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Deposit Insurance and Credit Union Lending

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Keywords: Deposit insurance, lending, loan quality, credit unions, Emergency Economic Stabilization Act.

JEL Codes: G21; G28

1. Introduction

In this paper we investigate the impact of deposit insurance on the volume, composition and quality of credit union lending. Deposit insurance schemes have been widely adopted by regulators and policy makers around the world to reduce the probability and frequency of bank runs, and ensure financial stability (Calomiris and Jaremski, 2016; Anginer and Demirguc-Kunt, 2019). By insuring deposit accounts up to a set limit, deposit insurance provides protection for depositors from the negative outcomes associated with contagious runs.[1] However, deposit insurance does not eliminate entirely the possibility of bank runs as was so aptly illustrated in several high-profile instances (including Northern Rock Bank, UK and IndyMac Bank, US) during the global financial crisis. Moreover, deposit insurance imposes a moral hazard problem as it encourages depositors and bankers to behave less carefully if deposits are guaranteed (Eisenbeis and Kaufman, 2014). Bankers may pursue riskier lending practices in pursuit of higher returns, while depositors may place funds with banks that offer higher returns because of risky lending. Overall, the adoption of an explicit deposit insurance scheme lowers market discipline by reducing monitoring incentives of depositors and other investors. This in turn can lead to excessive risk-taking and risk-shifting (Demirgüç-Kunt and Detragiache, 2002; Hovakimian et al., 2003). Consequently, investigating the impact of deposit insurance on the behaviour of financial institutions is of relevance for the financial system and real economy as well as government agencies tasked with monitoring the safety and soundness of depository institutions.

[1] The inherent fragility of banks brought about by high leverage and a mismatch between short term liquid (deposit liabilities) and long term illiquid assets leaves them exposed to the possibility that depositors will simultaneously demand access to their funds. In a seminal contribution, Diamond and Dybvig (1983) develop a model which predicts that a bank run will occur as depositors rush to withdraw funds before a bank's liquid assets are exhausted. However, a government guarantee means that the deposit insurance fund will pay out when necessary. Consequently, deposit insurance schemes reduce the probability of panics and runs, as long as depositors believe they can always recover funds, even in the event of bank failure. The duration of bank-depositor relationships and the prevalence of social networks across depositors also play an important role in determining the extent to which depositors panic and run in the event of bank distress (Iyer and Puri, 2012).

In this study, we investigate the impact of deposit insurance on the lending behaviour of US credit unions. Deposit insurance could take on particular importance for credit union stability relative to commercial banks. Credit unions are financial cooperatives taking deposits from members only. Members of a credit union are relatively homogenous given that they share a common bond such as employment in the same organization or industry, residence in a specific geographic area, or membership of a social organization or religious institution (McKillop and Wilson, 2011). Consequently, membership ties enable rapid information flows, and could under certain circumstances encourage herd like panic behaviour among depositors. Banks are less likely to have this problem given their more diversified and less connected customer base. Moreover, given that credit unions do not have access to wholesale funding, they rely to a greater extent on retail deposits from individual members to provide products and services (as shown in Table A5 in the Appendix). Consequently, deposit insurance coverage is of particular importance to ensuring stable funding.

Compared to other countries, the US credit union industry is the largest and most mature in the world. In 2020, 5206 credit unions, accounted for $1.87 trillion in total assets, and around 10% of consumer savings and deposits in the US, provide financial services to more than 123 million members (NAFCU, 2020). Originally credit union membership and growth were severely limited by strict common bond requirements based around association, community, occupation (Goddard et al., 2002).[2] This allowed credit unions to develop and maintain close

[2] Credit union industries can be characterised as nascent, transition and mature. Industries in the developing countries of Africa, Asia, and many countries of the former Soviet Bloc (except for Poland and Lithuania which are more advanced) can be at a nascent stage of development with: small asset size; limited product offerings; high proportions of volunteer labour; and strict regulatory and supervisory oversight. Nascent industries are populated with credit unions with specific missions of financial inclusion and poverty reduction. Transition industries in countries such as Lithuania, Poland and the United Kingdom are characterised by larger asset size; more varied product offerings; and a more permissive regulatory environment. Mature movements in countries such as Australia, Canada and the United States have large asset size; diversified product portfolios; high proportions of full-time salaried staff; electronic technologies; and subject to extensive prudential requirements including an explicit deposit insurance scheme. Worldwide, there are more than 86,451 credit unions operated in 118 countries, with a combined membership of 375 million and assets under control of $3.21 trillion (World Council of Credit Unions, 2020).

and long-lasting customer relationships within a prescribed geographic area and offer small unsecured loans to individuals of limited means. Deregulation during the 1990s and 2000s diluted common bond requirements and allowed credit unions to diversify product portfolios to offer a wide range of product and services using interaction and transaction internet technologies, leading to increased competitive rivalry with traditional commercial banks in many market segments such as unsecured and secured lending (Goddard et al., 2008; 2009). Credit unions are subject to a raft of prudential regulations overseen by the National Credit Union Association (the industry regulator). A deposit insurance scheme, the National Credit Union Share Insurance Fund, provides depositors with insurance coverage - the terms of which changed suddenly at the height of the global financial crisis and provides a major motivation of the present study.

The extent to which credit union lending and portfolio risk respond to a change in deposit insurance is likely to depend crucially on the monitoring behaviour of credit union depositor-members, and whether these members are willing to exert discipline on managers following changes in the volume and composition of lending and the risk profile of credit unions (Gomez-Biscarri et al., 2021). On the one hand, the enhanced information environment at credit unions brought about by common bond arrangements and reduced asymmetric information may make it more likely that member-depositors become aware and take steps to discipline managers in the light of excessive lending and increasing loan portfolio risk. The co-concurrent ownership and consumption of deposit services at credit unions, means that depositor-members are more likely to take an active role in monitoring the lending activities of management in order to preserve the value of credit union capital of which they have a claim. Moreover, the prevailing cooperative ethos within the credit union industry implies that credit unions are less likely to engage in activities that may ultimately lead to losses, which are

ultimately borne by the deposit insurance fund and by extension other credit unions which are liable to make up any shortages (Kane and Hendershot, 1996).

Alternatively, given the cooperative ethos and ownership structure of credit unions, ownership rights (shares) are not tradeable in secondary capital markets. Consequently, the capital market discipline (including possible takeover threats which could arise and threaten job security following poor financial performance) faced by managers at commercial banks is absent at credit unions. Moreover, prior evidence suggests that given the dispersed ownership at credit unions, active member-based monitoring and scrutiny of senior management and directors (who are elected by the membership) is rather weak (Goth et al., 2012). Given limited member-based scrutiny and absence of external monitoring, credit union managers have significant opportunities to pursue increased lending and portfolio risk following changes to deposit insurance coverage. Ultimately, the extent to which credit unions increase lending following a change to deposit insurance coverage is an empirical question – the answer to which has significant implications for the safety and soundness of credit unions (especially given their heavy reliance on member deposits).[3]

In the present study, we investigate the impact of deposit insurance on the lending activities of US credit unions by taking advantage of a sudden change in the coverage of insured deposits under Section 136 of the Emergency Economic Stabilization Act (EESA). Effective on October 3, 2008, the maximum insurance coverage for credit union deposits and commercial banks increased from $100,000 to $250,000. The increase in the maximum insurance coverage

[3] As member-based financial cooperatives, managers at credit unions do not have to satisfy shareholders' profit expectations like commercial banks. However, credit unions have to satisfy the disparate interests of owner savers (seeking liquidity and a high return on investments) and owner borrowers (seeking access to funds at low rates of interest). The conflicting interests of borrower- and saver-members could lead to a favouring of one group at the expense of the other (Flannery, 1981; Smith et al., 1981; McKillop and Wilson, 2011) and increase the likelihood of credit unions being impacted by the increase in deposit insurance coverage. Prior evidence suggests that at any given point in time, some credit unions favour borrowers (borrower-orientated), while others favour savers (saver-orientated), but that benefits to members are maximised where neither group are favoured. Such credit unions are regarded as being neutral rather than borrower- or saver-orientated (Taylor, 1971; Patin and McNeil, 1991; McKillop et al., 2020).

did not affect all credit unions equally. In some cases, credit unions experienced a substantial increase in insured deposits, while in other cases credit unions experienced almost no increase at all. This variation in the differential change in insured deposits across credit unions provides us with a strong research design to investigate whether there is a link between deposit insurance and lending activities of credit unions.

Our dataset (which straddles the increase in deposit insurance coverage in October 2008) comes from the quarterly Call Reports published by the National Credit Union Association (NCUA) and made available via S&P Global Market Intelligence (formerly SNL Financial) database. For each credit union, we calculate the difference in the ratio of insured deposits to assets before and after the change in deposit insurance coverage. This allows us to construct a treated (affected) and control (unaffected) group of credit unions based upon the relative exposure of a given credit union to the change in maximum level of deposit insurance coverage. In order to assess the impact of the change in the maximum level of deposit insurance on credit union lending, we use a difference-in-difference approach. We compare the difference in the lending of affected credit unions before and after the change in deposit insurance coverage with the same difference in lending for credit unions (classified as) unaffected by the change. Credit union lending is measured by total loans and various loan sub-categories comprising: credit card loans; other unsecured personal loans; new-vehicle loans; used-vehicle loans; other loans to members; first mortgage loans; and other real estate loans. We also investigate the impact of deposit insurance on loan performance (quality) via an examination of loan delinquency by collateral type and number of days delinquent.

By way of preview, our results suggest that the increase in the maximum level of deposit insurance coverage (following the enactment of the EESA) leads to a significant increase in total credit union lending and risk relative to unaffected counterparts. Our findings provide new and additional insights to the existing evidence regarding the behavioural

responses of financial institutions to the expansion of deposit insurance coverage. We show that despite having very different operational objectives and governance, not-for-profit financial institutions behave in similar ways to commercial banking counterparts. Given that the observed increased lending and portfolio risk run contrary to the member-based cooperative ethos of credit unions (which are much more reliant on deposits for funding relative to commercial banks), the results have particular relevance for industry stakeholders, and regulatory oversight of the credit union (NCUSIF) deposit insurance fund.

The results are robust to a battery of sensitivity checks including alternative dependent variables, various fixed effects permutations and possible confounding events such as the introduction NCUSIF corporate credit union (CCU) stabilization programme (which required credit unions to write-off 1% of their insured deposits by 51% and make additional annual contributions to cover the costs of the CCU program). By loan category, our results suggest that the change in maximum level of deposit insurance coverage leads to a corresponding increase in credit card, unsecured personal and vehicle lending. In terms of loan performance, we find consistent evidence that following the change in maximum level of deposit insurance coverage, overall loan quality declines. This is driven by an increase in the delinquency for unsecured and non-real-estate secured loans. Overall, the results of our empirical analysis suggest significant changes in the volume, composition and riskiness of credit union lending following an increase in the coverage of insured deposits of US credit unions under Section 136 of the Emergency Economic Stabilization Act.

We contribute to the literature regarding the impact of deposit insurance on the risk taking of financial institutions. [4,5] DeLong and Saunders (2011) find that the introduction of deposit insurance in the 1930s increased risk-taking at US banks. Contrary evidence is presented by Gropp and Vesala (2004) who provide evidence of a decline in bank risk following the introduction of deposit insurance for a sample of European banks. Using a similar identification strategy to that employed in the current study, Lambert et al. (2017) present evidence that following an increase in deposit insurance coverage, affected US commercial banks extend more risky commercial real estate loans, which subsequently perform poorly, leading to an overall deterioration in the financial stability of affected banks. Our study lends support to (and complements the recent findings of Lambert et al. (2017) for US commercial banks) the view that while deposit insurance leads to increased lending, this is associated with a reduction in loan quality. This suggests that increasing the maximum level of deposit

[4] Prior US evidence suggests that uninsured bank depositors respond negatively to increases in bank risk. Goldberg and Hudgin (2002) find that uninsured deposits decline with increased risk and probability of insolvency in the period 1986 to 1989, while Maechler and McDill (2006) find evidence that levels of uninsured deposits at banks and savings and loans corporations are crucially impacted by bank capitalisation, asset quality, earnings, and liquidity. Calomiris and Wilson (2014) present evidence for New York banks in the 1920s and 1930s and find evidence of deposit outflows with increasing levels of bank risk. Iyer et al. (2016) show heterogeneity in depositor responses to significant negative shocks at an Indian bank. Depositors with prior loan relationships and bank employees only run in the presence of a negative shock, which threatens bank solvency, while uninsured depositors are likely to run even if a shock does not threaten solvency. Martin et al. (2021) utilise account-level deposit balances data from a distressed US bank during the global financial crisis and observe that despite significant outflows in response to declining fundamentals, inflows of new deposits continued, suggesting that deposit insurance increases the willingness of depositors to fund poorly performing banks.

[5] Cross-country evidence supports the view that deposit insurance decreases market discipline (Berger and Turk-Ariss, 2015; Demriguc-Kumt and Detragiache, 2002; Demirguc-Kunt and Huizinga, 2004; Anginer et al., 2014). However, individual country level studies provide mixed evidence. For example, the removal of unlimited deposit insurance in Japan in 2002 led to an increase in market discipline (Imai, 2006), while the introduction (Ioannidou and Penas, 2010) and expansion of deposit insurance coverage (Ioannidou and de Dreu, 2019) in Bolivia decreased market discipline. Relatedly, Iyer et al. (2019) present evidence for Denmark, which suggests that following a decrease in deposit insurance coverage, large too-big-to-fail (TBTF) banks find it less costly to retain deposits than counterparts not considered to be TBTF. For the US, Calomiris and Jaremski (2019) present historical evidence for the early 20th century suggesting that banks covered by deposit insurance schemes captured deposits, leading to increased liquidity risk and eventual losses. Focusing on dividend payout, Johari et al. (2020) present evidence that an increase in deposit insurance coverage leads US banks to pay lower dividends, suggesting that a large reduction in uninsured deposits reduces pressure on banks to continue paying dividends during periods of financial instability when accumulation of retained earnings are likely to be important. Extensive reviews of the depositor discipline and deposit insurance scheme characteristics and salient literature are provided in Eisenbeis and Kaufman (2009), Demirgüç-Kunt et al. (2008; 2015), Calomiris and Jaremski (2016), Anginer and Demirgüç-Kunt (2019).

insurance coverage leads to a decline in market discipline and an increase in moral hazard in the US credit union industry. Our findings contrast with historical evidence, which suggests that the introduction of deposit insurance for US credit unions did not lead to an increase in risk taking (Karels and McClatchey, 1999).

We also contribute to the small, but important literature investigating the consequences of deposit insurance for cooperative financial institutions. Early evidence suggests that the introduction of federal deposit insurance increased the risk of US credit unions (Black and Dugger, 1981; Clair, 1984). However, Kane and Hendershott (1996) note that the NCUSIF performed better than the FDIC deposit insurance fund throughout the 1980s, thus providing no evidence for moral hazard at credit unions. The authors attribute these findings in large part to the design of the NCUSIF, which discouraged excessive risk taking by requiring credit unions to keep one per cent of insured deposits with the NCUSIF and accept liability for an additional premium if fund reserves decline below regulatory minima. Karels and McClatchey (1999) also provide little support for moral hazard at credit unions after the introduction of federal deposit insurance in the 1970s. However, Rauterkus and Ramamonjiarivelo (2010) suggest that depositors do punish risky credit unions via deposit withdrawals during the period 2004-2008. Van Dalsem (2016) finds that uninsured depositors play an important role in disciplining credit union managers. This is confirmed in an extensive study by Gomez-Biscarri et al., 2021) who provide evidence of deposit market discipline at credit unions for the period 1994-2018. Specifically, the authors find a negative relationship between credit unions portfolio risk, earnings volatility, and the growth in member deposits.[6] Using a quasi-experimental research design, the results of the present study suggest that credit unions increase total and unsecured lending, leading to a decline in loan quality. As such our results augment

[6] Outside the US, Murata and Hori (2006) and Chipalkatti et al. (2007) provide evidence of depositor discipline at Japanese and Indian cooperative banks respectively, while Arnold et al. (2016) note that depositors at German savings and cooperative banks exert greater market discipline than counterparts at commercial banks.

and complement evidence presented in prior studies by showing that more generous deposit insurance coverage increases moral hazard at credit unions, evidenced by subsequent increased lending and a deterioration in loan quality. The finding that credit unions behave similarly to commercial banks despite differences in operational objectives and ownership structure has relevance for (NCUA) regulatory oversight of the (NCUSIF) deposit insurance fund and raises important policy implications for financial stability.

Our study also contributes to the literature on the evolution, composition and riskiness of credit union lending in response to changes in macroeconomic conditions and industry regulation. Prior descriptive evidence suggests that credit union lending is less sensitive (than commercial bank lending) to fluctuations in macroeconomic conditions. This leads credit unions to continue extending loans to members during economic downturns (Smith and Woodbury, 2010; Smith, 2012). However, recent evidence suggests that credit unions that were more negatively impacted by the onset of the global financial crisis did significantly reduce mortgage and unsecured loans to members (Ramcharan et al., 2016).[7] We augment this evidence using a quasi-experimental research design, which uses data on insured and uninsured credit union deposits to investigate the extent to which credit union lending is affected by an increase in maximum level of deposit insurance coverage. We find that credit unions most affected by changes to deposit insurance (i.e. those with the largest increase in the proportion of insured deposits) increase total unsecured (vehicle and credit card) lending. This suggests that a relaxation in prudential regulation allowed credit unions to continue lending to members during the financial crisis, albeit by extending riskier unsecured loans. Consequently, our results suggest that regulatory permissiveness has a short-run positive impact on credit union member households via increased lending. However, this comes with a downside of increasing

[7] Cororaton (2020) notes that US credit union lending grew more quickly relative to similar commercial banks in the period following the global financial crisis. This higher loan growth was achieved by lower interest margins. Aghabarari et al. (2021) provide similar evidence for Brazil, which suggests that credit unions reduced lending less than commercial banking counterparts during a crisis.

the loan portfolio risk at credit unions and subsequent losses, which are ultimately borne by the member-owners at credit unions.

2. Background, Methodology and Data

2.1. Background

In common with commercial banks (which are supervised by various government agencies including the Federal Reserve, Office of the Comptroller of the Currency, Federal Deposit Insurance Corporation), credit unions are subject to prudential oversight including deposit insurance and capital regulation overseen by an industry regulator (the National Credit Union Association, NCUA). For banks, federal deposit insurance was introduced following the widespread bank failures that occurred during the Great Depression. The first Federal deposit insurance scheme (Federal Deposit Insurance Scheme Insurance Fund, FDICIF) was established under the auspices of the Federal Deposit Insurance Corporation (FDIC) via the Banking Act of 1933. In the case of credit unions, Federal deposit insurance was not introduced until 1970, when the National Credit Union Share Insurance Fund (NCUSIF) was founded under NCUA oversight. Insurance premiums were levied against federally insured state and federally chartered credit unions. Both deposit insurance funds carry enough capital to fund operating activities. The FDICIF the designated minimum reserve ratio is 1.35% while for the NCUSIF, the statutory reserve ratio is 1.2%. While there are some differences in the funding arrangements of the FDICIF and the NCUSIF, depositors at both credit unions and banks enjoy the same level of protection on deposits to a maximum of $250,000, albeit in the case of credit unions, depositors are also the owners.[8]

[8] In contrast to banks which had been subject to capital regulation since the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991, minimum capital requirements were not introduced for credit unions until the passage of the Credit Union Membership Access Act (CUMAA) in 1998. Most credit unions are relatively low risk, due to their cooperative ethos, restrictions on the geographic (common bond) and product scope (credit unions lend to member and face maximum caps on small business lending) activities and prohibitions against issuing equity shares and supplemental capital. Moreover, in contrast to commercial banking counterparts, the

In an attempt to maintain consumer confidence in retail financial institutions and stabilise the financial system during the global financial crisis of 2007-2009, the US Senate voted for the temporary increase in the limit on federal deposit insurance coverage from $100,000 to $250,000 per depositor, which was ratified upon the ratification of the Emergency Economic Stabilization Act on 3rd October 2008. Anecdotal evidence suggests that this change to deposit insurance coverage was unexpected given that US stock markets reacted to increase the coverage limit to $250,000 (Johari et al., 2020).

The NCUA and its constituent credit unions moved quickly to communicate changes to depositors evidenced by the subsequent official testimony (of David Marquis, Executive Director, NCUA) to the United States Congressional Committee on Housing, Banking and Urban Affairs hearings on current issues in deposit insurance (March 9th 2009) and the NCUA Annual Report of 2008-2009 (NCUA, 2009a, p.11), which notes: *'The economic crisis resulted in a variety of major governmental actions, including legislation increasing the level of federal insurance coverage to $250,000. When the legislation was signed into law, NCUA moved quickly to update insurance coverage disclosures and signs and to implement a public awareness campaign to ensure consumers were well informed of the change. Backed by the full faith and credit of the U.S. government, members were assured their federally insured credit union shares were safe and secure.*' At this new threshold, more than 99.5% of depositors, and approximately 80% of the dollar value of deposits were fully insured (Financial Stability Board, 2012).

The temporary increase in deposit insurance coverage was scheduled to expire at the end of 2009. However, industry stakeholders expressed widespread concerns that any expiration of these temporary arrangements would have a detrimental impact on any economic

capital framework for credit unions is not risk-based, and consequently does not differentiate between low- and high-risk institutions (Goddard et al., 2016).

recovery (Horowitz, 2012). Anecdotal evidence suggests that there was extensive industry lobbying of congress to extend the duration of expanded deposit insurance coverage in order to ensure: the stability of financial institutions; and continued access to finance for households and firms (Davis Polk & Wardwell, 2008; Wyatt, 2012). Consequently, Section 204 of the Helping Families Save Their Homes Act passed in 2009 extended the temporary increase in deposit insurance coverage for a further four years. These arrangements were superseded under the terms of Section 335 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, when the $250,000 threshold on deposit insurance was made permanent.

Given that the change in the maximum level of deposit insurance was significant, unanticipated and expected to become permanent, it is highly likely that dependent upon their relative exposure to the change in deposit insurance this would lead to a change in the (lending) behaviour of credit unions. However, ex ante the reaction of credit unions to the Act is difficult to predict because they are different from commercial banks in operational objectives, ownership structure and regulatory framework (as discussed above).

2.2. Methodology

In the present study, we employ a methodology similar to that used by Lambert et al. (2017) and Johari et al. (2020), and utilise a difference-in-difference (DiD) framework to compare the lending behaviour between the most affected (those experiencing significant changes in insured deposits) and the least affected credit unions (those experiencing relatively small changes in insured deposits) in the periods before and after the EESA was enacted. Our empirical model is as specified in Equation (1).

$$y_{it} = \alpha_{it} + \beta_1 \text{Affected}_i * \text{Post}_t + \beta_2 X_{i(t-1)} + \omega_t + \gamma_i + \sigma_i + \varepsilon_{it} \qquad (1)$$

where i denotes credit unions and t denotes (time) quarters. y_{it} is the outcome variable of interest. In our lending analyses (presented in Sections 3.1, 3.2 and 3.3), y_{it} is the ratio of loans to total assets (total gross loans and loan sub-categories). In our loan performance analysis (presented in Sections 4.1 and 4.2), y_{it} is the ratio of non-performing loans to total loans (total non-performing loans and non-performing loans by type and days delinquent). $Affected_i$ is a dummy variable that equals one if a credit union is affected by the EESA, and zero otherwise. $Post_t$ is a dummy variable that equals one for all quarters from Q4 2008 onwards, and zero otherwise.

The key explanatory variable of interest is the interaction term $Affected_i$*$Post_t$. The coefficient on this interaction term is the estimated impact of the change in maximum level of deposit insurance coverage on credit union lending. A positive and statistically significant coefficient would suggest that the change in maximum level of deposit insurance coverage leads to an increase in lending, while a negative coefficient implies the opposite. $X_{i(t-1)}$ are a set of control variables (lagged by one quarter). ω_t, γ_i and σ_i are time, charter type and credit union fixed effects, respectively. ε_{it} is the error term.

The control variables employed in the present study have been used in prior studies modelling credit union behaviour and performance (Karels and McClatchey, 1999; Esho et al., 2005; Goddard et al., 2002; 2008; 2009; 2014; Bauer, 2008). We include: credit union size (Size), measured as the natural logarithm of the total assets; liquidity (Cash) measured as the ratio of cash to total assets; deposit (Total Deposit) measured as the ratio of deposits to total assets; net worth (Net Worth) defined as the ratio of net worth to total assets; and performance (ROA) measured by the return on assets. In order to control for differences in asset quality, we include: the ratio of non-performing loan to total loans (non-performing loan); loan charge-offs to total loans (loan charge-offs); and loan loss provisions to total loans (loan loss provision). We also include average cost of loan measured by loan interest rate which might affect lending

volume. To capture the characteristics of credit unions, we include charter types of credit unions and credit union fixed effects. Table 1 provides detailed definitions of the variables used in the empirical analysis.

[Insert Table 1 here]

2.3. Data

The quarterly data for credit unions for the period Q4 2006 through Q4 2010 come from the Call Reports published by the National Credit Union Association (NCUA), and made available via S&P Global Market Intelligence (formerly SNL Financial) database. We include all credit unions active until after Q4 2008 (when the EESA was enacted) in the analysis. In order to classify credit unions as affected and unaffected by the increase in insured deposits during the period from Q3 2008 to Q4 2008, we adopt a similar approach to Lambert et al. (2017) and Johari et al. (2020). We first calculate the difference between the insured deposits to assets ratio under the deposit insurance coverage of $100,000 and the insured deposit to assets ratio following the increase in deposit insurance coverage to $250,000. Credit unions are assigned to one of four quartiles based on the increase in the ratio of insured deposits to total assets. We retain credit unions in the top and bottom quartiles (i.e. those experiencing the highest and lowest change in the ratio of insured deposits to total assets) in order to create our treated and control groups.

A critical concern is that the determinants of the selection of credit unions into treated and control groups may not be strictly random. This potentially creates a selection bias, which could imply that any observed changes in credit union lending behaviour after the EESA takes effect could be due to the difference in the inherent characteristics of each group rather than the change to deposit insurance regulation. In order to address this concern, we follow prior literature (Cole and White, 2012; Lambert et al., 2017), and use a Propensity Score Matching

approach where we match (based on the key characteristics of credit unions) credit unions from the affected group with counterparts in the control group.[9] The averages of the explanatory variables for each credit union in the period of 2006Q4 to 2008Q3 are used to estimate the probability model from which the propensity scores are derived. We employ one-to-one nearest neighbour matching without replacement in order to ensure that each possible matching credit union can be used only once. A calliper (1%) is also specified to ensure that the propensity scores of credit unions in the control group fall within the appropriate range. From this propensity score matching procedure, we can match credit unions in the affected group with counterparts in the control group. Thus, the final sample used in the empirical analysis comprises 1,268 (634 treated and 634 control) credit unions.

Figure 1 presents information regarding the trends in total insured deposits (Figure 1a) and insured deposits of the affected and control group credit unions (Figure 1b). While the ratio of deposits to total assets of both groups follows a similar trend, there is a remarkable increase in the insured deposit ratio of the affected credit unions following the change in maximum level of deposit insurance coverage (indicated by the vertical line).

[Insert Figure 1 here]

In the baseline empirical analysis, we start with a sample that covers ±1 quarter around the change in maximum level of deposit insurance coverage at the beginning of Q4 2008 (Q3 2008 to Q1 2009) and then extend the sample up to ±4 quarters. In subsequent robustness tests, we extend the analysis window to ±6 for loan volume and ±8 quarters for loan performance (in order to capture the delayed effects of risky lending on loan quality).

[9] The variables used for matching include Size, Cash Deposit, Net worth (capital), ROA and Non-performing assets. We also include State fixed effects to capture the locality of credit unions. Table 1 presents detailed definitions of the variables.

Table 2 presents the summary statistics of the main variables used in our empirical analysis for the period prior to the change in maximum level of deposit insurance coverage (Q4 2006 to Q3 2008). Panel A presents summary information for the full sample, Panel B does the same for the affected and unaffected group. In order to ensure similarity across our treated and control group of credit unions, we follow Imbens and Wooldridge (2009) and compute normalised differences (ND) as: $\text{ND} = \frac{\bar{X}_1 - \bar{X}_0}{\sqrt{SD_1^2 + SD_0^2}}$ where $\bar{X}_1$ and $\bar{X}_0$ denote the mean of treatment and control group respectively, and respective variances are denoted by SD_1^2 and SD_0^2. The two groups are considered equal and appropriate for linear regression analysis if ND lies within the range of ±0.25. As Table 2 (Panel B) illustrates, prior to the change in maximum level of deposit insurance coverage, affected and unaffected credit unions are similar across various characteristics (ND falls within ±0.25).[10]

[Insert Table 2 here]

3. Impact of deposit Insurance on credit union lending

3.1. The baseline results

In order to test the impact of deposit insurance on the credit union lending, we run our baseline specification in Equation (1) over the period of Q3 2008 to Q1 2009 (±1 around the introduction of EESA in October 2008) and then extend to ±2, ±3 and ±4 quarters (Q4 2007 to Q4 2009). The results are presented in Table 3. Column (1), (2), (3) and (4) present the results for ±1, ±2, ±3 and ±4 quarters respectively. All regressions include quarter (time), charter type and credit

[10] We also perform parallel trend test. In order to conserve space, the results are not reported here, but are available from the authors upon request.

union fixed effects. The results presented in Column (1) represent our preferred baseline estimates.[11]

[Insert Table 3 here]

Overall, the results are consistent across various time horizons (windows). The estimated coefficients on *Affected*Post* (the DiD term) are positive and statistically significant at 1% level for ±1 quarter window around the increase in deposit insurance. This suggests that relative to counterparts assigned to the control group, affected credit unions expand lending following the change in maximum level of deposit insurance coverage. The results presented in Table 3 are also economically significant. Following the change in maximum level of deposit insurance coverage, the change in loan-to-asset ratio for affected credit unions is 55 basis (±1 quarter) points higher than unaffected counterparts. Considering the loan-to-asset ratio in our sample is around 0.61, the lending gap corresponds to a substantial marginal effect of 0.90% (=0.55%/0.61). Consequently, these results suggest that deposit insurance leads credit unions to initiate more loans.

Our results are consistent with the findings from Lambert et al., (2017) who use a similar identification strategy for US commercial banks, and find that banks increase lending after the introduction of the EESA in October 2008. Moreover, our results also provide support to the historical findings of Black and Duggar (1981) who show that following the introduction of deposit insurance in the early 1970s, credit unions assumed more risk. However, our findings differ from Karels and McClatchey (1999) who find that the adoption of deposit insurance does

[11] Because the EESA was effective at the start of Q3 2008 (October 3rd, 2008) credit unions could have responded to the deposit insurance level change and altered their lending behaviour since the beginning of the quarter. Any significant change in lending volume should reflect in the financial statements at the end of Q3 2008. If this was the case, there might not be Time 0. Therefore, we carried out a robustness test without Time 0 and find that the results only become significant after 2 quarters. This suggests that credit unions did not respond as soon as the EESA became effective and provides some support to our baseline set-up. In order to conserve space, the results are not reported here, but are available from the authors upon request.

not lead to an increase in the risk-taking behaviour of credit unions. Regarding control variables, the overall result suggests that smaller, less liquid, higher deposit base and better capitalized credit unions increase lending following a change in maximum level of deposit insurance coverage.

3.2 Robustness tests and sensitivity checks

In this section, we execute a number of additional tests to ensure the robustness of our baseline results. All robustness tests include the same full set of control variables as those used in the baseline setting.

Corporate Credit Union Stabilisation Program

An important event occurring during our analysis period relates the corporate credit union (CCU) stabilization program initiated by NCUA.[12] This program was required to restore the equity ratio of the NCUSIF, which suffered a significant decline in equity capital following significant losses incurred by corporate credit unions on mortgage-backed securities. In January 2009, credit unions were directed by the NCUA to: write-off 1% of their insured deposits by 51%; and make a special temporary contribution to meet the costs of the CCU stabilization program. These measures were expected to reduce credit unions' return on assets (ROA) by an average of 0.62% and net worth by 0.56%. Consequently, it is plausible that in

[12] Corporate credit unions are non-profit financial institutions owned by their respective member credit unions via paid-in and membership capital and deposit (share) accounts. Each credit union has equal voting rights. Corporate credit unions provide loans, investment products and processing services to member credit unions. De-regulation in the 1990s expanded the investment opportunities of corporate credit unions, and led to a change to investment portfolios toward risky investments including non-government agency mortgage backed securities. During the global financial crisis of 2007-2009, several large corporate credit unions experienced significant investment losses. With insufficient capital to cover such losses, the remainder of the losses were to be covered by credit unions' paid-in and membership capital, and the NCUSIF. Ultimately the losses were so large that the NCUA (in cooperation with the Federal Reserve Board and the Department of the Treasury) instituted a series of measures (including a $1billion capital injection) to stabilize the system and resolve problems individual corporates by isolating distressed assets. Ultimately, the costs (of what became known as the Corporate Credit Union Stabilization Program) were covered via special assessments levied on individual credit unions (NCUA, 2009b, 2009c, 2009d; Ramcharan et al., 2016).

response to such financial pressures, credit unions would increase lending to cover these additional expenses and maintain net worth ratios at a level to comply with regulatory minima.

In order investigate this possibility, we compute the ratio of the NCUSIF expense to total non-interest expense of each credit union. We scale the NCUSIF expense in Q1 2009 (the first available data) by total non-interest expense in Q4 2008. This allows us to capture the financial pressure on credit unions at the time they were required to write-off their insured deposits (the result is unchanged when total noninterest expense in Q1 2009 is used). Second, we construct a CCU stabilization variable, where credit unions with high expense (expense ratio above the median) as 1, and 0 otherwise. We then introduce a triple interaction term (*Affected*Post*CCU stabilization*) into our baseline regression in order to estimate the impact (if any) on credit union lending. The results reported in Column (1) of Table 4 show that the coefficient on this triple interaction term is insignificant. This suggests that credit unions did not increase lending to cover the expenses associated with the CCU stabilization program.

[Insert Table 4 here]

Alternative model specifications and lending measure

In order to eliminate bias from unobservable factors that change across credit unions within a given state and year, we augment our baseline model specification by including state-year fixed effects. The results are reported In Column (2) of Table 4. In Column (3), we use the change in loan-to-asset ratio as an alternative outcome variable. In Column (4), we report the results from a sample which is winsorized at the 1% and 99% level to exclude outliers. In Column (5), we exclude the largest credit unions (total assets exceeding $1 billion). In Column (6), we exclude under-capitalized credit unions that could be subject to different lending incentives

arising from their respective financial positions. In all of the aforementioned cases, the results of our empirical analysis remain unchanged.[13]

Commercial Bank Depositor Behaviour

It is possible that existing credit union depositors transfer money from banks to credit unions or bank depositors could join as new members of credit union and deposit funds, leading to the increase in deposit inflows to credit unions and, as a result, the surge in deposits that we observe are not entirely due to the deposit insurance Act. If this is the case, the deposits of commercial banks in the same period should decline. We then collect data for all commercial banks from Call Reports from Q4 2007 to Q4 2009 and explore the changes in commercial bank deposits. We find that deposits at commercial banks increase in the same period as reported in the Appendix (Figure A1a: total deposits; Figure A1b: retail deposits). The finding is consistent the results from a similar study using a matched sample of commercial banks by Lambert et al. (2017) and rules out the possibility of depositors switching from banks to credit unions.

Commercial Bank Borrower Behaviour

Having shown previously that, like credit unions, deposits of commercial banks also increase, we then explore the change in commercial bank loans. If higher deposits lead to higher lending (either by supply: banks use extra liquidity to make loans; or demand as deposit customers increasingly apply for loans), we should also observe an increase in lending at commercial banks similarly to lending increase at credit unions. However, Figure A2 in the Appendix reveals that commercial bank loans decline both in relative (loan-to-asset on the left axis) and absolute terms (dollar amount on right axis) after changes to deposit insurance coverage. This statistic shows that higher deposits do not always drive commercial bank lending up. If this

[13] We perform two additional tests: one is a placebo test in which the actual event date is falsified to occur one year before and one year after the actual event date and another in which net loans (that reflects more precisely lending supply) are used to measure lending volume and the findings are consistent with our baseline results. In order to conserve space, we do not report these results. However, the results are available from the authors upon request.

loan decline is driven by a reduction in demand, we would not see borrowers switching to credit unions. If the decline in loans arises from a reduction in bank credit supply, borrowers will turn to credit unions for loans. Given that credit unions are member-based organizations, if borrowers (and depositors) are new, there should be a significant rise in the number of members joining credit unions following the increase in deposit insurance coverage. Utilizing the membership data of credit unions from Call Reports, we explore how membership changes and show the result in Figure A3 in the Appendix. As seen from Figure A3, there is no abnormal growth in the number of credit union members (the dotted line) within two quarters around the deposit insurance Act (Q1 2008 to Q1 2009). This reduces concerns regarding the possibility that the observed increase in credit union lending arises from loans to newly switched bank depositors seeking loans.[14]

3.3. Loan categories

In order to obtain further insights to the lending behaviour of credit unions following an increase in the maximum coverage of insured deposits, we proceed to examine lending by loan sub-category. The seven loan sub-categories are: (1) unsecured credit card loans; (2) other unsecured personal loans; (3) new-vehicle loans; (4) used-vehicle loans; (5) other loans to members; (6) first mortgage loans; and (7) other real estate loans.[15] If an increase in deposit

[14] We acknowledge that the use of loan balances aggregated at credit union level to infer about the lending volume prevents us from ruling out completely the possibility that credit union lending increase is partially caused by a reduction in commercial bank lending. Home Mortgage Disclosure Act data (HMDA) at first seems to be a good fit for this purpose given that it provides data on the number of loan applications and approvals, and previous studies use approval rate defined as the number of loans approved divided by loans applied to account for demand side issues (Cortés et al., 2016; Lim and Nguyen, 2021). Another useful feature of HMDA data is that there is information on loan location which facilitates the inclusion of two-way (bank-county and county-year) fixed effects as additional tools to control for local characteristics affecting loan demand. Unfortunately, the HMDA data are only available annually with the date stamps of loan decisions kept confidential. Consequently, we cannot assess how lending changes following the increase in the maximum deposit insurance because the dates (of loan application and origination) are unavailable on the public version of HMDA. In addition, due to size threshold criteria, most credit unions are too small to be included in the HMDA dataset (Avery et al., 2010; van Rijn and Li, 2019).

[15] Our use of these loan categories is driven by the availability of data. The cumulative total of these loan categories represent 98% of total lending of credit unions in the sample period. Auto loans and mortgage and real estate loans

insurance reduces market discipline, and encourages credit unions to assume more risk, we would expect to see credit unions re-orientate toward riskier forms of lending such as credit card and other unsecured personal lending. We re-estimate our baseline model for each of the aforementioned loan sub-categories. The results are presented in Table 5.

[Insert Table 5 here]

As can be seen from Table 5 (Panel A), an increase in the maximum coverage of insured deposits leads to a corresponding increase in credit card loans (Column 1), unsecured personal loans (Column 2), new vehicle (Column 3) and used vehicle loans (Column 4). The estimated coefficients on *Affected*Post* are positive and statistically significant. This suggests that an increase in the maximum coverage of insured deposits leads to more risky lending by credit unions.[16] This result complements recent evidence suggesting that following an increase in the maximum coverage of insured deposits, commercial banks increase commercial real estate lending (Lambert et al., 2017).

Given the particularly strong significance exhibited by the coefficient on *Affected*Post* in the unsecured loans regression, we expand the analysis to investigate whether the increase in lending to unsecured (riskier) borrowers persists over time. In order to do so, we extend the analysis window up to ±6 quarters, and report the results in Panel B of Table 5. Columns (1) to (6) of Panel B show that the increase in unsecured loans appears to be long lasting. All *Affected*Post* coefficients are statistically significant. In terms of magnitude, the coefficient

represent a major component of the loan portfolio accounting for approximately 31% and 53% of loan portfolio of credit unions, respectively, as shown in Table A1 in the Appendix. These statistics are consistent with previous studies (Ramcharan et al., 2016) and data from NCUA (2020).

[16] Credit card, unsecured and new vehicle loans are among the riskiest loans extended by credit unions. Evidence of this is presented via the results of a set of t-tests comparing the average delinquency rates between different loan categories. The results reported in Table A2 confirm this. These results are also consistent with the descriptive statistics using the latest data from the Quarterly Credit Union Data Summary Q4 2020 compiled by the NCUA shown in Table A3 in the Appendix.

reaches its peak after four quarters, and then begins to decline. These results provide additional evidence of more risk taking by credit unions following an increase in the maximum coverage of insured deposits.

4. Impact of deposit insurance on credit union loan quality

4.1. Overall loan performance

Thus far, we have documented that an increase in the maximum coverage of insured deposits leads to an expansion in lending, and a re-orientation toward unsecured loans. In this section, we extend our analysis to investigate how an increase in the maximum coverage of insured deposits affects loan performance (quality).

Following established practice in prior literature, we use the ratio of non-performing loans to total loans as a proxy for loan performance. A higher non-performing loan ratio indicates lower loan quality and vice versa. Thus, if loan quality decreases (increases) following an increase in the maximum coverage of insured deposits, we should expect a positive (negative) and significant coefficient on *Affected*Post*. Given that data on non-performing loans from credit union Call Reports include loans delinquent for 2 months and more, we extend the analysis window from ±1 quarter in the baseline (2008Q3 to 2009Q1) to ±8 quarters (2006Q4 to 2010Q4) around the introduction of EESA. This allows us to capture any delayed effects of lending decisions on loan performance. Table 6, Columns (1) through (8) present the results for eight different time windows. We include the same full set of control variables used in our baseline specification.[17]

[17] Given that the Emergency Economic Stabilization Act was introduced at the beginning of the financial crisis, the higher level of non-performing loans could be a result of the crisis itself. In this study, we explore how the increase in non-performing loan (NPL) differs between the two groups of credit unions that are most and least affected by changes to the maximum level of deposit insurance coverage. As shown in Figure A4 of the Appendix, the NPLs of the two groups follow a parallel trend prior to Q3 2008. However, a divergence in NPLs across the two groups occurs following the enactment of the Emergency Economic Stabilization Act (2008), which suggests a differential impact of changes to deposit insurance.

[Insert Table 6 here]

The estimated coefficients on non-performing loans become significant two quarters after the increase in the maximum coverage of insured deposits (Column 2). The positive *Affected*Post* coefficient is also economically significant. This suggests that following the increase in the maximum coverage of insured deposits, non-performing loans of affected credit unions increase relative to counterparts in the control group. The non-performing loans are persistent. The significance only diminishes after six quarters, evidenced by the decline in the magnitude and significance of the *Affected*Post* coefficient (Column 6). Our evidence from a sudden increase in the deposit insurance coverage and higher frequency data (allowing us to observe quarterly change in credit union loan performance) supports the view that an increase in deposit insurance coverage reduces depositors' monitoring incentives and encourages risk taking (Eisenbeis and Kaufman, 2014; DeLong and Saunders, 2011).[18]

4.2. Loan delinquency by type and days delinquent

Thus far, we have documented that credit unions affected by the increase in the maximum coverage of insured deposits increase overall lending to risky (unsecured) borrowers, leading to an increase in overall non-performing loans. In this section, we further expand the analysis to investigate loan performance (delinquencies) by collateral type and days delinquent.

Given that affected credit unions increase lending to unsecured borrowers, we expect loans without collateral to be the main driver of the decline (increase) in overall loan performance (non-performing loans). In order to do so, we utilise detailed information made

[18] We also use total loan charge-offs and charge-offs by loan type as alternative indicators of risk in an additional robustness test. The results reported in Table A4 in the Appendix are consistent with the main findings.

available via credit union call reports, which categorise loan delinquencies into four collateral types: unsecured credit card loans; unsecured and non-real-estate secured loans; mortgage loans; and other real estate loans.[19] We then use the ratios of these loan delinquencies to total loans as the dependent variables in our baseline model (Equation 1). Table 7 reports the results.

[Insert Table 7 here]

As can be seen in Panel A (Column 2), the delinquency for unsecured and non-real-estate secured loans increases following the increase in the maximum coverage of insured deposits. The coefficient on *Affected*Post* is economically meaningful and statistically significant. Given that we have already found evidence to suggest that credit unions increase unsecured loans, we believe that the increased delinquency is driven by unsecured loans rather than non-real-estate secured loans (which cannot be observed separately due to data limitation). In addition, we explore delinquency by days delinquent (Panel B) and find that the delinquency is concentrated on loans delinquent from 2 months to 6 months (Columns (3) for ±2 quarters window and (4) for ±3 quarters window).

Overall, our findings suggest that following the increase in deposit insurance coverage, affected credit unions take on more risk by increasing lending to unsecured borrowers, leading to a decline in loan performance. This supports the findings of: Black and Duggar (1981) for credit unions; and DeLong and Saunders (2011) and Lambert et al. (2017) for commercial

[19] Because of data limitation, we are unable to align the non-performing loan categories with seven loan categories examined in the lending volume analysis (Section 3.3). As a result, we use the instructions to credit unions (Call Report Form and Instructions) to partition seven loan categories into four loan collateral types (unsecured credit card loans; unsecured and non-real-estate secured loans (e.g. vehicle loans, all other consumer loans and member loans not secured by real estate); mortgage loans; other real estate loans). The relevant information comes from the Call Report Form and Instructions (June 2008) available at https://www.ncua.gov/files/publications/data-apps/CRF200806.pdf. Seven loan types are listed on page 4 (Line 15, 16, 17, 18, 19, 20 and 22) and four loan delinquency types are on page 9 (Line 1, 2, 3 and 5) of the Call Report Form. Additional instructions to reporting loan delinquencies (classified on page 9) are detailed on page 42 (Item 5) of the Call Report Instructions, which immediately follow the Call Report Form.

banks. However, our findings contrast to those presented by Karels and McClatchey (1999) regarding the impact of deposit insurance on credit union risk. By duration, we show that total loan delinquency is driven by unsecured loans and loans delinquent from 2 to 6 months.

5. Conclusions

Deposit insurance schemes are an integral part of financial safety net arrangements in many countries, providing valuable protection for insured depositors from the negative outcomes arising from contagious runs and bank failures. However, the safety provided by deposit insurance schemes may also introduce a moral hazard problem by encouraging depositors and financial institutions to behave recklessly. Indeed, an extensive base suggests this has often been the case for shareholder owned commercial banks.

In this study, we investigate how deposit insurance affects credit union behaviour. As such we contribute to an area where there is a paucity of evidence. Moreover, our study is of particular relevance given that credit unions are financial not-for profit cooperatives almost entirely reliant on deposit funding from a pre-defined membership sharing a common bond. Consequently, how deposit insurance impacts on credit union behaviour has significant implications for the vitality and sustainability of an important segment of the retail financial services industry providing deposit and lending services to households.

We use the United States credit union industry as a setting to investigate the response of credit union lending following a sudden change to the maximum coverage of insured deposits, which took place at the height of the global financial crisis in October 2008. The increase in insurance coverage did not affect all credit unions equally. Some credit unions experienced a substantial increase in insured deposits, while others experienced a negligible change. Given that the change in the maximum level of deposit insurance was significant and unanticipated, it is likely that the change in deposit insurance would lead to a change in the

(lending) behaviour of credit unions. However, the reaction of credit unions is difficult to predict given their not-for-profit orientation, diffuse ownership and cooperative ethos.

We take advantage of the variation in credit union exposure to changes in deposit insurance arrangements to overcome identification concerns and investigate whether there is a link from deposit insurance to credit union lending. Employing propensity score matching procedures to classify credit unions into affected and unaffected groups and a difference-in-difference approach, we show that affected credit unions significantly increase overall lending following the increase in the maximum coverage of insured deposits. The increase in lending is particularly evident for unsecured loans. The expansion in this risky form of lending leads to a deterioration in loan performance, which varies by loan type and duration.

The increase in risky lending following an increase in deposit insurance coverage and deposit inflows provides some evidence to support the conjecture that the diffuse ownership, lack of internal monitoring and absence of market discipline at credit unions is compounded by moral hazard associated with deposit insurance (Newton, 2015). This leads credit union managers to expand lending and increase portfolio risk to the detriment of members. This suggests a need for policy measures to strengthen external monitoring and place restrictions on loans to members such as caps on loan rates, loans conditioned on deposits of members or length of membership.

Overall, the results of our study suggest that the more generous deposit insurance coverage brought about by the EESA increased moral hazard at credit unions and led to increased lending and a deterioration in loan quality. The finding that credit unions behave similarly to commercial banks despite differences in operational objectives and ownership structure has relevance for the regulatory oversight of credit union risk as well as the administration of the deposit insurance fund.

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Figure 1. Change in Credit Union Deposits following the EESA Act in October 2008

Figure 1a. All Credit Unions

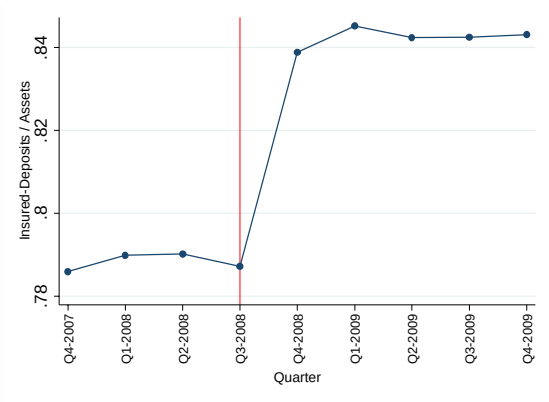
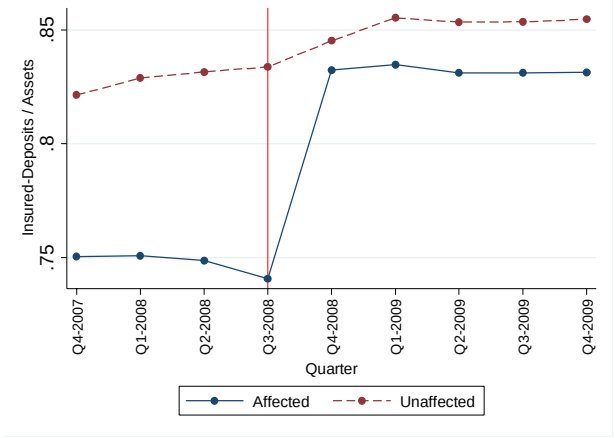


Figure 1b. Affected vs Unaffected



Note: This figure presents the average change in Insured Deposits and Total Deposits of credit unions around the introduction of EESA on October 3rd, 2008, which increased deposit insurance from $100,000 to $250,000. The solid vertical lines indicate the end of the third quarter of 2008, three days before the EESA was launched. Figure 1a shows the change in Insured Deposits to Total Assets for all credit unions. Figure 1b compares the change in Insured Deposits to Total Assets between affected and unaffected group. The affected group consists credit unions which have the difference in insured-deposits-to-total-assets ratio based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 falling in the top quartile. The unaffected group comprises credit unions in the bottom quartile. The solid line represents the average value for the affected and dotted line for unaffected group of credit unions. Each group includes 634 credit unions from a propensity score matched sample.

Table 1. Variable Construction and Definitions

Variable	Definition
Post	A dummy variable that equals one for all quarters from Q4 2008 onwards after the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000 per depositor per bank, and 0 otherwise
Affected	A dummy variable that equals one if the difference in the ratio of insured deposits to total assets based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 lies in the top quartile, and 0 for credit unions showing a difference in the bottom quartile
Affected*Post	A dummy variable that equals one for an affected credit union from Q4 2008 onwards, and 0 otherwise
Insured deposit	Total insured deposits of a credit union to total assets. Prior to Q4 2008, the insured deposits are based on $100,000 threshold per depositor and bank. From Q4 2008 onwards, the threshold is $250,000 per depositor and bank
Total loan	The ratio of total loans to total assets
Credit card loan	The ratio of credit card loans to total assets
Unsecured loan	The ratio of other unsecured loans to total assets
New vehicle loan	The ratio of new vehicle loans to total assets
Used vehicle loan	The ratio of used vehicle loans to total assets
Mortgage loan	The ratio of mortgage loans to total assets
Other real estate loan	The ratio of other real estate loans to total assets
Other loan	The ratio of all other loans to total assets
Size	The natural logarithm of total assets
Cash	The ratio of cash and cash equivalent to total assets
Total deposit	The ratio of total deposits to total assets
Net worth	The ratio of net worth to assets ratio
ROA	The ratio of net income to total assets
Non-performing loan	The ratio of total loans that become delinquent for 2 months or more to total loans
Loan charge-offs	The ratio of total loan charge-offs to total loans
Loan loss provision	The ratio of loan loss provisions to total loans
Average cost of loan	The average interest rate charged on major loan categories (credit card loan; unsecured loan; new vehicle loan; used vehicle loan; mortgage loan; other real estate loan; other loan)

Table 2. Sample Statistics

Panel A. Full sample

Variables	Mean	Standard Deviation	25th Percentile	50th Percentile	75th Percentile	Observations
Insured deposit	0.7926	0.0783	0.7555	0.8043	0.8485	10,144
Total loan	0.6114	0.1668	0.5165	0.6289	0.7299	10,144
Size (Log of total assets)	10.0026	1.2523	9.1343	9.9167	10.7780	10,144
Total assets (in $ thousands)	55,528.60	134,779.63	9,267.50	20,265.50	47,956.50	10,144
Cash	0.1190	0.0954	0.0564	0.0959	0.1540	10,144
Total deposit	0.8507	0.0506	0.8287	0.8609	0.8844	10,144
Net worth	0.1375	0.0486	0.1051	0.1275	0.1595	10,144
ROA	0.0014	0.0037	0.0005	0.0015	0.0026	10,144
Non-performing loan	0.0141	0.0184	0.0041	0.0088	0.0173	10,136
Loan charge-offs	0.0019	0.0048	0.0001	0.0010	0.0022	10,030
Loan loss provision	0.0014	0.0044	0.0000	0.0007	0.0018	10,136
Average cost of loan	0.0717	0.0163	0.0614	0.0737	0.0834	10,136

Panel B. Normalised difference between affected and unaffected group

	Affected			**Unaffected**			
Variables	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	ND
Insured deposit	0.7573	0.7573	0.0788	0.8279	0.8279	0.0598	-0.7137
Total loan	0.6027	0.6027	0.1816	0.6201	0.6201	0.1501	-0.0739
Size (Log of total assets)	9.9942	9.9942	1.3376	10.0109	10.0109	1.1607	-0.0094
Total assets (in $ thousands)	55,672.49	55,672.49	115,087.80	55,384.70	55,384.70	151,952.09	0.0015
Cash	0.1179	0.1179	0.1056	0.1201	0.1201	0.0839	-0.0163
Total deposit	0.8506	0.8506	0.0483	0.8509	0.8509	0.0527	-0.0042
Net worth	0.1376	0.1376	0.0463	0.1375	0.1375	0.0507	0.0015
ROA	0.0014	0.0014	0.0038	0.0014	0.0014	0.0035	0.0000
Non-performing loan	0.0149	0.0149	0.0209	0.0133	0.0133	0.0156	0.0613
Loan charge-offs	0.0019	0.0019	0.0054	0.0019	0.0019	0.0043	0.0000
Loan loss provision	0.0013	0.0013	0.0046	0.0015	0.0015	0.0043	-0.0318
Average cost of loan	0.0714	0.0714	0.0169	0.0721	0.0721	0.0157	-0.0303

Note: This table reports the descriptive statistics of the credit unions for the period before the event in 2008Q4 (from 2006Q4 to 2008Q3). Panel A reports the statistics for the full sample from a propensity score matching algorithm including both the affected credit unions and the unaffected ones. Each group consists of 634 credit unions. In panel B, we show the summary statistics between the affected group and unaffected group. The normalised difference (ND) following Imben and Woolridge (2009) is shown in the last column of panel B comparing the difference between two groups of credit unions. The value within ±0.25 indicates that they are sufficiently equal for the purposes of conducting a linear regression.

Table 3. Insured Deposits and Credit Union Lending: the Baseline Results

Dependent variable: Loans/Assets	(1)	(2)	(3)	(4)
Affected*Post	0.0055***	0.0048**	0.0056**	0.0078***
	(0.0018)	(0.0021)	(0.0025)	(0.0029)
Size	0.0142	-0.0315**	-0.0372**	-0.0472***
	(0.0122)	(0.0151)	(0.0168)	(0.0171)
Cash	-0.0198	-0.0849***	-0.1049***	-0.1373***
	(0.0144)	(0.0157)	(0.0169)	(0.0184)
Total deposit	-0.0213	0.1787***	0.1611***	0.1393***
	(0.0911)	(0.0399)	(0.0426)	(0.0440)
Net worth	-0.1401	0.1918*	0.2837**	0.3401***
	(0.1140)	(0.1060)	(0.1210)	(0.1297)
ROA	0.0984	-0.0553	-0.0300	0.0825
	(0.2522)	(0.1634)	(0.1413)	(0.1433)
Non-performing loan	-0.0387	-0.1207**	-0.1412**	-0.1496**
	(0.0561)	(0.0600)	(0.0579)	(0.0593)
Loan charge-offs	-0.0045	-0.0245	-0.0854	-0.1232*
	(0.1178)	(0.1174)	(0.0604)	(0.0680)
Loan loss provision	0.1413	0.0535	-0.0296	0.1173
	(0.1606)	(0.1185)	(0.1312)	(0.1207)
Average cost of loan	0.0081	0.1431	-0.1306	-0.2592
	(0.2198)	(0.1813)	(0.1720)	(0.1810)
Constant	0.4966***	0.7283***	0.8109***	0.9693***
	(0.1465)	(0.1703)	(0.1890)	(0.1928)
Observations	3,750	6,272	8,763	11,236
R-squared	0.3541	0.2690	0.1906	0.2542
Quarter FE	Yes	Yes	Yes	Yes
Charter Type FE	Yes	Yes	Yes	Yes
Credit Union FE	Yes	Yes	Yes	Yes
Number of Credit Unions	1,267	1,267	1,267	1,267

Note: This table shows the results of the regression model (1) on the impact of an increase in the maximum coverage of insured deposits on credit union lending. The dependent variable is the ratio of total loans to total assets of credit union *i* at the end of quarter *t*. The estimation is extended from ±1 quarter (Column 1, which is the baseline result) to ±2 (Column 2), ±3 (Column 3) and ±4 quarters (Column 4) around the introduction of EESA on October 3rd, 2008. All regressions include both credit-union and quarter fixed effects. 'Post' is a dummy variable that equals one for all quarters from Q4 2008 onwards after the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000 per depositor per bank, and 0 otherwise. 'Affected' is a dummy variable that equals one for affected credit unions if the difference in the ratio of insured deposits to total assets based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 lies in the top quartile, and 0 for unaffected credit unions that show a difference in the bottom quartile. 'Affected*Post' is the respective interaction term. The regression is estimated on a one-to-one propensity score matched sample including 634 credit unions in each group. Other control variables are all lagged by one quarter. Table 1 displays variable definitions. Standard errors clustered at credit-union level are reported in parentheses. ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Table 4. Robustness Tests

	(1)	(2)	(3)	(4)	(5)	(6)
Affected*Post	0.0069***	0.0087***	0.0120***	0.0052***	0.0053***	0.0051***
	(0.0024)	(0.0024)	(0.0037)	(0.0018)	(0.0018)	(0.0018)
Affected*Post*CCU Stabilization	-0.0027					
	(0.0028)					
Affected		-0.0186**				
		(0.0083)				
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,750	3,750	3,750	3,750	3,723	3,631
R-squared	0.3544	0.2757	0.4333	0.3587	0.3540	0.3622
Quarter FE	Yes	No	Yes	Yes	Yes	Yes
Charter Type FE	Yes	No	Yes	Yes	Yes	Yes
Credit Union FE	Yes	No	Yes	Yes	Yes	Yes
State-Quarter FE	No	Yes	No	No	No	No
Number of Credit Unions	1,267	1,267	1,267	1,267	1,260	1,251

Note: This table shows the robustness test results of our baseline regression model (1) on the impact of an increase in the maximum coverage of insured deposits on credit union lending. The dependent variable is the ratio of total loans to total assets of credit union *i* at the end of quarter *t*, unless otherwise stated. Column (1) presents the results capturing the effects of NCUSIF stabilization expense to inject capital to Corporate Credit Unions (CCU). Column (2) presents the estimation with state-quarter fixed effects. Column (3) uses alternative dependent variable which is the quarterly change in total loans to total assets. Column (4) is the result from a winsorized sample. Column (5) excludes large credit unions with more than $1 billion in total assets. Column (6) excludes credit unions which are undercapitalized. 'Post' is a dummy variable that equals one for all quarters from Q4 2008 onwards and 0 otherwise. 'Affected' is a dummy variable that equals one for affected credit unions if the difference in the ratio of insured deposits to total assets based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 lies in the top quartile, and 0 for unaffected credit unions that show a difference in the bottom quartile. 'Affected*Post' is the respective interaction term. The regression is estimated on a one-to-one propensity score matched sample including 634 credit unions in each group. Other control variables are all lagged by one quarter, but not reported for brevity. The time period is ±1 quarters around the event (2008Q3 to 2009Q1). Table 1 displays variable definitions. Standard errors clustered at credit-union level are reported in parentheses. ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Table 5. Insured Deposits and Credit Union Lending: Loan categories

Panel A. Increase in different loans

Dependent variable: (Categorized) Loan/Asset	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Affected*Post	0.0005**	0.0020***	0.0028***	0.0022**	-0.0005	-0.0007	-0.0008
	(0.0002)	(0.0006)	(0.0008)	(0.0009)	(0.0009)	(0.0008)	(0.0010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,750	3,750	3,750	3,750	3,750	3,750	3,750
R-squared	0.1423	0.1167	0.1951	0.0950	0.0287	0.0781	0.0195
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Charter Type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Union FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Credit Unions	1,267	1,267	1,267	1,267	1,267	1,267	1,267

Panel B. Increase in unsecured loans over time

Dependent variable: Unsecured Loan/Asset	(1)	(2)	(3)	(4)	(5)
Affected*Post	0.0022***	0.0026***	0.0030***	0.0033***	0.0033***
	(0.0006)	(0.0006)	(0.0007)	(0.0008)	(0.0009)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	6,272	8,763	11,236	13,718	16,217
R-squared	0.0895	0.0634	0.0703	0.0738	0.0695
Quarter FE	Yes	Yes	Yes	Yes	Yes
Charter Type FE	Yes	Yes	Yes	Yes	Yes
Credit Union FE	Yes	Yes	Yes	Yes	Yes
Number of Credit Unions	1,267	1,267	1,267	1,267	1,267

Note: This table shows the results of the regression model (1) on the impact of an increase in the maximum coverage of insured deposits on credit union lending. In Panel A, the dependent variable in Column (1) is credit card loan. Column (2) is unsecured loans. Column (3) is new vehicle loans. Column (4) is used vehicle loans. Column (5) is mortgage loans. Column (6) is other real estate loans. Column (7) is other loans to members. In Panel B, The dependent variable is unsecured loans. The event window is extended from ±1 quarter in Panel A to ±2 (2008Q2 to 2009Q2) (Column 1) up to ±6 quarters (2007Q2 to 2010Q2) (Column 5) around the introduction of EESA on October 3rd, 2008. All dependent variables are scaled by total assets. 'Post' is a dummy variable that equals one for all quarters from Q4 2008 onwards after the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000 per depositor per bank, and 0 otherwise. 'Affected' is a dummy variable that equals one for affected credit unions if the difference in the ratio of insured deposits to total assets based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 lies in the top quartile, and 0 for unaffected credit unions that show a difference in the bottom quartile. 'Affected*Post' is the respective interaction term. The regression is estimated on a one-to-one propensity score matched sample including 634 credit unions in each group. Other control variables are all lagged by one quarter but not reported for brevity. Table 1 displays variable definitions. Standard errors clustered at credit-union level are reported in parentheses. The time period is ±1 quarter around the introduction of EESA (2008Q3 to 2009Q1). ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Table 6. Insured Deposits and Credit Quality: Overall non-performing loan (NPL)

Dependent variable: NPL/Total Loan	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Affected*Post	0.0007	0.0017**	0.0023***	0.0025***	0.0025***	0.0023***	0.0022***	0.0021***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Size	0.0115*	0.0046	-0.0010	-0.0016	-0.0024	-0.0018	-0.0008	-0.0005
	(0.0068)	(0.0050)	(0.0049)	(0.0049)	(0.0039)	(0.0033)	(0.0030)	(0.0031)
Cash	0.0010	0.0101	0.0086*	0.0086	0.0076	0.0066	0.0044	0.0046
	(0.0062)	(0.0073)	(0.0051)	(0.0063)	(0.0057)	(0.0051)	(0.0053)	(0.0053)
Total deposit	0.0349	0.0092	0.0096	0.0140	0.0128	0.0141	0.0162	0.0161
	(0.0370)	(0.0174)	(0.0153)	(0.0140)	(0.0128)	(0.0123)	(0.0108)	(0.0106)
Net worth	0.1675**	0.1078**	0.0483	0.0070	-0.0005	0.0094	0.0198	0.0132
	(0.0667)	(0.0511)	(0.0420)	(0.0428)	(0.0348)	(0.0288)	(0.0247)	(0.0234)
ROA	-0.0663	-0.0029	-0.0242	-0.0092	-0.0498	-0.0678	-0.0413	-0.0292
	(0.1539)	(0.0832)	(0.0764)	(0.0681)	(0.0710)	(0.0676)	(0.0675)	(0.0643)
Loan charge-offs	-0.0217	-0.0227	-0.0054	-0.0148	-0.1150	-0.1038	-0.0964	-0.1198
	(0.0642)	(0.0543)	(0.0257)	(0.0348)	(0.0918)	(0.0829)	(0.0705)	(0.0777)
Loan loss provision	0.0212	0.0559	0.1322**	0.2017***	0.1697***	0.2082***	0.2313***	0.2497***
	(0.0940)	(0.0596)	(0.0670)	(0.0653)	(0.0648)	(0.0597)	(0.0628)	(0.0508)
Average cost of loan	-0.0875	-0.0180	0.0179	0.0229	0.0237	0.0283	0.0237	0.0295
	(0.0948)	(0.0599)	(0.0437)	(0.0419)	(0.0379)	(0.0382)	(0.0387)	(0.0398)
Constant	-0.1461**	-0.0546	0.0071	0.0153	0.0242	0.0150	0.0017	-0.0015
	(0.0735)	(0.0511)	(0.0482)	(0.0480)	(0.0394)	(0.0337)	(0.0318)	(0.0328)
Observations	3,750	6,272	8,763	11,236	13,718	16,217	18,678	19,881
R-squared	0.0193	0.0274	0.0400	0.0452	0.0470	0.0498	0.0520	0.0505
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Charter Type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Union FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Credit Unions	1,267	1,267	1,267	1,267	1,267	1,267	1,267	1,267

Note: This table shows the results of the regression model (1) on the impact of an increase in the maximum coverage of insured deposits on credit union lending performance. The dependent variable is non-performing loan to total loans. Column (1) to (8) presents the result for the time period of ±1 (2008Q3 to 2009Q1) to ±8 quarters (2006Q4 to 2010Q4), respectively, around the introduction of EESA. 'Post' is a dummy variable that equals one for all quarters from Q4 2008 onwards after the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000 per depositor per bank, and 0 otherwise. 'Affected' is a dummy variable that equals one for affected credit unions if the difference in the ratio of insured deposits to total assets based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 lies in the top quartile, and 0 for unaffected credit unions that show a difference in the bottom quartile. 'Affected*Post' is the respective interaction term. The regression is estimated on a one-to-one propensity score matched sample including 634 credit unions in each group. Other control variables are all lagged by one quarter. Table 1 displays variable definitions. Standard errors clustered at credit-union level are reported in parentheses. ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Table 7. Insured Deposits and Credit Quality: Loan Delinquency by Type and Days Delinquent

Panel A. Loan delinquency by collateral type

	(1)	(2)	(3)	(4)
Affected*Post	0.0000	0.0017***	0.0006	0.0003**
	(0.0001)	(0.0006)	(0.0004)	(0.0001)
Controls	Yes	Yes	Yes	Yes
Observations	8,763	8,763	8,763	8,763
R-squared	0.0649	0.0193	0.0225	0.0219
Quarter FE	Yes	Yes	Yes	Yes
Charter Type FE	Yes	Yes	Yes	Yes
Credit Union FE	Yes	Yes	Yes	Yes
Number of Credit Unions	1,267	1,267	1,267	1,267

Panel B. Unsecured and non-real estate secured loan delinquency by days delinquent

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Affected*Post	-0.0005	0.0003	0.0014***	0.0018***	0.0001	0.0004	-0.0001	-0.0002
	(0.0015)	(0.0015)	(0.0005)	(0.0005)	(0.0004)	(0.0004)	(0.0002)	(0.0002)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,272	8,763	6,272	8,763	6,272	8,763	6,272	8,763
R-squared	0.0049	0.0048	0.0129	0.0139	0.0081	0.0074	0.0066	0.0256
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Charter Type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Union FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Credit Unions	1,267	1,267	1,267	1,267	1,267	1,267	1,267	1,267

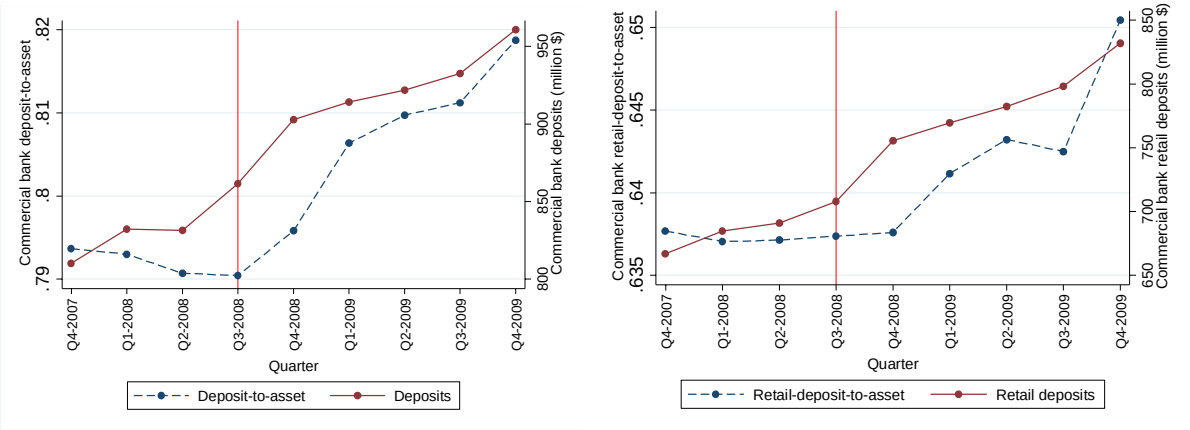
Note: This table shows the results of the regression model (1) on the impact of an increase in the maximum coverage of insured deposits on credit union lending performance by collateral type and number of days delinquent. In Panel A, the dependent variable is loan delinquent for 2 months and more to total loans. Column (1) presents the result for credit card loan delinquent. Column (2) is for unsecured loan and non-real-estate secured loan. Column (3) is for mortgage loan and Column (4) is for other real estate loan. The time period is ±3 quarters around the event (2008Q1 to 2009Q3) to capture the delayed effects of risky lending on loan quality. In Panel B, the dependent variable is unsecured loan and non-real-estate secured loan to total loans. Column (1) and (2) show the result for loan delinquent from 1 to less than 2 months ±2 and ±3 quarters, respectively, around the introduction of EESA. Column (3) and (4) show the result for loan delinquent from 2 to less than 6 months. Column (5) and (6) show the result for loan delinquent from 6 to less than 12 months. Column (7) and (8) show the result for loan delinquent for more than 12 months. 'Post' is a dummy variable that equals one for all quarters from Q4 2008 onwards after the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000 per depositor per bank, and 0 otherwise. 'Affected' is a dummy variable that equals one for affected credit unions if the difference in the ratio of insured deposits to total assets based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 lies in the top quartile, and 0 for unaffected credit unions that show a difference in the bottom quartile. 'Affected*Post' is the respective interaction term. The regression is estimated on a one-to-one propensity score matched sample including 634 credit unions in each group. Other control variables are all lagged by one quarter but not reported for brevity. Table 1 displays variable definitions. Standard errors clustered at credit-union level are reported in parentheses. ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Appendix

Figure A1. Change in deposits of commercial banks

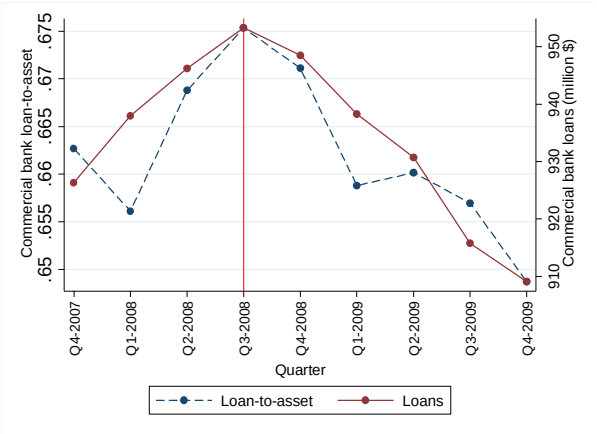
Figure A1a. Domestic deposits

Figure A1b. Retail deposits



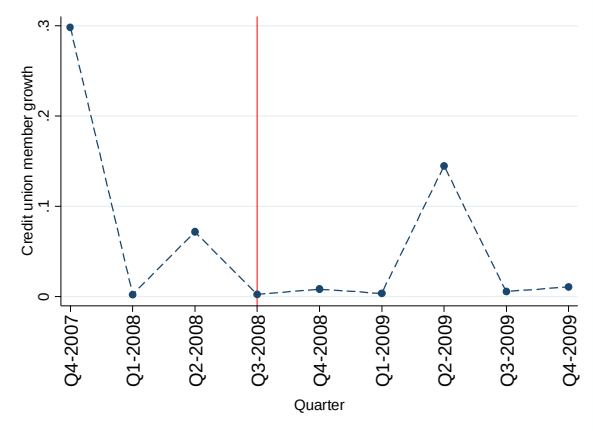
Note: This figure shows the quarterly change in deposits for all commercial banks around the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000. Figure A1a and Figure A1b shows the change in domestic and retail deposits, respectively. The solid line represents the change in deposit-to-asset ratio and dotted line the absolute dollar amount of deposits per quarter. Data come from Call Reports.

Figure A2. Change in loans of commercial banks



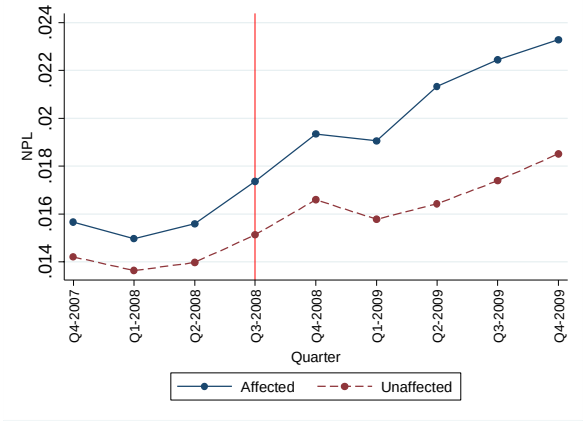
Note: This figure shows the quarterly change in loans for all commercial banks around the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000. The solid line represents the change in loan-to-asset ratio and dotted line the absolute dollar amount of loans per quarter. Data come from Call Reports.

Figure A3. Change in membership of credit unions



Note: This figure presents the growth in the number of credit union members around the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000. Data come from Call Reports compiled by NCUA and made available via S&P Global.

Figure A4. Change in credit union NPL: Affected vs. unaffected



Note: This figure shows the change in non-performing loan of affected and unaffected credit unions around the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000 per depositor per bank. The affected group consists credit unions which have the difference in insured-deposits-to-total-assets ratio based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 falling in the top quartile. The unaffected group comprises credit unions in the bottom quartile. Each group includes 634 credit unions from a propensity score matched sample.

Table A1. Summary Statistics of Loan Category of Credit Unions

Loan category	Proportion (%)	Amount ($ billion)
Credit card	5.53	31,905.13
Unsecured	4.37	25,219.71
New vehicle	14.41	83,174.86
Used vehicle	16.47	95,071.95
Mortgage	35.89	207,177.02
Real estate	16.73	96,596.36
Other loan	4.71	27,203.12
Total	98.10	577,327.49

Note: This table reports the descriptive statistics of different loan categories to total loan of all credit unions at the end of Q3 2008 just before the introduction of the EESA on October 3rd, 2008. 'Credit card' is the ratio of credit card over total loans. 'Unsecured' is the ratio of unsecured loan (other than credit card) over total loans. 'New vehicle' is the ratio of new vehicle loan over total loans. 'Used vehicle' is the ratio of used vehicle loan over total loans. 'Mortgage' is the ratio of mortgage loan over total loans. 'Real estate' is the ratio of real estate loan over total loans. 'Other loan' is the ratio of other loan (such as business loans to members) over total loans. The statistics reported using Call Reports data published by the National Credit Union Association and available via S&P Global Market Intelligence (formerly SNL Financial) database.

Table A2. Differences in delinquency rate of loan categories

Panel A. Before the financial crisis 2006Q4 - 2007Q3

	Delinquency rate of loan categories	Obs. (1)	Mean 1 (2)	Mean 2 (3)	Difference (4)
1.	'Credit card' – 'Unsecured and non-RE secured'	17,031	0.0225	0.0132	0.0091***
					(0.0011)
2.	'Unsecured and non-RE secured' – 'Mortgage'	18,822	0.0147	0.0085	0.0062***
					(0.0005)
3.	'Mortgage' – 'Other RE'	17,145	0.0075	0.0055	0.0021***
					(0.0005)

Panel B. Entire sample period 2006Q4 - 2010Q4

	Delinquency rate of loan categories	Obs. (1)	Mean 1 (2)	Mean 2 (3)	Difference (4)
1.	'Credit card' – 'Unsecured and non-RE secured'	69,327	0.0235	0.0155	0.0077***
					(0.0005)
2.	'Unsecured and non-RE secured' – 'Mortgage'	78,298	0.0169	0.0137	0.0032***
					(0.0002)
3.	'Mortgage' – 'Other RE'	71,565	0.0132	0.0102	0.0030***
					(0.0002)

Note: This table shows the results of the mean t-tests comparing the differences in delinquency rate of different loan categories of all credit unions. Data come from the Call Reports published by the National Credit Union Association and made available via S&P Global Market Intelligence (formerly SNL Financial) database. 'Credit card' is the delinquency rate of credit card loans. 'Unsecured and non-RE secured' is unsecured and non-real estate secured loans (including unsecured loans other than credit card, business loans to members and loans secured by vehicles). 'Mortgage' is mortgage loans. 'Other RE' is other real estate loans. Panel A presents the results for a sample before the financial crisis (2006Q4-2007Q3) while Panel B for the entire sample period (2006Q4-2010Q4 which is ±8 quarters around the introduction of EESA on October 3rd, 2008). Standard errors are reported in parentheses. *** indicate significance at 1% level.

Table A3. Delinquency rate by loan category (2016-2020)

Item	Loan category	Delinquency rate (%)
(1)	Credit card	1.24
(2)	Commercial loan	0.91
(3)	Auto	0.65
(4)	Fixed-rate real estate	0.47

Note: This table presents the average annual delinquency rate by loan categories over the period of 2016 to 2020 (the latest data released by NCUA for all credit unions in the US). Data are available from NCUA Quarterly Credit Union Data Summary Q4 2020 available at https://www.ncua.gov/files/publications/analysis/quarterly-data-summary-2020-Q4.pdf

Table A4. Insured Deposits and Credit Quality: Total loan charge-offs and charge-offs by loan type

	(1)	(2)	(3)	(4)	(5)	(6)
Affected*Post	0.0009***	0.0008***	0.0015**	0.0012***	0.0143*	0.0161***
	(0.0003)	(0.0003)	(0.0006)	(0.0004)	(0.0077)	(0.0057)
Size	-0.0059	-0.0039	-0.0123*	-0.0070**	-0.0404	-0.0283
	(0.0053)	(0.0024)	(0.0068)	(0.0030)	(0.0652)	(0.0298)
Cash	-0.0086	-0.0015	0.0525	0.0201	0.0670	0.0049
	(0.0082)	(0.0053)	(0.0456)	(0.0182)	(0.0944)	(0.0421)
Total deposit	-0.0090	0.0272	0.0136	0.0042	-0.0669	0.1478
	(0.0135)	(0.0234)	(0.0169)	(0.0088)	(0.1636)	(0.0966)
Net worth	-0.0781	-0.0563*	-0.0928	-0.0483	0.0846	-0.1407
	(0.0528)	(0.0303)	(0.0626)	(0.0331)	(0.3109)	(0.2457)
ROA	0.1269	0.0026	0.2712	0.1363	0.4532	0.5903
	(0.0918)	(0.0319)	(0.2428)	(0.0896)	(0.6159)	(0.4372)
Non-performing loan	0.0074	0.0150	0.0409**	0.0198	-0.3157	0.3511
	(0.0254)	(0.0156)	(0.0170)	(0.0124)	(0.5290)	(0.2810)
Loan loss provision	0.0053	-0.0296	0.1292	0.1159	-0.3134	-0.3877
	(0.0951)	(0.0704)	(0.1865)	(0.1157)	(0.6059)	(0.4896)
(Average) cost of loan	0.1717	0.0926	-0.0039	0.0213	1.2811*	1.0671**
	(0.1084)	(0.0659)	(0.0164)	(0.0198)	(0.7125)	(0.5146)
Constant	0.0683	0.0198	0.1197*	0.0701**	0.4218	0.1485
	(0.0640)	(0.0202)	(0.0711)	(0.0294)	(0.7092)	(0.3339)
Observations	3,764	6,259	3,793	6,315	3,021	5,008
R-squared	0.0182	0.0087	0.0596	0.0142	0.0046	0.0060
Quarter FE	No	No	No	No	No	No
Charter Type FE	Yes	Yes	Yes	Yes	Yes	Yes
Credit Union FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of Credit Unions	1,267	1,267	1,267	1,267	1,179	1,215

Note: This table shows the results of the regression model (1) on the impact of an increase in the maximum coverage of insured deposits on credit union lending performance. The dependent variable is loan charge offs to total loans. Column (1) and (2) present the result for total loan charge offs during the period of ±1 (2008Q3 to 2009Q1) to ±2 quarters (2008Q2 to 2009Q2), respectively, around the introduction of EESA. Column (3) and (4) present the result for other loan charge offs. Other loans include unsecured loans (other than credit card loans) and non-real estate secured loans and lines of credit such as member business loans and loans secured by vehicles and boats. Column (5) and (6) present the result for mortgage loan charge offs. 'Post' is a dummy variable that equals one for all quarters from Q4 2008 onwards after the introduction of EESA on October 3rd, 2008 which increased the deposit insurance from $100,000 to $250,000 per depositor per bank, and 0 otherwise. 'Affected' is a dummy variable that equals one for affected credit unions if the difference in the ratio of insured deposits to total assets based on $100,000 threshold and $250,000 threshold at the end of Q3 2008 lies in the top quartile, and 0 for unaffected credit unions that show a difference in the bottom quartile. 'Affected*Post' is the respective interaction term. The regression is estimated on a one-to-one propensity score matched sample including 634 credit unions in each group. Other control variables are all lagged by one quarter. Table 1 displays variable definitions. Standard errors clustered at credit-union level are reported in parentheses. ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Table A5. Total and Insured Deposits: Credit Unions vs. Commercial Banks

Panel A. Credit Unions

VARIABLES	Mean (1)	Standard Deviation (2)	25th Percentile (3)	50th Percentile (4)	75th Percentile (5)	Observations (6)
Deposit/Asset	0.8535	0.0577	0.8288	0.8664	0.8920	45,255
Insured/Total Deposit	0.9552	0.0669	0.9312	0.9822	0.9994	45,255
Insured/Asset	0.8150	0.0777	0.7764	0.8293	0.8696	45,255

Panel B. Commercial Banks

VARIABLES	Mean (1)	Standard Deviation (2)	25th Percentile (3)	50th Percentile (4)	75th Percentile (5)	Observations (6)
Deposit/Asset	0.8074	0.1145	0.7760	0.8336	0.8747	140,567
Insured/Total Deposit	0.7955	0.1538	0.7295	0.8286	0.9020	140,532
Insured/Asset	0.6460	0.1563	0.5745	0.6738	0.7518	140,567

Note: This table presents the summary statistics of total deposits and insured deposits of credit unions and commercial banks during the period from Q4 2006 to Q42010. Credit union data come from S&P Global and commercial bank data come from FDIC.

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