financial services to those of limited means. As part of this Act, the Bureau of Federal Credit Unions was formed as the precursor to the National Credit Union Administration to charter and regulate federal credit unions. Credit unions organized under state charters were supervised primarily by state regulators. The National Credit Union Administration (NCUA), which had as its primary objective to charter and supervise federal credit unions was established as a federal independent agency in 1970. Federal deposit insurance had not been available to credit unions until 1970. The National Credit Union Share Insurance Fund (NCUSIF) was founded in 1970 under NCUA oversight. Insurance premiums were levied against federally insured (state and federally chartered credit unions). In state-chartered credit unions, the process is determined by state requirements. In some states, a requirement of deposit insurance followed the establishment of the NCUSIF in 1971, while in other states insurance requirements were not required until later in the decade. While some states encouraged credit unions to choose between private and federal deposit insurance by 1980 most states required credit unions to have federal deposit insurance (Clair, 1984; Karels and McClatchey, 1999; Getter, 2014).

In the wake of the global financial crisis, many countries introduced or enhanced deposit insurance schemes (Demirgüç-Kunt et al., 2015).[1] In the US, on October 3rd, 2008, Congress implemented the Emergency Economic Stabilization Act. This Act included a Section 136, which temporarily increased the maximum level of deposit insurance coverage for credit union members provided by the NCUA from $100,000 to $250,000 per depositor. Similar arrangements were introduced for commercial banks. The increase in deposit insurance coverage was temporary until December 31st, 2009. However, in May 2009, the Helping Families Save Their Homes Act, extended the increase in insured deposits until December 31st, 2013. This arrangement was modified by Section 335 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of July 2010, which permanently increased the deposit insurance threshold from $100,000 from $250,000.

3. Literature Review

In this section, we present a selective review of the relevant literature. Section 3.1 presents an overview of the earnings opacity literature for credit unions, credit unions. In Section 3.2, we provide an overview of the literature regarding the impact of deposit insurance on and credit unions.

3.1 Earnings Opacity

In common with banks, loan loss provisions constitute the most significant accrual for credit unions. However, given their not-for-profit status and the simplicity of their operation, little attention is paid to financial reporting quality and the potential use of discretion in loan loss provisions Given the rapid growth of the credit unions the last years, Gomez-Biscarri et al. (2020) investigate the prevalence of earnings management techniques and the potential motivation for such strategies in the credit union industry. Using a sample of credit unions with total assets exceeding $50 million for the period 1994-2015, they provide evidence, which is in line with banking literature, that credit union managers exercise considerable discretion in loan loss provisioning via income smoothing, big-bath accounting, loss avoidance and capital management. Furthermore, using hurricane Katrina as an exogenous shock they provide causal evidence that credit unions that manage earnings have attributes consistent with being saver-oriented, and consequently are able to deliver higher remuneration to members, owners, and employees in the medium-to-long run.[2]

[1] Kyei (1995) and Garcia (2000) provide a historical review for the implementation of deposit insurance around the world.

[2] Saver-oriented credit unions will set high loan rates to maximize surplus and then will use the surplus to pay dividends to their depositors at the highest rate possible. On the other hand, "borrower-oriented" credit unions will set low rates on loans in order to increase access to loans, which will lower dividend rates as well. Given that members prefer "saver-oriented" type, credit unions need to balance the interests of borrowing and saving members.

Taking advantage of the 2005 congressional hearing on the federal tax-exempt status of US credit unions, Brushwood et al. (2021) investigate the prevalence of earnings management through discretionary loan loss provisions as a means of reducing political scrutiny.[3] Using a combined sample of US credit unions and banks from 2002 to 2007 , the authors find that credit unions manage earnings downwards (through an increase in discretionary loan loss provisions) in the quarters prior to and around the US congressional hearings on the credit union tax exemption in an effort to avoid political scrutiny. They also provide evidence that credit unions have incentives to manage earnings in order to influence policymakers to underestimate the tax revenue potential from a repeal of the tax exemption.

3.2 Deposit insurance

To date there is limited and mixed evidence regarding the impact of deposit insurance on credit union behaviour. For instance, Black and Dugger (1981) show that US federally insured credit unions increase their risk taking following the introduction of deposit insurance in 1971 (which led to lower capital and higher liquidity). Similarly, Clair (1984)) shows that the implementation of deposit insurance for federally insured credit unions in 1971 leads to an increase in risk taking, evidenced by lower capital ratios, higher loan delinquency and higher loan-to-deposit ratios. In order to tackle this issue, Clair (1984) suggests that risk-sensitive insurance premiums should be charged via a privately insured deposit insurance scheme. Kane and Hendershott (1996) find that the US credit union deposit insurance fund performed better than both commercial banks and savings and loans during 1980s, providing limited evidence for moral hazard in credit unions. Based on an assessment of the National Credit Union Share Insurance Fund's solvency, they suggest that over the 1980s it outperformed both bank and savings and loan insurance funds. They conclude that as part of the National Credit Unions Share Insurance Fund's reform in 1984, all insured credit unions are responsible for resolving any shortfalls in the fund. Consequently, this means that credit unions insured by the National Credit Union Share Insurance Fund act as co-insurers of one another. Similarly, Karels and McClatchey (1999) provide little support for moral hazard at credit unions after the introduction of federal deposit insurance. The authors find that risk-taking behaviour in the post-insurance period decreases despite the introduction of softer capital regulations in 1970 and 1977. According to the authors, the common bond requirement restricts the ability of managers to invest in high-risk loans or grow rapidly. Likewise, Hannafin and McKillop (2007) find no evidence of risk shifting behaviour by Irish credit unions following the implementation of a private deposit insurance scheme in 1989. Using sample of Irish credit unions for the period 1991-2005 they provide evidence that the common bond requirement, the non-profit

[3] Federal credit unions are exempt from federal income tax under the Federal Credit Union Act of 1934, whereas state-chartered credit unions are exempt from federal income tax under the Revenue Act of 1916 (Tatom, 2005; DeYoung et al., 2019). Outside US, a number of countries provide tax exemptions to not-for-profit financial cooperatives including Estonia, Ireland, Mexico and Romania (McKillop et al., 2020).

orientation, the volunteer culture and the limited range of permissible investment activities mitigate excessive risk behaviour. For the years following the financial crisis, Van Dalsem (2017) finds that uninsured depositors and excess share insurers perform an important monitoring role in preventing management from taking excessive risks. They also provide evidence that credit unions with more uninsured deposits are less liquid, hold less capital and report lower loan default. Using Section 136 of the Emergency Economic Stabilization Act 2008 which increased the deposit insurance coverage from $100,000 to $250,000, Nguyen et al. (2022) document that enhanced deposit insurance arrangements encouraged credit unions to assume greater risk via increases in total and unsecured lending, ultimately leading to a decline in loan performance. Beyond the impact of the deposit insurance coverage on credit union performance, Gomez-Biscarri et al. (2021) investigate the market discipline that credit unions face from depositors. Based on data collected from 1994-2018, they provide evidence that credit union members exercise strong depositor discipline. Specifically, they find that delinquent loans and charge-offs adversely affect total shares and deposits. Furthermore, depositors punish volatility indicated by bad performance, whereas they prefer credit unions with strong net worth ratios, accounting performance, and net interest margins. However, the existence of a deposit insurance scheme mitigates depositor discipline.[4]

4. Identification strategy, empirical specification and data

Research design

To investigate the impact of deposit insurance on earnings opacity, we focus on the introduction of Section 136 of the Emergency Economic Stabilization Act that took place in October 2008 (at the height of the global financial crisis). Section 136 increased the maximum insured amount per depositor from $100,000 to $250,000. The passage of the Emergency Economic Stabilization Act in October 2008 can be considered as a source of exogenous change in the extent to which credit union deposits are insured. Consequently, the variation in the quantity of insured deposits across credit unions allows us to identify affected (treated) and unaffected(control) credit unions. Based on prior literature, we assign credit unions to treatment and control groups, according to the change in ratio of insured deposits to total assets (Lambert et al., 2017; Johari et al., 2020; Nguyen et al., 2022).

We first calculate the insured deposits to assets ratio by subtracting the insured deposits to assets ratio under the deposit insurance coverage of $100,000 from the insured deposits to assets ratio after the deposit insurance coverage was increased to $250,000. Credit unions are classified into four quartiles according to the increase in the insured deposit to total assets ratio. Our treated and control groups of credit unions comprise those classified to the top and bottom quartiles respectively.

[4] Outside US, the adoption of a deposit insurance scheme does not reduce depositor discipline for both insured and uninsured deposits (Murata and Hori, 2006; Arnold et al., 2016).

Following prior literature, we measure discretionary loan loss provisions by estimating a model which allows us to disentangle total loan loss provisions into discretionary and non-discretionary parts (Beatty and Liao, 2014). The absolute values of the residuals generated from Equation (1) are discretionary loan loss provisions.

$$LLP_{it} = \beta_0 + \beta_1 \Delta NPA_{it+1} + \beta_2 \Delta NPA_{it} + +\beta_3 \Delta NPA_{it-1} + \beta_4 \Delta NPA_{it-2} + \beta_5 SIZE_{it-1} + \beta_6 \Delta LOANS_{it} + \beta_7 HPI_{it} + \beta_8 \Delta GSP_{it} + \beta_9 \Delta UNEMP_{it} + \varepsilon_{it} \quad (1)$$

where i, indexes credit union and t indexes time. LLP_{it} represents total loan loss provisions scaled by lagged total loans. ΔNPA_{it} denotes the change in total non-performing loans between quarter t and t-1 scaled by lagged total loans. We also include the two-period lag, ΔNPA_{it-2} , the last-period, ΔNPA_{it-1}, and the forward-period, ΔNPA_{it+1}.[5] $SIZE_{it-1}$ is the natural logarithm of total assets in quarter *t-1*. $\Delta LOANS_{it}$ is the change in total loans between quarter *t* and *t-1* scaled by lagged total loans. The model also includes HPI_{it}, ΔGSP_{it} and $\Delta UNEMP$. These variables denote the return on the Home Price Index, the change in gross state product and the change in the rate of state unemployment, respectively. Full definitions of these aforementioned variables and summary statistics are provided in Table A1, while the results obtained from estimating Equation (1) are presented in Table A2.

ε_{it} is the residual term of Equation (1). It reflects the discretionary component of loan loss provision, and it is the outcome variable we use for our empirical analysis. Given that residuals can be either positive or negative, in order to capture the magnitude of discretionary loan loss provisions, we use the absolute value.

To estimate the effect of deposit insurance on financial reporting quality, we use a difference-in-differences approach. This approach compares the difference in reporting quality between credit unions experiencing significant change in insured deposits (affected) and counterparts where there was only a relatively small change in insured deposits (unaffected) in the pre- and post-event periods. We estimate a model of the form:

$$Y_{i,t} = \beta_1 (Affected_i * Post\ Event_t) + \delta X_{i,t-1} + v_i + \gamma_t + \varepsilon_{i,t}, \quad (2)$$

where i indexes credit union and t indexes time. $Y_{i,t}$ denotes the absolute value of the residuals derived from Equation 1 (discretionary loan loss provisions) which is our financial reporting quality measure. $Affected_i$ is a dummy variable equal to one that captures whether a credit union was affected by

[5] Prior evidence from banking literature suggests that banks in order to determine loan loss provisions might use past and future changes in non-performing loans (Bushman and Williams, 2012).

the increase in deposit insurance coverage in 2008Q4, and zero otherwise$Post\ Event_t$ is a dummy variable for the post-treatment period. This variable takes the value of one for quarters after 2008q4 onwards, and zero otherwise. $Affected_i * Post\ Event_t$ is an interaction term which takes the value of one if the credit union was affected by the increase in deposit insurance coverage in the post-event period, and zero otherwise. The key explanatory variable of interest is the interaction term $Affected_i * Post\ Event_t$. The coefficient on this interaction term, β_1, is the estimated impact of the change in maximum level of deposit insurance coverage on the financial reporting quality of credit unions. A positive and statistically significant coefficient would suggest that affected credit unions become less transparent following the change in maximum level of deposit insurance coverage.

$X_{i,t-1}$ represents a set of credit union-level control variables found previously to be important determinants of credit union performance (Karels and McClatchey, 1999; Esho et al., 2005; Goddard et al., 2002; Bauer, 2008; Goddard et al., 2008; Goddard et al., 2009; Goddard et al., 2014). These control variables include credit union size, liquidity, total deposits, net worth, profitability and total loans. To control for differences in earnings opacity, we also include the one quarter lag of loan loss provisions.[6] In order to avoid endogeneity, we lag each of our control variables by one period. Table 1 provides a full list of variables and definitions included in the model. Equation (2) also includes time fixed effects, γ_t, as well as credit union fixed effects v_i, which control for unobserved credit union heterogeneity. Standard errors $\varepsilon_{i,t}$, are clustered at the credit union level to account for possible autocorrelation.

[Insert Table 1 near here]

Data and summary statistics

We construct our dataset from two main data sources. We collect the financial data of US credit unions from the S&P Global Market Intelligence database. Our sample period spans 16 quarters from 2007Q1 to 2010Q4. This period straddles the increase in deposit insurance coverage that took place in October 2008. State-level macroeconomic data are collected from the Bureau of Economic Analysis, the Bureau of Labour Statistics, and the Federal Housing Finance Agency. Our initial sample comprises 8,065 credit unions that existed at the end of the third quarter of 2008. We exclude credit unions located in unincorporated territories given that macroeconomic data for these regions are unavailable. This leaves us with a sample of 8,031 credit unions. Further, our identification strategy only considers credit unions in the top quartile (treatment group) or lowest quartile (control group) of reported changes in insured deposits. This reduces our sample to 2,582 credit unions.

[6] Research from the banking literature suggests that past information for loan loss provisions is associated with financial reporting quality (Kanagaretnam et al., 2010; Jiang et al., 2016; Danisewicz et al., 2021).

Table 2 provides descriptive statistics for the main variables for the credit unions in the treated and control group, spanning the period Q1 2007 through Q4 2010. Panels A and B tabulate these descriptive statistics for the period before and after the introduction of the Emergency Economic Stabilization Act, while Panel C and D tabulate the evolution of the outcome variable for the pre- and post-treatment period. Panel A of Table 2 shows that during the pre-treatment period, affected credit unions are larger, hold more deposits, grant more loans and make greater provision for loan losses than unaffected counterparts. However, affected credit unions are less liquid and less profitable than unaffected credit unions. Furthermore, affected credit unions experience a smaller increase in discretionary loan loss provisions growth relative to credit unions assigned to the control group.

One of the major concerns is that the selection of credit unions into treated and control groups might not be truly random. If affected credit unions differ from unaffected credit unions in the pre-treatment period across a number of observable characteristics, they may exhibit different trends in the financial reporting quality in the post-treatment period even in the absence of the Emergency Economic Stabilization Act. It is possible, therefore, that any observed changes in credit union financial reporting after the Emergency Economic Stabilization Act takes effect are due more to existing differences within each group than to the changes in deposit insurance regulations. To alleviate these concerns, following prior literature, we use a propensity score matching method and construct a matched sample of credit unions (Cole and White, 2012; Lambert et al., 2017; Nguyen et al. 2022). Specifically, we conduct one-to-one matching where we match credit unions from the affected group with counterparts in the control group based on the key characteristics of credit unions. These characteristics include size, liquidity, total deposits, net worth, non-performing loans, profitability, and total loans. We also include state fixed effects to control for the geographic location of credit unions. For each credit union, we estimate the probability model from which the propensity scores are derived using the mean values of the explanatory variables from Q1 2007 to Q3 2008 (pre-treatment period). This matching is performed without replacement such that one control credit unions can act as the closest match for one treated credit union on one occasion. We require common support and use calliper at the level of 1% to ensure that the selection of a credit union from the control group as an ideal partner for a treated credit union lies within the propensity range.

[Insert Table 2 near here]

Summary statistics of the matched sample

After matching, the final data set includes 1,194 credit unions, of which 597 constitute our treatment group (affected credit unions) and 597 constitute our control group (unaffected credit unions). The impact of the matching is illustrated in Table 3, where summary statistics for the outcome and control variables of

the treated and control credit unions are presented. Panel A of Table 3 shows that the difference in means between affected and the matched group of unaffected credit unions is not statistically significant for all credit union characteristics. Moreover, the descriptive statistics indicate that the trend in discretionary loan loss provisions is similar between affected and unaffected credit unions after the matching procedure in the pre-treatment period (Panel C). These findings lend support to the notion that the parallel trend assumption is not violated in our setting (the results of more formal tests are reported in Section 7.1). In addition, Panel D shows that in the post-treatment period the growth in discretionary loan loss provisions, is significantly higher for treated credit unions compared to control credit unions.

[Insert Table 3 near here]

Figure 1 provides a graphical illustration of the evolution of insured deposits to total assets for our treated and control group of credit unions before and after the Emergency Economic Stabilization Act was introduced. From the end of Q3 2008, we observe a sharp increase in the insured deposits of affected credit unions relative to the group that we consider unaffected by the change in maximum level of deposit insurance coverage.

[Insert Figure 1 near here]

5. Results

Baseline results

Table 4 presents the main regression results of estimating Equation (2) using discretionary loan loss provisions as a dependent variable. We begin with a sample that spans 16 quarters over the period from Q1 2007 to Q4 2010 and then narrow this to ±1 quarter around the change in maximum level of deposit insurance coverage at the beginning of Q4 2008 (Q3 2008 to Q1 2009). Columns 1 and 2 present the results. The additional columns of Table 4 show that these results are robust for model specifications without quarter(time) fixed effects. Columns 3 and 4 present the results. Column 1 presents our baseline results. We find a positive and significant on our primary variable of interest (*Affected* x *Post Event*) at the 1% level. The point estimate suggests that the amount of discretionary loan loss provisions of affected credit unions increases by 4 basis points. This increase is also economically significant. Given that the discretionary loan loss provisions for the average credit union in our sample is around 0.22%, affected credit unions increase discretionary loan loss provisions by 18.2% (0.0004/0.0022). This suggests that relative to unaffected counterparts assigned to the control group, credit unions affected by the change in

maximum level of deposit insurance coverage are more likely to increase discretion over loan loss provisions. Overall, the results are consistent across various econometric specifications.

Regarding our control variables, we focus our discussion on the baseline specification (Column 1) in Table 4. Specifically, the coefficient on *Size* is negative and statistically significant at the 1% level, suggesting that larger credit unions are less likely to use discretionary loan loss provisions. *Liquidity* enters the regression with a negative but statistically insignificant coefficient. We also find that higher deposit-based credit unions make lower discretionary loan loss provisions as indicated by the negative and statistically significant coefficient on *Total deposits*. *Net worth* and *Profitability* enter the regression with a negative but statistically insignificant coefficient. Furthermore, we find that credit unions which predict more loan losses are more likely to use discretionary loan loss provisions (as indicated by the positive and statistically coefficient on *Loan loss provisions*). Finally, the negative coefficient on *Total loans* suggests that credit unions with a higher amount of loans report less discretionary loan loss provisions.

[Insert Table 4 near here]

Overall, our results suggest that credit unions with more insured deposits become less transparent via an increase in discretionary loan loss provisions as insured depositors have fewer incentives to monitor and discipline credit union performance. Our findings largely support those of Van Dalsem et al. (2017) who contend that uninsured credit union depositors are more effective monitors and exercise more discipline than insured credit union depositors. They are also in line with recent theoretical and empirical evidence which suggests that the existence of a deposit insurance scheme reduces depositor discipline Gomez-Biscarri et al. (2021). However, our findings differ from Jin et al. (2018) who find that an increase in the maximum limit of deposit insurance coverage leads to significant improvements in earnings quality (via less discretionary loan loss provisions) for banks whose funding structure focuses on core deposits.

Incentives to use discretionary loan loss provisions

The results of our empirical analysis (described above) suggest that affected credit unions become less transparent (through an increase in discretionary loan loss provisions) following the increase in the maximum coverage of insured deposits. We further investigate whether credit unions affected by the increase in deposit insurance coverage behave differently in the use of discretionary loan loss provisions as a tool to manage capital. As discussed in Section 3, credit unions can exercise discretion over loan loss provisions consistent with capital management (Gomez-Biscarri et al., 2020). In particular, given that credit unions rely on retained earnings to raise capital, credit union managers have incentives to influence the

level of reported loan loss provisions in order to meet minimum capital requirements (McKillop et al., 2020).

In order to test for credit union capital management through discretionary loan loss provisions, we introduce the variable Low_*capital* and its interaction with *Affected* x *Post Event* in Equation (2). Low_*capital* is defined as a dummy variable that is equal to one if a credit union is not well-capitalized (and the ratio of net worth to total assets is less than 7%) as of Q3 2008, and zero otherwise. The separate inclusion of Low_*capital* in Equation (2) is not possible as the variable is spanned by the credit union fixed effects. A negative and significant coefficient of the triple interaction term would indicate that credit unions report less discretionary loan loss provisions in order to boost their regulatory capital and meet the minimum capital requirements. The results are presented in column 1 of Table 5. The coefficient on the triple interaction term (*Affected* x *Post Event* x *Low_capital*) enters with a negative sign and is statistically significant at the 1% level. That is, following the implementation of the increase in deposit insurance coverage, affected credit unions engage in active capital management via less discretionary loan loss provisions. The additional column of Table 5 show that this result is robust to alternative econometric specification without further control variables (Column 2).

[Insert Table 5 near here]

The role of credit union size

In the subsequent analysis, we explore whether the effect of increased deposit insurance coverage on earnings opacity varies by asset size. Prior evidence suggests that large banks are more transparent, while banks with a higher percentage of non-interest income are less transparent (Altamuro and Beatty 2010; Jiang et al., 2016; Berger et al., 2018; Delis et al., 2018). Thus, credit union size may also affect how credit unions adjust earnings opacity following a change to deposit insurance coverage. Following prior literature (Le et al., 2021), we define *small* credit unions, as those with assets in the bottom tercile of the sample as of Q3 2008 (below $20.7 million). *Medium* credit unions are those in the medium tercile (asset size between $20.7 and $60 million), while *large* credit unions are those in the top tercile (with assets exceeding $60 million). We introduce the *Small*, *Medium* and *Large* and their interactions with *Affected* x *Post Event* in Equation (2). *Small*, *Medium* and *Large* are dummy variables equal to one when a credit union belongs to the bottom, medium and top tercile respectively. We find a positive and significant triple interaction coefficient for the group of *small* (*Affected* x *Post Event* x *Small*) and *medium* (*Affected* x *Post Event* x *Medium*) credit unions as shown in Column 1 of Table 6. Our results provide evidence that the effect of the regulatory change is most prominent for affected credit unions that are defined as *small* and

medium, and insignificant for *large* affected credit unions. The additional column of Table 6 shows that this result is robust to alternative econometric specification without further control variables (Column 2).

[Insert Table 6 near here]

6. Robustness checks

In this section, we present various robustness checks on our main finding that the increase in the deposit insurance coverage causes affected credit unions to become less transparent by exercising more discretion over loan loss provisions. Furthermore, we explore potential confounding effects that could influence our reported baseline results.

Parallel trend assumption

The analysis presented thus far has shown that credit unions affected by the increase in deposit insurance coverage through the implementation of the Emergency Economic Stabilization Act increase earnings opacity. However, a key identification assumption of the difference-in-differences approach is that in the absence of treatment, changes in the magnitude of earnings opacity (through discretionary loan loss provisions) for both treated and control credit unions demonstrate similar trends, commonly referred to as the parallel trend assumption (Abadie, 2005). We extend our analysis of the parallel trend assumption described in Section 5 (Table 3 Panel C) by performing two supplementary tests. First, we examine the validity of the parallel trend assumption in our difference-in-differences design by allowing the effect of the increase in deposit insurance coverage to vary across time (Bertrand and Mullainathan, 2003). Specifically, we interact the *Affected* indicator with time dummy variables, both prior to and after the quarter of the event to examine parallel trends. If the change in earnings opacity (through discretionary loan loss provisions) is indeed a result of the increase in deposit insurance coverage, then the results should reveal significant effects only after, and not before, the increase in deposit insurance coverage was implemented. The results of this test are displayed in panel A of Table 7. We do not find any significant change in earnings opacity in the period before the introduction of the increase in deposit insurance coverage. The coefficients for the interaction terms are statistically significant following the adoption of the increase in deposit insurance coverage. Second, we conduct a placebo test, where we falsify that the increase in deposit insurance coverage took place in Q4 2007 rather than Q4 2008. The results of this test are presented in column 1, Panel B of Table 7. The coefficient on the interaction term (*Affected x Placebo Post Event*) is statistically insignificant. This further demonstrates the parallel trend assumption holds and does not affect the results.

Sensitivity tests

The above results provide strong support for the parallel trends assumption. To further confirm these results, our analysis also incorporates a number of time-varying control variables. However, the inclusion of such variables may bias the estimate of the treatment effect (Roberts and Whited, 2013; Atanasov and Black, 2016). To alleviate concerns regarding this issue we replicate our main analysis excluding time-varying control variables. The results, tabulated in column 2, Panel B of Table 6, show that the magnitude of the coefficient of interest (*Affected* x *Post Event)* remains significant and our main conclusions continue to hold.

Standard errors with serial correlation raise concerns regarding the validity of a difference-in-differences estimation. As a result, reported standard errors might be biased downwards. In order to ensure that our results do not suffer from such a bias, we follow Bertrand et al. (2004) and collapse our sample into two time periods. That is, we average our variables before and after the introduction of the increase in deposit insurance coverage. The results of this analysis, which are reported in column 3, Panel B of Table 7, show that the magnitude of the coefficient of interest (*Affected x Post Event*) remains virtually unchanged and thus our main findings are not driven by serial correlation.

Confounding events

Our estimated results would be invalid if there are other factors driving them rather than the increase in deposit insurance coverage. As a result, we isolate any simultaneous activities that may confound our analysis. While Section 136 of the EESA exempts temporary increases in deposit insurance coverage from credit unions' assessments, other NCUA initiatives including changes to assessment rates will likely result in higher deposit insurance costs. In November 2009, the NCUA board assess an insurance premium of 0.1027 percent on insured shares along with the collection of the 1 percent capitalization deposit adjustment in order to restore the equity ratio of the NCUSIF to its normal level (NCUA, 2009).[7] Furthermore, in September 2010, it was also approved that the NCUA would charge credit unions a premium on insured shares of 12.42 basis points or 0.1242 percentage points (Getter, 2011). If insurance related costs changed substantially for affected credit unions after the increase in deposit insurance coverage, this could reduce credit unions' net income. Therefore, it is reasonable to assume that in response to these additional expenses credit unions may increase discretionary loan loss provisions in order to anticipate potential losses. To address such concerns, we control for the growth rate of the assessments paid by credit unions in our baseline regression throughout the investigation period. Specifically, we construct *High Assessment*, a binary variable equal to one if the growth rate of a credit union's insurance costs is above the sample's

[7] Credit unions were required to report this data from Q1 2009 and the subsequent quarters.

median value, and zero otherwise. We re-estimate Equation (2) augmented with the interaction term (*Affected x Post Event x High Assessment*). The results of this analysis, which are presented in Column 4 of Table 7, suggest that this is not the case and thus confirm our main findings.

[Insert Table 7 near here]

Alternative measures of earnings opacity

We also test how our findings are affected by alternative specifications of discretionary loan loss provisions which is our proxy for earnings opacity. Following Beatty and Liao (2014), we re-estimate Equation (2) using modified versions of Equation (1) in order to calculate our dependent variable (discretionary loan loss provisions). Specifically, in Column (1) of Table 8, we re-estimate Equation (1), including the one-quarter lag of loan loss allowance. Loan loss allowance is defined as the ratio of loan loss allowance scaled by total loans at the beginning of the quarter. In Column (2), we re-estimate Equation (1) incorporating net charge-offs. Net charge-offs defined as the ratio of net charge-offs over the quarter scaled by total loans at the beginning of the quarter. Finally, in Column (3), we re-estimate Equation (1) adding both loan loss allowance and net charge-offs. The results of these tests are presented in Table 8. The sign and magnitudes of the coefficient of interest (*Affected x Post Event*) remain unchanged confirming the validity of our main results.

[Insert Table 8 near here]

Other robustness tests

The analysis presented thus far suggests that credit unions affected by the increase in deposit insurance coverage become less transparent. To eliminate bias emanating from unobservable factors that vary across credit unions within a state and quarter, we augment our baseline model specification by adding state-year fixed effects. Specifically, we re-estimate Equation (2) by including state-quarter fixed effects. The results of this test are displayed in Column 1 of Table 9. We find that the coefficient on the interaction term (*Affected x Post Event*) remains unchanged. Furthermore, in order to account for correlation between credit unions located in the same state, we cluster the standard errors at state rather than credit union level when re-estimating Equation (2). Column 2 of Table 9 reports the results of this test. The coefficient on the interaction term (*Affected x Post Event*) is statistically significant. This implies that our results of our main analysis hold. Finally, we investigate if our results are driven by the inclusion of extreme values. To address this concern, we re-estimate Equation (2), using a sample which is winsorized at the 1% and 99% level to exclude outliers. The results of this analysis, which are reported in Column 3 of Table 9, suggest that our main findings remain qualitatively unaltered to the exclusion of these observations.

[Insert Table 9 near here]

7. Conclusion

Following the onset of the 2007-2009 global financial crisis many countries augmented deposit insurance coverage in order to prevent runs on individual depository institutions and protect financial stability. This has reignited debates regarding the impact of deposit insurance on the behaviour of depository institutions, and more generally the potential moral hazard posed by government financial safety nets.

In this study, we investigate the impact on the financial reporting quality of US credit unions following a sudden increase in the maximum coverage of insured deposits (from $100,000 to $250,000) enacted by the Section 136 of the Emergency Economic Stabilization Act. Credit unions were not all affected equally by the increase in insurance coverage. The insured deposits of some credit unions increased significantly, while others had a modest or no increase. By utilizing the differential change in insured deposits across credit unions, we overcome identification concerns, we examine whether there is a causal relationship between deposit insurance and credit union financial reporting quality.

Employing a propensity score matching procedures to assign credit unions to affected and unaffected groups and a difference-in-difference approach, we show that affected credit unions become less transparent following the increase in the maximum coverage of insured deposits. The deterioration in financial reporting quality is more prominent for small- and medium-sized credit unions. Additional analyses of the incentives for credit unions to use discretionary loan loss provisions also reveal important insights. We find that less well capitalized credit unions exercise less discretion over loan loss provisions in order to increase capital to meet the minimum regulatory capital requirements. A myriad of additional tests confirm our findings.

Overall, the evidence produced in this study suggests a deterioration in credit union financial reporting quality following increased deposit insurance coverage. As such, our findings suggest that more intense regulatory scrutiny of the financial information produced by credit unions is warranted given the decline in depositor discipline and moral hazard pervading the industry following more generous coverage of member deposits.

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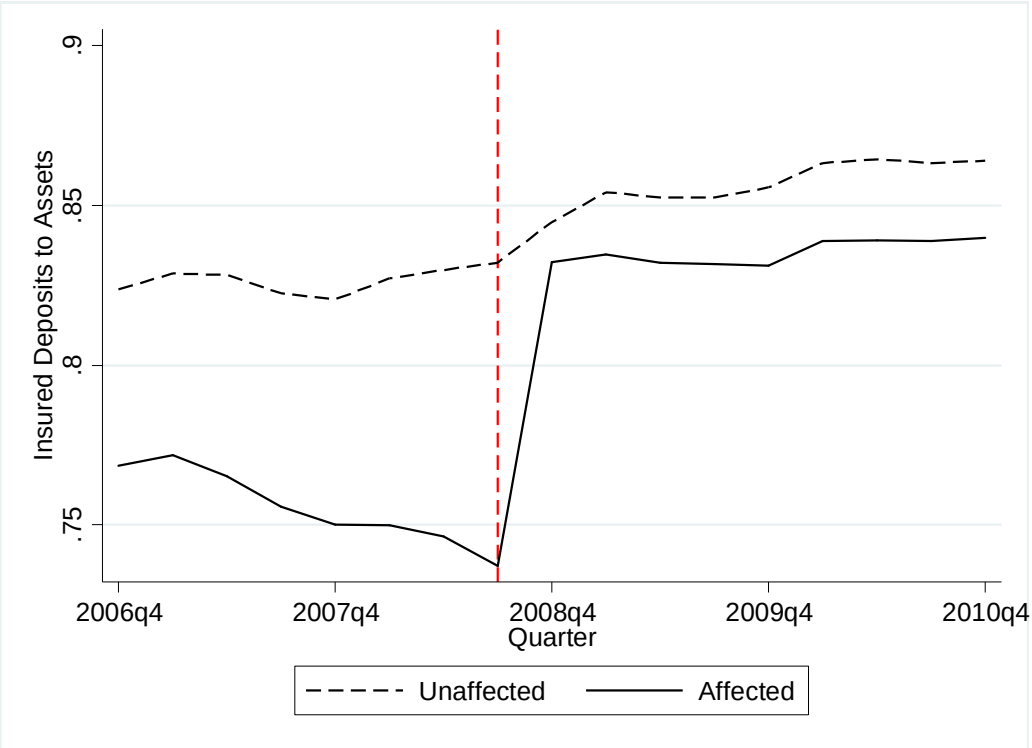
Figure 1: Evolution of insured deposits from Q1 2007 to Q4 2010



Notes: This figure plots the evolution of insured deposits for both treated and control credit unions of the matched sample over the period Q1 2007- Q4 2010. The dashed vertical line marks the end of Q3 2008, three days before the passage of the Emergency Economic Stabilization Act. The average value of affected credit unions is represented by a solid line, and the average values of unaffected credit unions are represented by a dashed line.

Table 1: Definition of variables

Variable name	Description
Dependent variable	
Discretionary loan loss provisions	The absolute value of the residuals obtained from the Equation (1) modelling total loan loss provisions on its normal components.
Control variables	
Affected	A binary variable equals one if the credit union experiences a change in the ratio of insured deposits to total assets following the increase in deposit insurance coverage in the top quartile and zero if the change is in the bottom quartile.
Post Event	A binary variable that equals one for quarters after 2008Q4 as the event quarter of deposit insurance coverage increase and zero otherwise
Size	Natural logarithm of total assets
Liquidity	Ratio of cash and cash equivalents to total assets
Total deposits	Ratio of total deposits to total assets
Net worth	Ratio of net worth total assets
Profitability	Ratio of net income to total assets
Loan loss provisions	Ratio of loan loss provisions scaled by lagged total loans
Total loans	Ratio of total loans to total assets

Notes: This table provides definition for all variables used in main analysis. The first column shows the name of the variable as used throughout the paper, while the second column presents the corresponding definition.

Table 2: Summary statistics of the full sample

Variables	Affected Credit Unions			Unaffected Credit Unions			Diff	*p*-value
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Pre-treatment period (Q1 2007 – Q3 2008)								
Insured deposits	9,031	0.7511	0.0765	9,037	0.8169	0.0643	-0.0658	0.00
Discretionary loan loss provisions	8,940	0.0015	0.0030	8,951	0.0018	0.0036	-0.0003	0.00
Size	9,031	11.1679	1.6985	9,037	9.5538	1.1205	1.6141	0.00
Liquidity	9,031	0.1020	0.0861	9,037	0.1307	0.0936	-0.0287	0.00
Total deposits	9,031	0.8549	0.0479	9,037	0.8334	0.0622	0.0215	0.00
Net worth	9,031	0.1244	0.0393	9,037	0.1559	0.0619	-0.0315	0.00
Profitability	9,030	0.0013	0.0032	9,037	0.0014	0.0033	-0.0001	0.10
Loan loss provisions	8,940	0.0014	0.0034	8,951	0.0012	0.0040	0.0002	0.00
Total loans	9,031	0.6375	0.1677	9,037	0.5802	0.1631	0.0573	0.00
Panel B: Post-treatment period (Q4 2008 – Q4 2010)								
Insured deposits	11,426	0.8375	0.0660	11,319	0.8437	0.0668	-0.0062	0.00
Discretionary loan loss provisions	11,336	0.0025	0.0051	11,221	0.0025	0.0056	0.0000	0.33
Size	11,426	11.3045	1.7212	11,319	9.6728	1.1499	1.6317	0.00
Liquidity	11,426	0.1032	0.0864	11,319	0.1338	0.0959	-0.0306	0.00
Total deposits	11,426	0.8656	0.0551	11,319	0.8472	0.0639	0.0184	0.00
Net worth	11,426	0.1116	0.0432	11,319	0.1420	0.0628	-0.0304	0.00
Profitability	11,426	-0.0005	0.0149	11,319	-0.0007	0.0066	0.0002	0.15
Loan loss provisions	11,390	0.0031	0.0063	11,294	0.0022	0.0068	0.0009	0.00
Total loans	11,426	0.5985	0.1732	11,319	0.5251	0.1656	0.0734	0.00
Panel C: Pre-trend growth rate								
Discretionary loan loss provisions	9,031	3.0577	1.2128	9,037	4.3128	3.6229	-1.2551	0.00
Panel D: Post-trend growth rate								
Discretionary loan loss provisions	11,336	5.1693	3.0979	11,221	4.0243	1.3449	1.1450	0.00

Notes: This table reports summary statistics for our sample. Panel A and B show summary statistics for the treated and control group before, for both the pre-treatment period (Q1 2007- Q3 2008) and the post-treatment period (Q4 2008-Q4 2010), respectively. Panel C and D present trends in the pre- and post-treatment period and the mean comparison of these trends between treated and control credit unions for the outcome variable. Columns 7 and 8 report the differences and p-values for the difference in means test (t-test) between affected and unaffected credit unions. The definitions of the variables are given in Table 1.

Table 3: Summary statistics of the matched sample

Variables	Affected Credit Unions			Unaffected Credit Unions			Diff	*p*-value
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Pre-treatment period (Q1 2007 – Q3 2008)								
Insured deposits	4,179	0.7537	0.0792	4,179	0.8270	0.0556	-0.0733	0.00
Discretionary loan loss provisions	4,145	0.0017	0.0039	4,145	0.0018	0.0045	-0.0001	0.13
Size	4,179	10.035	1.3619	4,179	10.0681	1.1745	-0.0330	0.23
Liquidity	4,179	0.1218	0.1066	4,179	0.1236	0.0856	-0.0018	0.40
Total deposits	4,179	0.8481	0.0514	4,179	0.8478	0.0502	0.0003	0.77
Net worth	4,179	0.1371	0.0465	4,179	0.1382	0.0473	-0.0011	0.27
Profitability	4,179	0.0014	0.0039	4,179	0.0014	0.0035	0.0000	0.87
Loan loss provisions	4,145	0.0012	0.0042	4,145	0.0014	0.0049	-0.0002	0.06
Total loans	4,179	0.6002	0.1781	4,179	0.5985	0.1544	0.0017	0.65
Panel B: Post-treatment period (Q4 2008 – Q4 2010)								
Insured deposits	5,280	0.8353	0.0677	5,245	0.8570	0.0528	-0.0217	0.00
Discretionary loan loss provisions	5,237	0.0027	0.0064	5,199	0.0025	0.0045	0.0002	0.07
Size	5,280	10.1642	1.3932	5,245	10.1956	1.2021	-0.0314	0.21
Liquidity	5,280	0.1234	0.1061	5,245	0.1241	0.0875	-0.0007	0.72
Total deposits	5,280	0.8587	0.0608	5,245	0.8612	0.0526	-0.0025	0.02
Net worth	5,280	0.1246	0.0525	5,245	0.1242	0.0483	0.0004	0.69
Profitability	5,280	-0.0008	0.0213	5,245	-0.0006	0.0059	-0.0002	0.55
Loan loss provisions	5,232	0.0028	0.0080	5,264	0.0026	0.0056	0.0002	0.14
Total loans	5,280	0.5585	0.1820	5,245	0.5508	0.1596	0.0077	0.02
Panel C: Pre-trend growth rate								
Discretionary loan loss provisions	4,179	4.2832	3.5975	4,179	6.6644	7.6405	-2.3812	0.53
Panel D: Post-trend growth rate								
Discretionary loan loss provisions	5,280	3.9621	1.5270	5.245	3.2955	1.6020	0.6666	0.00

Notes: This table reports summary statistics for our matched sample. Panel A and B show summary statistics for the treated and control group before, for both the pre-treatment period (Q1 2007- Q3 2008) and the post-treatment period (Q4 2008-Q4 2010), respectively. Panel C and D present trends in the pre- and post-treatment period and the mean comparison of these trends between treated and control credit unions for the outcome variable. Columns 7 and 8 report the differences and p-values for the difference in means test (t-test) between affected and unaffected credit unions. The definitions of the variables are given in Table 1.

Table 4: Main results

Dependent variable: Discretionary loan loss provisions				
	(1)	(2)	(3)	(4)
Affected x Post Event	0.0004***	0.0007***	0.0006**	0.0004*
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Size	-0.0022***	-0.0009	-0.0074*	-0.0063
	(0.0008)	(0.0007)	(0.0042)	(0.0045)
Liquidity	-0.0013	-0.0024	0.0012	-0.0015
	(0.0023)	(0.0023)	(0.0029)	(0.0030)
Total deposits	-0.0069**	-0.0059**	-0.0253**	-0.0273***
	(0.0028)	(0.0027)	(0.0112)	(0.0105)
Net worth	-0.0080	-0.0055	0.0390	0.0476
	(0.0071)	(0.0069)	(0.0315)	(0.0329)
Profitability	-0.0336	-0.0213	0.0053	0.0096
	(0.0205)	(0.0158)	(0.0590)	(0.0600)
Loan loss provisions	0.0701**	0.0777***	-0.0365	-0.0313
	(0.0355)	(0.0364)	(0.0735)	(0.0744)
Total loans	-0.0026*	-0.0037**	-0.0122**	-0.0067
	(0.0013)	(0.0013)	(0.0060)	(0.0059)
Credit Union fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	No	Yes	No
Observations	18,521	18,521	3,543	3,543
No. of credit unions	1,194	1,194	1,194	1,194
R-squared	0.030	0.016	0.054	0.033

Notes: This table reports the baseline results. The dependent variable is *Discretionary loan loss provisions.* Column 1 investigates the effect of an increase in the maximum coverage of insured deposits that took place in Q4 2008 for a period spanning 16 quarters (Q1 2007 – Q4 2010). The variable of interest is *Affected* x *Post Event* which indicates the deterioration in financial reporting quality between affected and unaffected credit unions following the introduction of the increase in deposit insurance coverage. In column 2 the estimation is shortened up to ±1 quarter (Q3 2008 – Q1 2009) around the introduction of the increase in deposit insurance coverage on Q4 2008. Columns 3 and 4 correspond to the specifications of Columns 1 and 2 without quarter (time) fixed effects. The definitions of variables are provided in Table 1. Standard errors clustered at credit union level are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

Table 5: Deposit insurance and motivation to use discretionary loan loss provisions

Dependent variable: Discretionary loan loss provisions		
	(1)	(2)
Affected x Post Event	0.0004***	0.0004***
	(0.0001)	(0.0001)
Affected x Post Event x Low_capital	-0.0012**	-0.0020***
	(0.0005)	(0.0007)
Control variables	Yes	No
Credit Union fixed effects	Yes	Yes
Quarter fixed effects	Yes	Yes
Observations	18,521	18,726
No. of credit unions	1,194	1,194
R-squared	0.030	0.019

Notes: This table reports results on the impact of deposit insurance on motivations to use discretionary loan loss provisions. The dependent variable is Discretionary loan loss provisions. Column 1 investigates the effect of capital management on the impact of the increase in deposit insurance coverage on credit union financial reporting quality. *Low_capital* is defined as a binary variable which equals 1 for credit unions that are not considered as well-capitalized (the ratio of net worth to total assets is less than 7%) in Q3 2008. Column 2 presents results for a regression without further control variables. Unless otherwise stated, in all regressions, we include a set of control variables: Size, Liquidity, Total deposits, Net worth, Profitability, Loan loss provisions, Total loans (lagged by one period but are not reported in the table for brevity. Standard errors clustered at credit union level are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The definitions of variables are provided in Table 1.

Table 6: The relevance of credit union size

	(1)	(2)
Affected x Post Event x Small	0.0007**	0.0007**
	(0.0003)	(0.0003)
Affected x Post Event x Medium	0.0005**	0.0005*
	(0.0002)	(0.0002)
Affected x Post Event x Large	0.0001	0.0000
	(0.0001)	(0.0001)
Control variables	Yes	No
Credit Union fixed effects	Yes	Yes
Quarter fixed effects	Yes	Yes
Observations	18,521	18,521
No. of credit unions	1,194	1,194
R-squared	0.030	0.020

Notes: This table reports results on the impact of deposit insurance on credit union earnings opacity for various subsamples of credit unions. The dependent variable is Discretionary loan loss provisions. We split the sample into three subsamples according to the credit union size. In column 1, we include three additional interaction terms between the dummy variables *Small*, *Medium* and *Large* and their interaction terms with *Affected x Post Event*. *Small*, *Medium* and *Large* are dummy variables which equal one if a credit union belongs to the bottom medium and top tercile, respectively. Column 2 presents results for a regression without further control variables. Unless otherwise stated, in all regressions, we include a set of control variables: Size, Liquidity, Total deposits, Net worth, Profitability, Loan loss provisions, Total loans (lagged by one period but are not reported in the table for brevity. Standard errors clustered at credit union level are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The definitions of variables are provided in Table 1.

Table 7: Robustness Checks

Panel A: Timing effects of Section 136 of the Emergency Economic Stabilization Act	
	(1)
Affected x $Pre_{\leq t-3}$	-0.0001
	(0.0001)
Affected x Pre_{t-3}	-0.0002
	(0.0001)
Affected x Pre_{t-2}	0.0001
	(0.0002)
Affected x Pre_{t-1}	-0.0001
	(0.0001)
Affected x $Post_{t}$	0.0010***
	(0.0002)
Affected x $Post_{t+1}$	0.0007***
	(0.0002)
Affected x $Post_{t+2}$	0.0002
	(0.0001)
Affected x $Post_{t+3}$	0.0009***
	(0.0003)
Affected x $Post_{\geq t+3}$	0.0009***
	(0.0001)
Control variables	Yes
Credit Union fixed effects	Yes
Observations	18,521
No. of credit unions	1,194
R-squared	0.028

Notes: This table presents the results of robustness checks of our main results with respect to different model specifications and sample composition, as well as on the validity of the parallel trend assumption. The dependent variable is Discretionary loan loss provisions. Panel A: We present regression test where we interact the treatment group dummy with time dummies prior and after the treatment year. Unless otherwise stated, we include a set of control variables: Size, Liquidity, Total deposits, Net worth, Profitability, Loan loss provisions, Total loans (lagged by one period but are not reported in the table for brevity). Standard errors, clustered at credit union level, are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The definitions of variables are provided in Table 1.

Table 7: Robustness Checks (continued)

Panel B: Other robustness checks				
	Placebo Event	Covariates Exclusion	Two-period sample	Insurance Premiums
	(1)	(2)	(3)	(4)
Affected x Placebo Post Event	0.0001			
	(0.0001)			
Affected x Post Event		0.0004***	0.0004***	0.0003**
		(0.0001)	(0.0001)	(0.0001)
High Assessments				0.0001
				(0.0001)
Affected x Post Event x High Assessments				0.0002
				(0.0002)
Control variables	Yes	No	Yes	Yes
Credit Union fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	No	Yes
Observations	18,521	18,726	2,376	18,521
No. of credit unions	1,194	1,194	1,194	1,194
R-squared	0.029	0.019	0.516	0.030

Notes: This table presents the results of robustness checks of our main results with respect to different model specifications and sample composition, as well as on the validity of the parallel trend assumption. The dependent variable is *Discretionary loan loss provisions.* Panel B: In column (1), we create a hypothetical event one years prior the actual event in Q4 2008. The results are estimated using a sample spanning the period before the introduction of the actual increase in deposit insurance coverage. *Placebo Post Event* is a dummy variable equal to one for all quarters from Q4 2007 onwards and zero otherwise. In column (2), we exclude covariates from the main model. In column (3), following Bertrand et al. (2004), we collapse our dataset into a two-period panel. Specifically, we average the data before (Q1 2007-Q3 2008) and after (Q1 2009- Q4 2010) the increase in deposit insurance coverage in Q4 2008. In column (4), we include the variable *High Assessments* and its interaction term *with Affected x Post Event* taking into account any increases in insurance costs resulting from the increase in deposit insurance coverage. Unless otherwise stated, we include a set of control variables: Size, Liquidity, Total deposits, Net worth, Profitability, Loan loss provisions, Total loans (lagged by one period but are not reported in the table for brevity). Standard errors, clustered at credit union level, are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The definitions of variables are provided in Table 1.

Table 8: Alternative measures of earnings opacity

Affected x Post Event	0.0004***	0.0003**	0.0003**
	(0.0001)	(0.0001)	(0.0001)
Control variables	Yes	Yes	Yes
Credit Union fixed effects	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes
Observations	18,521	18,160	18,160
No. of credit unions	1,194	1,194	1,194
R-squared	0.030	0.029	0.029

Notes: This table reports the results of sensitivity checks of our baseline estimation with respect to alternative measures of discretionary loan loss provisions which is our proxy for earnings opacity. In column (1), we re-estimate Equation (1), including the one-quarter lag of loan loss allowance. Loan loss allowance is defined as the ratio of loan loss allowance scaled by total loans at the beginning of the quarter. In column (2), we re-estimate Equation (1) incorporating net charge-offs. Net charge-offs defined as the ratio of net charge-offs over the quarter scaled by total loans at the beginning of the quarter. Finally, in column (3), we re-estimate Equation (1) adding both loan loss allowance and net charge-offs. In all regressions, we include a set of control variables: Size, Liquidity, Total deposits, Net worth, Profitability, Loan loss provisions, Total loans (lagged by one period but are not reported in the table for brevity. Standard errors are shown in parentheses and are clustered at the credit union level in all models unless explicitly stated otherwise. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The definitions of variables are provided in Table 1.

Table 9: Further robustness checks

Dependent variable: Discretionary loan loss provisions			
	(1)	(2)	(3)
Affected x Post Event	0.0003**	0.0004***	0.0003**
	(0.0001)	(0.0001)	(0.0001)
Control variables	Yes	Yes	Yes
Credit Union fixed effects	No	Yes	Yes
Quarter fixed effects	No	Yes	Yes
State-Quarter fixed effects	Yes	No	No
Observations	18,521	18,521	18,521
No. of credit unions	1,194	1,194	1,194
R-squared	0.061	0.030	0.024

Notes: This table presents the results of sensitivity checks of our baseline regressions with respect to different model specifications and sample composition. The dependent variable is *Discretionary loan loss provisions.* In Column (1) the main model is estimated including state-quarter fixed effects. In Column (2), we re-estimate the baseline model by clustering the standard error at state level. In column (3), we re-estimate the baseline model using a winsorized sample. In all regressions, we include a set of control variables: Size, Liquidity, Total deposits, Net worth, Profitability, Loan loss provisions, Total loans (lagged by one period but are not reported in the table for brevity. Standard errors are shown in parentheses and are clustered at the credit union level in all models unless explicitly stated otherwise. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The definitions of variables are provided in Table 1.

Table A1: Variables used for the calculation of discretionary loan loss provisions

Variables	Definition	Obs.	Mean	Median	Std. Dev.
LLP	The ratio of loan loss provisions scaled by lagged total loans	18,786	0.0021	0.0009	0.0060
ΔNPA	The change in non-performing loans between quarter t and t-1, scaled by lagged total loans	18,883	0.0003	0.0000	0.0121
SIZE	The natural logarithm of total assets	18,883	10.1230	10.0730	1.2899
ΔLOANS	The change in total loans between quarter t and t-1, scaled by lagged total loans	18,883	0.0029	-0.0012	0.0594
HPI	The return on the Home Price Index over the quarter	19,104	358.455	321.700	123.428
ΔGSP	The change in gross state product between quarter t and t-1, scaled by 100	19,104	30.7920	18.4180	135.0712
ΔUNEMP	The change in unemployment rates between quarter t and t-1	19,104	0.2788	0.1666	0.5112

Notes: This table provides the definition and summary statistics for the variables used to estimate discretionary loan loss provisions. Data were retrieved from three sources. Financial information was retrieved S&P Global Market Intelligence database. Macroeconomic variables were retrieved from the Bureau of Economic Analysis, the Bureau of Labour Statistics, and the Federal Housing Finance Agency. The number of observations (Obs), mean, median and standard deviation (Std. Dev) are reported.

Table A2: Stage-one regression for estimating discretionary loan loss provisions

	(1) *Loan loss provisions*
ΔNPA_{it+1}	-0.0304***
	(0.0086)
ΔNPA_{it}	-0.0133
	(0.0134)
ΔNPA_{it-1}	0.0158
	(0.0083)*
ΔNPA_{it-2}	0.0024
	(0.0052)
$SIZE_{it-1}$	0.0001***
	(0.0000)
$\Delta LOANS_{it}$	-0.0018
	(0.0022)
HPI_{it}	-0.0000
	(0.0000)
ΔGSP_{it}	0.0000
	(0.0000)
$\Delta UNEMP_{it}$	0.0005***
	(0.0000)
Observations	18,726
R-squared	0.010

Notes: This table reports the results from the estimation of Equation 1 using OLS. The sample consists of 1194 credit unions from Q1 2007 through Q4 2010. Standard errors clustered at credit level are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The definitions of variables are given in Table A1.

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