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The Policy Impact of New Rules for Loan Participation on Credit Union Returns

Abstract: In recent years credit unions have increasingly purchased loan participation agreements in order to diversify their loan portfolios and manage loan growth. Responding to high charge-offs rates for these loans and concern for systemic risk, the National Credit Union Administration imposed in 2013 new rules on federally insured credit unions, which limited the purchase of loan participations from a single originator to the maximum of five million dollars and 100% of net worth. This study uses a difference-in-difference framework to examine the effect the policy had on returns. We find as a result of the policy change credit unions with a high share of net worth in loan participations earned, on average, a return on their assets 48 basis points less than their counterparts. Further we find evidence that suggests these lower returns were driven by liquidity issues and relatively higher interest expenses.

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1. Introduction

Credit unions in the United States are made up of members who share common bonds, which may be based on their occupation, some other association, or the geographic area in

which they live.[1] As such, the close ties between credit unions and their membership may provide additional insight into the lending decision due to information that may have otherwise been private (Kane and Hendershott, 1996). These ties though also significantly limit lending opportunities of credit unions to a relatively homogenous and narrow market segment. The result of which may lead to a lack of diversification among credit union assets and limited lending opportunities. To overcome these challenges, credit unions may use loan participation agreements to manage their assets and liabilities, while increasing revenues.

Loan participations are an agreement whereby the originator of a loan transfers ownership to one or more purchasers, such that the originator maintains a retained interest in the participated loan. By participating in a loan outside of their trade area, a credit union may be able to diversify their loan portfolio across geographic regions, types of borrowers, and into loan categories they may not originate. Participation also allows credit unions to potentially earn higher interest income and reduce excess liquidity when their own member demand for loans is weak. The sale of loan participations allows originators to make larger loans and strengthens the ability to specialize in lending to distribute activity by increasing the liquidity of loans.

From a regulatory perspective the concern with third party loan agreements, such as loan participations is whether financial institutions will employ the same level of due diligence and monitoring as they would to loans they originated and held in their own portfolio. The issue with loans sold without recourse, as shown by Pennachchi (1988) and Gorton and

[1] Credit unions are also unique in they are owned by their members, who are depositors at the credit union. For this reason, various deposit accounts in a credit union are referred to as share accounts and interest paid on these accounts are referred to as dividends.

Pennacchi (1995), is moral hazard will reduce costly monitoring of loans below the most efficient level. Incentives for monitoring may also decline, as the ability to sell off loans allows one to transfer risk if necessary (Gande and Saunders 2012; Kamstra et al., 2014; Parlour and Plantin, 2008), such that financial institutions sell loans of lower quality than they retain in their portfolio. These views are consistent with the empirical findings of Li et al. (2015), where borrowers from lenders that are more prone to sell their loans are shown to perform worse and have lower credit quality, than borrowers from lenders where relationships are built by holding loans in the portfolio. Results they believe are due to resources being used inefficiently to market and distribute tradeable loans, rather than on screening and monitoring. Therefore loans that are originated and held may perform very differently than participation loans. The National Credit Union Administration (NCUA, 2008) warned of this point in a supervisory letter, noting the delinquency rate for loan participations among credit unions was 2.27% in 2008, or approximately twice the delinquency rate of the overall loan portfolio at 1.13%.

If only "lemons" were sold, adverse selection could cause the market for loan sales to break down. Gorton and Pennacchi (1995) show sellers are able to overcome the agency issue if they retain a portion of the loan, with the proportion increasing with the level of risk. The loan participation agreements held by credit unions are unique in they require the originator to maintain a fixed ownership stake in the underlying loan.[2] As Guo and Wu (2014) though demonstrate in their theoretical model, a flat-rate retention ratio may in fact aggravate the adverse selection problem as purchasers are unable to determine whether the retention ratio

[2] 12 C.F.R. §701.22 requires federal credit unions retain 10% of the outstanding balance of the loan in loan participations they originate. Other eligible organizations must retain 5%, unless a higher percentage is required by state law.

was the optimal choice of the seller, or the binding regulatory limit. If chosen by the seller, the retention ratio is a noiseless signal of asset quality, which will vary by the asset's riskiness and risk attitudes of market participants for various assets.

Another means of reducing the agency issue is information sharing. Loan participation agreements require the originator to provide the participants with all financial and nonfinancial credit information relevant to the loan. Despite this requirement, credit unions may participate in loans, where they lack origination experience, or are in a market outside their trade area, which may limit their ability to use "soft" information (see Coval and Moskowitz 2001; Berger et al. 2005), independent of the originator. In order to reduce the impact of asymmetric information and improve loan performance, credit union participants typically choose to work with only one or two originators so as to build close relationships.[3] Lenders are quite familiar with the notion that close relationships can lead to higher returns. Of concern to the NCUA is a high degree of concentration with any originator creates systemic risk among participants.

To mitigate the increase in risk exposure from continued growth of loan participation and concentration, the NCUA instituted new rules in 2013 to limit participants' concentration with any single originator. This paper contributes to the literature by quantifying the effect this policy change had on credit union returns in the short run. Using a difference-in-difference estimation framework, we find the return on assets was 48 basis points lower as a result of the policy change, among credit unions with a high ratio of loan participation to net worth. Our second important contribution is we demonstrate the pathway to lower returns in the short run

[3] Credit union leagues from Texas (Yashewski, 2012), Ohio (Kozlowsi, 2012), and Wisconsin (Whiting, 2012) noted in their public comments to the NCUA it was common for their members to work with only one or two originators.

has been a direct consequence of rising interest expenses following the policy change. It appears, credit unions with high loan participation ratios responded to the policy by committing relatively more resources to ensuring stable sources of funds to manage their liquidity needs. Premiums on credit union debt and dividend rates on deposits both rise, in relative terms, for impacted credit unions, as does the level of long term borrowing.

The rest of this paper is organized as follows. In section 2 we provide background information on the change in policy towards loan participations. Section 3 examines the empirical effects of the policy on the return on assets and the robustness of our results. In section 4 we consider the pathway to lower returns, and examine the role of higher interest expense. Section 5 concludes.

2. Federal Regulations on Credit Union Loan Participation

On December 22, 2011 the NCUA proposed (Federal Register, 2011) several new rules for federally insured credit unions (FICU), which would impose concentration limits on the purchase of loan participations. Under the proposed rules, a FICU would be limited to the purchase of loan participations from a single originator of up to 25% of their net worth. They would also be limited in their purchase of loan participations from a single borrower, or a group of associated borrowers of up to 15% of net worth, which is similar to existing policy (12 C.F.R. §723.8) regarding federal credit unions' origination of member business loans. The NCUA's perception is that while loan participation benefits the credit union industry, it exposes the share insurance fund to additional systemic risk from the shared exposure of assets tied to participation.

The ability to buy and sell loans via participation is said to allow credit unions to better manage their liquidity and credit risk, while potentially increasing returns. Cebenoyan and Strahan's (2004) empirical findings support these notions as banks engaged in buying and selling loans have, on average, a return on their assets 10 basis points higher than their counterparts that do neither activity, and tend to have lower risk as indicated by variation in these returns. Examining the transfer of credit risk more generally, Bedendo and Bruno (2012) find medium size banks prior to the financial crisis were subject to more variation in their returns on assets, the more dependent they were on combined loan sales and securitization for risk transfer. During the crisis there was no effect on the variation of returns, though bank loan portfolios performed worse the more involved banks were with the sale and securitization of loans not tied to residential mortgages. Further empirical evidence (Keys et al., 2010; Purnanandam, 2011) suggests loan sales and securitization led to less screening during the financial crisis, which resulted in origination of lower quality mortgage loans that exhibited higher default. Even if bank level risk did not rise from the use of loan sales, systemic risk may still rise as banks eliminate idiosyncratic exposure by diversifying, while creating similarity across balance sheets that exposes the system to shared shocks (De Vries, 2005; Nijskens and Wagner 2011). Nijskens and Wagner find this to be the case for banks using collateralized loan obligations and credit default swaps during the crisis. The increase in risk (beta) among banks using these financial instruments they find is due to higher correlation of returns between banks (systemic risk), rather than the volatility of individual bank returns (bank level risk).

Credit unions, not surprisingly, largely opposed the proposed rule changes, which was reflected in the majority of the 215 comments the NCUA received during the proposal's public

comment period that ran through February 21, 2012.[4] Opponents (e.g. Grinnick and Freeborn) in their comments argued a concentration limit of 25% of net worth for a single originator was too low, and ironically noted this limit could instead increase systemic risk by forcing credit unions to work with inexperienced and untested partners. Prudent participants, the industry noted, work with a small number of originators to improve information sharing and to develop an understanding of how a particular originator's loan products will be impacted over time by changes in the business cycle and interest rates, which improves due diligence and monitoring. By adding originators, the result of the concentration limit may be such that systemic risk instead increases if information asymmetry also increases. Credit unions though were primarily concerned a concentration limit would reduce their net income. Judith Sparrow (2012), Chairwoman of Chartway Financial FCU, indicated to the NCUA a 25% concentration limit would reduce her credit union's interest income by fourteen million dollars over five years, presumably from interest lost on not being able to extend profitable participations with existing originators.[5] Other credit union CEOs, such as Dubie (2012), believed non-interest expense would likely rise as credit unions added staff and information technology to increase self-origination and monitoring. In each case, lower returns are posited to be a direct result of the concentration limit being a binding constraint on credit union activities.

It is possible the policy had a more general effect on credit unions with exposure to participation loans. By limiting the ability to buy and sell participations, the change in policy

[4] Individual comments received by the NCUA regarding proposed regulations are available for review at http://www.ncua.gov/Legal/Regs/Pages/PropRegs.aspx

[5] In the proposed rules, existing participations above the concentration limits would be grandfathered in at the time the final rule became effective.

may have reduced the liquidity of loan participations as an asset. Pyles and Mullineax (2008) find this to be empirically the case for syndicated loans, where constrained loans are less liquid and shown to have higher spreads. Reducing the liquidity of credit union assets would increase exposure to liquidity risk, making it more difficult to meet borrower demands and potential outflows from creditors and depositors, the more participation loans they held. Compounding the liquidity issue is the fact that lenders use loan sales to manage the effects of liquidity shocks (Irani et al., 2014). Bank lenders can improve their ability to bear systematic liquidity risk by adding transactions deposits (Gatev et al., 2009). Attracting additional deposits, or in the case of credit unions, share accounts, comes with higher interest expenses. Credit union's may also stabilize their sources of funding by replacing more volatile wholesale funds and short term debt with long term debt, which needs to be rolled over less often and is subject to less risk with refinancing. Faced with higher liquidity risk, any additional borrowing by affected credit unions in the wholesale or debt market is likely to come with a higher premium and additional interest expense. As such, interest expenses may rise and returns may fall, if liquidity is negatively impacted by the policy change.

The final rules regarding participation limits were announced in the Federal Register on June 25, 2013 and were to become effective a month later on July 25, 2013. What is noteworthy about the difference between the proposed and actual rules is the NCUA increased the single originator concentration limit to the greater of five million dollars or 100% of net worth. The first condition was added to lessen the burden of the policy change on small credit unions, whereas the latter the NCUA (Federal Register, 2013) noted was to reduce the number of credit unions potentially impacted by the policy. As of fourth quarter 2012 call reports, the

NCUA indicated only 79 credit unions held loan participations greater than their net worth, under the assumption of a single originator.[6] Assuming participations were purchased equally from two originators, the number impacted fell to 17 credit unions, which fell further to five credit unions when the five million dollar limit was added (Federal Register, 2013). Despite the NCUA's expectation that few credit unions would be impacted by the change in policy, implementation was delayed to September 23, 2013, as a result of what the NCUA (2013) noted were difficulties by some FICUs to come into compliance. While the nature of the difficulties and number of credit unions impacted by the change in policy is unclear, it is evident from the NCUA's press release there was an effect. Below we examine whether the policy change had an effect on credit unions' returns on assets as feared by the industry.

3. The Effects of Regulation on the Return on Assets

In our empirical analysis, we examine the effect the change in policy towards the purchase of loan participations had on the return on assets of Federal Credit Unions (FCU) and Federally Insured State Credit Unions (FISCU). We focus our analysis on the sample of credit unions that held positions in purchased loan participations on their balance sheet in 2012, i.e. the year prior to the change in policy. The dependent variable used in the analysis, the annual return on assets, is equal to net income earned during the year divided by the value of total assets at year end. The financial data drawn throughout the analysis comes from end of year call report data reported to the NCUA and is adjusted to account for changes in the price level and mergers

[6] Call report data do not provide a breakdown of the amount of loan participations by originator. Several credit union leagues from Wisconsin (Whiting), Texas (Yashewski), and Ohio (Kozlowsi) noted in their public comments to the NCUA it was common for their members in their states to work with only one or two originators.

over time. Mergers can significantly impact financial statement items, thus similar to previous studies (DeYoung and Roland, 2001; Esho et al., 2005) we combine financial data from credit unions that subsequently merge within our period of analysis. That is to say, two credit unions that merge in 2014 would have a single combined return on assets for 2013 and prior years, which would equal their combined net incomes for the year divided by their combined total assets. We test this aggregation for robustness using a sample of observations that do not include mergers as well.

Our sample of observations is also adjusted to exclude very small credit unions. Similar to Ely (2014), we eliminate from our sample credit unions with either 100 or fewer members or those with assets of 2,000,000 or less in year 2000 dollars. These small credit unions, which are often run by volunteers, are potentially outliers. For our sample of credit unions with participation loans, this assumption has little effect, impacting only eight observations.

3.1 Identification and Estimation Strategy

To estimate the impact of the policy change, we need to be able to identify what would have happened to credit unions' returns if the intervention had never occurred, i.e. the true counterfactual. Lacking data from a randomly controlled trial in which the policy were randomly applied, we instead rely on a difference-in-difference (DID) approach for purposes of estimation. This approach compares the effects on returns, before and after the policy changes, for both a treatment and control groups, where the treatment group is assumed to be impacted by the policy intervention and the control group is not. In this case, the difference in returns over time for the control group represents what would have happened to the treatment group's returns over the intervention period if the policy were not implemented. By

comparing the difference in the difference in returns one is able to identify the effect of the policy change.

The control group we use throughout consists of FICU whose loan participations were positive, yet less than 25% of their net worth in 2012. These 825 credit unions were each below the proposed single originator concentration limit put forward by the NCUA and were thus less likely to be impacted during the discussion period of the policy and after it went into effect. We believe it is important to exclude credit unions from the control group that do not hold loan participations, as they may differ fundamentally from our treatment group on the basis of unobservable factors, which influence the decision to hold participation loans. In our baseline model, the treatment group consists of credit unions with loan participations greater than 100% of their net worth at year end 2012. The 66 credit unions that meet this criteria were not necessarily constrained by implementation of the policy, as it is unknown whether they worked with more than one originator. In which case, the estimate of the policy effect may be mitigated by the presence of these credit unions in the treatment group. We though believe that the policy could impact credit unions with high participation ratios more generally, by impacting their liquidity. To explore this notion and the robustness of our baseline model's results, we consider an alternative treatment group consisting of the 131 credit unions with loan participations more than 75 percent of their net worth at year end 2012.

The linear regression framework for the approach is specified in equation 1 by a two-way fixed effects model

$$y_{it} = \sum_{j=2}^{T} \alpha_j T_{j,it} + \beta x_{it} + \delta_t + \theta_i + \varepsilon_{it}, \quad (1)$$

where x_{it} represents a matrix of covariates that vary by credit union i = 1:N and time t = 1:T, with time and credit union fixed effects given by δ_t and θ_i, respectively. The time period covered by the model includes years 2010-2014, which allows us to evaluate whether there were any differences in pre-treatment trends between the control and treatment groups prior to and during the discussion periods of the policy change. The T-1 indicator variables $T_{j,it}$ are equal to one if credit union *i* is in the treatment group and the year *t = j,* and is zero otherwise. Our estimates of the treatment effect, α_j, capture the average difference in the return on assets between the treatment and control groups for year *j* minus the difference between the two groups for the baseline year 2010. Therefore the coefficient for the treatment effect coinciding with 2011 provides us a means to formally test whether the pre-treatment trends of the control and treatment groups were the same prior to the policy being discussed, by testing whether the coefficient was significantly different than zero. Similarity in trends is crucial for identification of the policy effect, as this is what allows us to determine what would have happened to returns for the treatment group if the policy had not been implemented. It is possible trends may have been different during the discussion period if credit unions responded preemptively to the proposed change in policy. Our primary interest though is in the coefficient for the treatment effect in 2014 as it captures the impact of the policy change in the first full year it was in effect. The coefficient for 2013 reflects income earned over 9 months prior to and 3 months following the change, therefore we are less likely to see an effect in this earlier period.

The idiosyncratic error term ε_{it} is assumed to meet strict exogeneity, such that the error has mean zero conditional on past, current and future values of the regressors and fixed effects. It is likely though that the error term is not necessarily independently and identically

distributed, therefore we adjust our standard errors to control for the possible presence of heteroskedacity and correlation of errors over time for a given credit union. Cameron and Miller (2015, 330) note that panel-robust, or cluster-robust standard errors are important even in specifications that include fixed effects, as errors for a given individual (cluster) may be correlated over time "due to unobserved factors that evolve progressively over time." Failure to account for these features can result in standard errors that are significantly lower than their robust counterparts, an issue that was shown by Bertrand, Duflo, and Mullainathan (2004) to be particularly relevant for interpreting the statistical significance of policy effects in difference-in-difference settings.

3.2 Specification of Return on Assets

A credit union's return on their assets is in large part influenced by management of their assets and liabilities, along with the economic environment they operate within. One would expect, ceteris paribus, holding assets associated with higher risk to offer higher returns. For example, a credit union receives, on average, a higher interest rate on unsecured credit (e.g. credit card) than on a loan supported by collateral (e.g. an auto or mortgage loan) in order to be compensated for additional credit risk. Whether the credit union actually earns a higher return on credit card debt than on a car loan, depends on realized outcomes. If default on credit card debt is more likely or costly than expected, then the premium may not have been sufficient to compensate for risk, in which case returns are lower despite higher risk. Therefore concentration in a particular asset class may have a different impact on returns in one period relative to another, and returns may not be associated with risk. This is evident in Ely's (2014) analysis of the return on credit union assets, as he finds the share of loans among credit cards

and other unsecured credit to have no effect on returns for the period 2004-2007, relative to the share of real estate loans. Similarly, the share of auto loans has no effect for the same period. Yet for the period 2008-2011, the effect differs across loan type, with the share of unsecured loans contributing to lower returns than the share of real estate loans, and the share of auto loans contributing to higher returns.

Returns are also influenced by the mix of assets and movements in interest rates. When interest rates rise (decline), the value of long term fixed rate assets decline (rise) by more than short term assets. Credit unions with a larger asset share among long term assets are exposed to additional interest rate risk. Depending on the size and direction of interest rate movements, credit unions may either earn higher returns as Ely (2014) finds for the period (2008-2011) or lower returns (2004-2007) from having a higher share of net long term assets. The liquidity of the mix of assets may also impact returns. Loans typically offer higher returns and are less liquid than other assets, whereas securities and cash may offer little to no return, but are highly liquid. The consequence of holding relatively more liquid assets is generally lower returns, but during economic downturns, more liquid and lower risk assets may outperform their counterparts. Thus variation in macroeconomic conditions will play a role in the performance of existing assets and in determining lending opportunities. How well credit unions make use of their opportunities as measured by their productivity will influence returns.

Our model specification of the return on assets includes several measures to control for differences in asset mix, credit union productivity, and the economic environment, which vary by credit union and time. Most of our measures are drawn from financial ratios used in the

NCUA's Financial Performance Reports (FPR) to evaluate credit unions.[7] The share of net long term assets to total assets is included to control for exposure to interest rate risk. Variation in liquidity across the mix of assets is controlled here using both the share of assets in cash and securities, along with the share of assets held in loans, with the share of investments omitted to avoid multi-collinearity. A measure of liquidity and liability management is included, which is the loan to deposits ratio. The more loans are supported by relatively low cost core deposits, the stronger earnings are likely to be. We control for variation in credit risk across the mix of loans, similar to Ely (2014), using both the share of loans held in unsecured credit and the share in autos, with the share of real estate loans omitted to avoid multi-collinearity.

Two measures are used to generically capture differences in productivity. The natural logarithm of total assets is included to control for the size of credit unions. Larger credit unions are able to take advantage of economies of scales by offering more banking services at lower costs, and are better able to diversify. For performance comparisons, the NCUA determines a credit union's peers on the basis of their size. Credit union productivity though is also potentially impacted by the local environment. The FPR ratio of current members to total potential members in the credit union is a measure of the scope in which expansion is possible (Glass and McKillop, 2006). As such, Glass and McKillop find higher penetration of members within the credit union's common bonds results in lower costs, which they believe may be due to informational advantages associated with higher membership penetration.

[7] Each of the financial ratios is based on the NCUA's formula used in their Financial Performance Report (FPR) along with merger adjusted data in 2014 dollars.

Differences in local economic conditions are captured here using the unemployment rate where the credit union is headquartered. The unemployment rate is measured using BLS data at the Metropolitan Statistical Area (MSA) or county level, depending on whether the credit union is within a MSA.[8] The inclusion of time fixed effects captures the impact of varying macroeconomic conditions at the national level, whereas fixed effects for each credit union capture the effect of any time invariant measures, such as charter type, region of operation, and type of common bond.

Summary statistics for our dependent and independent variables appear in Table 1, where we report values for the control and treatment groups in 2012, the year prior to the implementation of the policy change. Based on these observed characteristics, our control group is quite similar to both treatment groups prior to the intervention. The return on assets though differs significantly between each of the three groups, with mean returns highest among the control group. The difference-in-difference estimation method we use allows this difference in returns to be potentially due to unobserved time invariant heterogeneity at the credit union level. For example, unobserved differences in a credit union's management ability, or preferences toward risk aversion may affect whether credit unions hold a high share of loan participations, in addition to their return on assets. If these unobserved differences are stable over the time period we examine, then they are captured by the fixed effects at the credit union level.

[Insert Table 1 about Here]

[8] We examined whether the level of local banking competition had an impact on performance and found inclusion of a Herfindahl–Hirschman Index of deposit concentration (Ely, 2014) was not significant.

3.3 Results and Discussion

Interpretation of our DID estimates as a policy effect depends on the assertion trends in returns are the same for the treatment and control groups before and after the policy change. We test this assertion, in part, by evaluating whether the difference in returns between the treatment and control groups in 2011 was different than the difference in returns for 2010, keeping in mind that both years returns were prior to the rule being proposed. The estimate for this effect is given by α_2 (2011) found in column 1 of Table 2. The coefficient of which is not statistically significant at the 10% level, thus our pre-treatment trends are the same for both groups. The estimates of the other years' treatment effects also indicate that there is no difference in returns, relative to the baseline year 2010, between the two groups during the policy discussion and partial implementation stages of 2012 and 2013. Turning attention to the key policy effect α_5 (2014), the results indicate in the first full year the policy was in effect that returns on assets were lower by 48 basis points (.48 percentage points), a result statistically significant at the five percent level. The mean level of returns in 2014 was 57 basis points, therefore the magnitude of the policy effect is substantial.

[Insert Table 2 about Here]

The estimates indicate time-varying environmental factors at the local level have an impact on credit union returns. Credit unions that operate in a market where they have a strong presence among their potential members are shown by the positive coefficient on membership percentage to earn higher returns. These higher returns may be a result of informational advantages achieved by higher penetration into one's intended membership.

Local differences in macroeconomic conditions also have an effect. Higher unemployment rates in a credit union's home market contribute to lower returns on their assets. The coefficient estimate of -.06 is double the effect found by Ely (2014) in his analysis of credit union returns during the period 2000-2011. The larger magnitude found here may be due to local conditions having more of an effect in our more recent sample period or the effect may be stronger among our sample of credit unions with participation loans. Variation in asset and liability management also impacted returns. A higher share of total assets among long term assets and loans each separately contributed to lower returns. It appears loans, particularly long term loans such as mortgages, underperformed assets held in investments, which more generally indicates credit unions engaged more heavily in traditional activities underperformed during the period examined. The positive and statistically significant coefficient for the loan to deposit ratio, indicates credit unions with less liquidity earned higher returns.

Estimates in column two of Table 2 evaluate the robustness of our results to an alternative treatment group, which consists of credit unions with loan participation to net worth ratios larger than 75%. Coefficients for the treatment years indicate there was no difference in returns between the treatment group and control group for the years prior to the policy change, yet in the first full year following (2014) the change, the return on assets was lower by 24 basis points. The magnitude of the effect, while still large, is half that for the previous treatment group. This is not entirely surprising as the credit unions added to the baseline treatment group were less impacted by the policy change, due to their lower loan participation ratios. The marginal effects of the other time-varying covariates though remain similar in magnitude. As an additional robustness check, we consider the impact of mergers

and our use of merger adjusted data by eliminating observations from the sample if a credit union was part of a merger during the sample period. Columns three and four in Table 2 present the estimates of our two previous models using this subsample. The effect of the policy change is stronger among credit unions without a merger. Returns are lower by 61 basis points when the treatment group consists of credit unions with loan participation rates to net worth greater than 100%, and they are lower by 33 basis points for the alternative treatment group.

One of the things we do to further test the sensitivity of our DID estimates is to use a falsification test with a fake treatment group, i.e. a treatment group we know was not affected by the policy change. If the estimated treatment effect is non-zero for the fake group, then our previous DID estimates are likely biased. For our falsification test, we use credit unions that had not purchased loan participations as our fake treatment group, and the same control group as before. The estimates in Table 3 indicate that the coefficient for α_5 (2014) is not statistically significant for either the sample including mergers (column one) or excluding mergers (column two). Failing to reject the null hypothesis adds confidence in our results.

[Insert Table 3 about here]

4. Pathways

The results in Section III indicate credit unions with a high ratio of loan participation agreements to net worth had their return on assets negatively impacted by the change in policy. In this section, we consider the mechanism whereby returns were lowered in the short run. Under reasonable assumptions, very few credit unions were likely constrained by the

concentration limit, therefore it appears the policy had more of an indirect effect on credit unions with high exposure to participation. Our belief is the added restrictions on participations reduced their liquidity as an asset, which made liquidity management more challenging for credit unions, the more participations were held. In response, affected credit unions turned towards managing their liabilities to ensure stable sources of funds. These efforts though came with additional reliance on long-term borrowing and higher interest expenses.

Interest expense is split into three components in the call report, which includes dividends on shares, interest on deposits for state chartered credit unions, and interest on money borrowed. We first examine the impact the policy change had on the aggregate interest expenses from shares and deposits. Our dependent variable is the ratio of these interest expenses to total assets, with the model specification given by equation 1 and inclusion of the time-varying controls used previously. The coefficients for α in columns 1 and 2 of Table 4 represent the treatment effects of the policy on the cost associated with a credit union's deposits, where the treatment group in columns 1 and 2 consists of credit union's with loan participations greater than 100% and 75% net worth, respectively. Estimates in column 1 in Table 4, indicate interest expenses on shares and deposits were higher in the year following (2014) the change in policy relative to baseline, with the result significant at the 5% level. In the year the policy went into effect, interest expenses were also higher, with the result significant at the 10% level. Prior to 2013, there was no difference in the trend for these interest expenses between the control and treatment group relative to the baseline. Results for the alternative treatment group, where loan participations are more than 75% of net worth, indicate a similar

pattern in column 2. The magnitude of the impact on interest expense is mitigated for the alternative treatment group, which is consistent with the smaller impact we found for the policy's effect on returns for this group.

[Insert Table 4 about here]

It may seem counter intuitive that the treatment effect indicates interest expenses on share accounts increased following the change in policy, despite dividend and interest rates declining throughout the period examined. One must note while interest rates declined on average for both the control and treatment groups between 2010 and 2014, the decline tended to be larger among our control group. Comparing the simple difference-in-difference between average dividend rates in Table 5, we find the rate on regular shares to be 5 basis points higher than that of the control group. Among share drafts, money market shares, and IRA accounts the difference-in-difference is 5 basis points, 3 basis points, and 9 basis points higher, respectively. Only in the case of share certificates were dividend rates lower among the treatment group, with a difference of 3 basis points. These five categories of shares make up more than 95% of total shares and deposits, therefore it is quite evident credit unions in our treatment group were unable to reduce dividend rates, by as much as their counterparts, which contributed to less of a reduction in interest expense, and thus their lower returns. A similar relation is seen with our alternative treatment effect, though the effect is reduced.

[Insert Table 5 about here]

Following the change in policy, both treatment groups in addition became more dependent on long term borrowing (maturities more than three years) to fund their assets.

Long term debt is subject to less need to rollover and is less subject to refinancing risk. The dependent variable in columns 3 and 4 is the share of long term borrowing to total assets and the independent variables are those used in columns 1 and 2. For the treatment group with loan participations greater than net worth, the share of long-term borrowing increased by 15 basis points in the year after the policy change, which was statistically significant at the 10% level. The effect is similar for the alternative treatment group, with the estimate of 16 basis points, significant at the 5% level. In both sets of estimates, the coefficients of the treatment effects indicate that prior to the change in policy there were no discernable differences in long term borrowing between the two groups, relative to the baseline year. Higher levels of borrowing, not surprisingly contribute to higher interest expenses on borrowed money. Yet what we find is that borrowing expenses rose, when conditioning on the share of borrowing. We add to the baseline specification of equation 1 the shares of short term, intermediate term and long term borrowing to total assets and estimate the effect on the ratio of borrowing expense to total assets. The estimates of this model found in column 5 indicate interest expenses on borrowing increased for credit unions with loan participations greater than their net worth in the year of the policy change (2013) and the year following (2014), with each significant at the 1% level. Controlling for the shares of borrowing, this implies the interest rate at which credit unions in the treatment group were able to borrow increased as a result of the policy. This effect though was not found to be robust for the alternative treatment group shown in column 6.

5. Summary and Conclusion

As a result of the NCUA's policy to impose limits on loan participations, credit unions with high levels of loan participations relative to their net worth, were shown to earn lower returns on their assets in the year following the policy change. We examined the potential pathways which led to lower returns and found evidence to indicate credit unions impacted by the policy were unable to reduce the interest rates on their share accounts by as much as their counterparts. In addition they became more dependent on debt, which was also at relatively higher rates.

Our results do not provide empirical evidence to why there are these differences in dividend and interest rates, or a higher dependence on borrowing, but there are several seemingly reasonable explanations. The change in policy may have had an effect on reducing the liquidity of loan participations as an asset. Therefore credit unions with a high concentration in these loans may have responded by not reducing dividends on their share accounts by as much as their counterparts in order to ensure a stable source of funds as the policy went into effect. Adding long term borrowing, further compliments this strategy by providing an additional source of stable funding to counter the potential illiquidity in loan participations.

The other impact of the policy was to increase interest rates on money borrowed by our treatment group where loan participations were greater than net worth. If the policy change was interpreted by credit markets as a signal from regulators of higher risk and a need for greater regulatory oversight among this subset of credit unions, then one might expect our baseline treatment group to face higher interest rates on money borrowed due to the perception of increased risk. If this were the case, we would likely have seen evidence of a

treatment effect in 2012 when the policy was under discussion, which we do not. It appears more likely the higher interest on borrowing following the change in policy was a result of the impact it had on the liquidity of loan participations. Faced with fewer liquid assets, and a need to borrow, credit unions with a high share of loan participations were forced to pay higher premiums on their borrowing in the short run. In the long run the effects may differ. If credit unions are able to replace existing participation agreements, with those of other originators at similar terms and similar due diligence then it may be possible the effects on returns and risk are only temporary. A longer series of returns following the change in policy will be necessary to evaluate the effects on risk, and long run returns.

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Table 1 : Covariate Summary Statistics, 2012

	Control Group (1)	Treatment Group 1 (2)	Treatment Group 2 (3)
Return on Assets (%)	0.633	-0.094	0.156
	(0.874)	(2.912)	(2.150)
Loans / Total Assets (%)	58.327	59.785	58.905
	(15.842)	(13.359)	(13.634)
Member Percent	0.210	0.174	0.196
	(0.219)	(0.174)	(0.192)
Cash and S.T. Investments/ Total Assets (%)	18.114	21.970	21.445
	(9.554)	(11.135)	(11.521)
Size	18.972	17.754	18.144
	(1.518)	(2.019)	(1.771)
Credit Card Loan Share (%)	5.170	5.736	5.432
	(4.632)	(5.544)	(5.078)
Auto Loan Share (%)	32.355	27.632	27.325
	(17.548)	(17.341)	(15.752)
Net Long Term Assets/ Total Assets (%)	31.466	28.459	31.605
	(13.927)	(14.081)	(14.109)
Loans / Deposits (%)	67.088	66.786	65.979
	(18.991)	(15.182)	(15.570)
Unemployment Rate (%)	7.655	7.936	7.944
	(2.087)	(1.891)	(2.109)
Observations	825	66	131

Note: The mean appears above the standard error, which is in parenthesis. The control group, column (1), includes credit unions with a loan participation to net worth ratio greater than zero and less than or equal to 25 percent. The baseline treatment group, column (2), consists of credit unions with a loan participation to net worth ratio greater than 100 percent and the alternative treatment group, column (3), includes those greater than 75 percent.

Table 2: Policy Impact of Participation Rules on the Return on Assets

	Full Sample		Non-Merger Sample	
	(1)	(2)	(3)	(4)
α_2 Treatment Effect (2011)	-0.1228	-0.0838	-0.1505	-0.1100
	(0.1283)	(0.0759)	(0.1535)	(0.0953)
α_3 Treatment Effect (2012)	-0.4307	-0.2255	-0.4587	-0.2736
	(0.3635)	(0.1896)	(0.4327)	(0.2402)
α_4 Treatment Effect (2013)	-0.0497	0.0438	-0.0755	-0.0303
	(0.2100)	(0.1115)	(0.2528)	(0.1412)
α_5 Treatment Effect (2014)	-0.4768**	-0.2395*	-0.6071**	-0.3303**
	(0.2411)	(0.1226)	(0.2910)	(0.1576)
Loans / Total Assets (%)	-0.0565**	-0.0559**	-0.0692**	-0.0689**
	(0.0242)	(0.0230)	(0.0352)	(0.0340)
Member Percent	0.0003***	0.0003***	0.0004***	0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Cash and S.T. Investments/ Total Assets (%)	-0.0030	-0.0029	-0.0056	-0.0049
	(0.0047)	(0.0044)	(0.0053)	(0.0050)
Size	-0.0863	-0.0425	-0.1456	-0.1505
	(0.1764)	(0.1695)	(0.3087)	(0.2911)
Credit Card Loan Share (%)	-0.1567	-0.1401	0.0881	0.1107
	(1.0058)	(0.9435)	(1.1860)	(1.0999)
Auto Loan Share (%)	-1.1273	-0.9681	-1.2240	-1.1059
	(0.6988)	(0.6492)	(0.8716)	(0.8231)
Net Long Term Assets/ Total Assets (%)	-0.0107**	-0.0102**	-0.0148***	-0.0141***
	(0.0043)	(0.0040)	(0.0054)	(0.0050)
Loans / Deposits (%)	0.0497**	0.0487***	0.0602**	0.0599**
	(0.0194)	(0.0185)	(0.0287)	(0.0277)
Unemployment Rate (%)	-0.0633***	-0.0651***	-0.0760***	-0.0759***
	(0.0142)	(0.0132)	(0.0180)	(0.0165)
Constant	3.2353	2.3899	4.6126	4.6252
	(3.3533)	(3.1939)	(5.7448)	(5.3874)
Observations	4437	4765	3163	3406
Adjusted R^2	0.061	0.059	0.061	0.057

Note: The dependent variable in each column is the annual return on assets. In columns (1) and (3) the treatment group consists of credit unions with a loan participation to net worth ratio greater than 100 percent. Columns (2) and (4) use an alternative treatment group, where the loan participation ratio is greater than 75 percent. Each specification includes time and credit union level fixed effects. Standard errors clustered by credit union appear in parentheses. *, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

Table 3 : Falsification Test

	Full Sample	Non-Merger Sample
	(1)	(2)
α_2 Treatment Effect (2011)	0.0057	-0.0020
	(0.0289)	(0.0348)
α_3 Treatment Effect (2012)	-0.0449	-0.0312
	(0.0397)	(0.0488)
α_4 Treatment Effect (2013)	0.0061	0.0008
	(0.0367)	(0.0427)
α_5 Treatment Effect (2014)	0.0198	0.0015
	(0.0458)	(0.0482)
Loans / Total Assets (%)	-0.0007	0.0002
	(0.0379)	(0.0377)
Member Percent	-0.0001**	-0.0001***
	(0.0001)	(0.0001)
Cash and S.T. Investments/ Total Assets (%)	-0.0046***	-0.0045***
	(0.0015)	(0.0016)
Size	1.1437***	1.5223***
	(0.3385)	(0.4589)
Credit Card Loan Share (%)	0.7766	1.3835**
	(0.7085)	(0.6946)
Auto Loan Share (%)	0.2442	0.2742
	(0.1745)	(0.1887)
Net Long Term Assets/ Total Assets (%)	-0.0030**	-0.0031**
	(0.0014)	(0.0015)
Loans / Deposits (%)	0.0121	0.0128
	(0.0312)	(0.0308)
Unemployment Rate (%)	-0.0419***	-0.0415***
	(0.0094)	(0.0107)
Constant	-19.5853***	-25.7964***
	(5.7876)	(7.7300)
Observations	28982	25400
Adjusted R^2	0.036	0.038

Note: The dependent variable in each column is the annual return on assets. In columns (1) and (2) the fake treatment group consists of credit unions that do not hold loan participations. Each specification includes time and credit union level fixed effects. Standard errors clustered by credit union appear in parentheses. *, **, *** Statistically different from zero at the 10%, 5%, and 1% level of significance.

Table 4 : The Pathways to Lower Returns

	Interest Expense Shares & Deposits		Long-Term Borrowing		Interest Expense Borrowing	
	(1)	(2)	(3)	(4)	(5)	(6)
α_2 Treatment Effect (2011)	0.0011	0.0006	-0.0445	-0.0519	0.0034	0.0017
	(0.0007)	(0.0005)	(0.0376)	(0.0396)	(0.0021)	(0.0021)
α_3 Treatment Effect (2012)	0.0014	0.0008	0.0078	-0.0210	0.0037	0.0014
	(0.0011)	(0.0007)	(0.0718)	(0.0536)	(0.0027)	(0.0028)
α_4 Treatment Effect (2013)	0.0021*	0.0013*	-0.0112	-0.0089	0.0108***	0.0017
	(0.0011)	(0.0007)	(0.0743)	(0.0601)	(0.0033)	(0.0048)
α_5 Treatment Effect (2014)	0.0022**	0.0014**	0.1503*	0.1588**	0.0106***	0.0017
	(0.0010)	(0.0007)	(0.0813)	(0.0712)	(0.0037)	(0.0053)
Observations	4437	4765	4437	4765	4437	4765
Adjusted R^2	0.696	0.695	0.050	0.052	0.264	0.283

Note: The dependent variable in columns (1) and (2) is the ratio of interest expenses on share and deposit accounts to total assets. In columns (3) and (4) the dependent variable is the ratio of long-term borrowing (more than 3 year maturity) to total assets and in columns (5) and (6) it is the ratio of interest expense on borrowed money to total assets. Each is measured as a percentage. The treatment group in columns (1), (3), and (5) include credit unions with a loan participation ratio greater than 100 percent, whereas columns (2), (4), and (6) use the alternative group. Each specification includes time and credit union level fixed effects, along with the same covariates used in the earlier specifications. Omitted here to save space. The specifications of interest expense on borrowing, columns (5) and (6), also control for the shares of short-term, intermediate-term, and long-term borrowing to total assets. Standard errors clustered by credit union appear in parentheses. *, **, *** Statistically different from zero at the 10%, 5%, and 1% level of significance.

Table 5 : Difference-in-Difference of Mean Share Dividend Rates

a. IRA Shares

	Baseline Treatment	Control	DID		Alternative Treatment	Control	DID
2014	63.6	61.3		2014	53.7	61.3	
2010	109.5	116.3		2010	104.0	116.3	
Difference	-45.9	-55.0	9.1	Difference	-50.2	-55.0	4.7

b. Share Drafts

	Baseline Treatment	Control	DID		Alternative Treatment	Control	DID
2014	10.3	13.8		2014	8.1	13.8	
2010	14.5	22.6		2010	13.8	22.6	
Difference	-4.2	-8.8	4.6	Difference	-5.7	-8.8	3.2

c. Money Market Shares

	Baseline Treatment	Control	DID		Alternative Treatment	Control	DID
2014	16.1	21.8		2014	19.0	21.8	
2010	37.7	46.5		2010	42.2	46.5	
Difference	-21.6	-24.7	3.2	Difference	-23.2	-24.7	1.6

d. Share Certificates

	Baseline Treatment	Control	DID		Alternative Treatment	Control	DID
2014	51.4	66.9		2014	51.3	66.9	
2010	105.4	118.0		2010	110.9	118.0	
Difference	-53.9	-51.1	-2.9	Difference	-59.6	-51.1	-8.5

e. Regular Shares

	Baseline Treatment	Control	DID		Alternative Treatment	Control	DID
2014	12.7	14.0		2014	12.5	14.0	
2010	24.7	30.9		2010	27.7	30.9	
Difference	-11.9	-16.9	5.0	Difference	-15.2	-16.9	1.7

Reported are the average dividend rates in basis points for each group, prior to and after the change in policy. The baseline treatment group includes credit unions with a loan participation ratio greater than 100 percent, whereas the alternative treatment group includes credit unions with a loan participation ratio greater than 75 percent. The third row in each set of results, indicates the "difference" in mean dividend rates before and after the change in policy for each group. The figure in the third column represents the difference-in-difference (DID) across the treatment and control groups.